Exploring teachers' professional development with Twitter: A sociomaterial analysis

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Abstract

"BEST. PD. EVER!" Some teachers make bold claims for the way that Twitter supports their professional development, yet research into this area is rather limited. This study sought to gain a better understanding of the practices involved and the part that Twitter plays. It uses a sociomaterial sensibility informed by actor-network theory (ANT) to unravel the complex webs of relations which form, break apart and reform when knowledge practices are enacted in the mediated arena of Twitter.

To explore this rich but messy environment, I evoke the spirit of the Parisian flâneur to develop an ethnographic approach I refer to as 'flânography.' Characterised by purposeful wandering, the approach coupled participant observation and interviews, with emerging methods involving a bot and a 'walkie-talkie' app. Adopting the sensibility of the flâneur consistently through data collection, analysis and presentation resulted in traversals which render pathways of experience. This led to me presenting the findings in three 'Gatherings' (Law, 2004a), each taking a tweet or other data snippet as a point of departure. Through the Gatherings I present the activities of both human and nonhuman participants, establish how they came together (or didn't) and gain a better appreciation of the outcomes of those interrelationships.

In reading across the Gatherings, two interlocking dimensions emerged through which teachers' learning practices on Twitter might be conceptualised. 'Compound learning' describes how practices can be understood through three meanings of compound: framed chemically (through formation of bonds and associations), financially (like interest which grows cumulatively) and as a mixture (an assortment of actors engaged in activities). The second dimension describes how compound learning can be enacted across three 'scales:' acts, activities and practices.

By extending previous research, this thesis contributes a richer and deeper understanding of what 'Twitter Professional Development' involves, thereby helping to legitimise it within broader professional development discourse. Adding to the current literature on teachers' professional learning, this thesis reveals how significant ***personal***-isation is in two senses: that teachers can exercise choice in what, when and how they learn; and secondly, the importance of being able to forge socio-professional connections with fellow educators in different ways. The flânographic approach and the new methods which arose within it offer wider contributions for studies exploring activities which range across online and offline spaces, and through time.

Acknowledgements

This thesis represents only the tip of an iceberg which owes its visibility to a host of buoyant people.

My first debt of gratitude is owed to my supervisors, Mark Boylan, Guy Merchant and Emily Perry. Without their initial encouragement, I would not have started the PhD; without their ongoing advice, support and guidance, I could never have brought it to this conclusion.

I am also grateful to Sheffield Hallam University for providing the means through which I could undertake this study full time, and also for making available such an abundance of opportunities to learn. The most potent aspect of that emerged in the support, wisdom, friendship and humour of my fellow doctoral students at Sheffield Hallam … and beyond. In particular, I was blessed to be able to learn with Martina Emke, a fellow doctoral student in Germany conducting similar research to me. Twitter constituted our parallel research area, source of connection and means of communication. Thanks to all for making this a more manageable and thoroughly enjoyable experience.

So many people were kind enough to participate in this study and their words are visible throughout this thesis. I am so grateful for their willingness to be involved and generosity in donating their time. Special thanks are deserved to those who took the trouble to read my research blog, then challenge my thinking through their comments.

Though my parents are no longer with us, their influence on my capacity and desire to learn continues into this, my sixtieth year. What I am, I owe to them and posthumously thank them through these pages. In lieu of a family, my friends provided the sounding board I sometimes needed, kindly asking about my research and patiently listening to me wittering on. Other than a supervisor, who but a best friend would offer to read through a draft of a thesis? Surprisingly, all of them are still my friends.
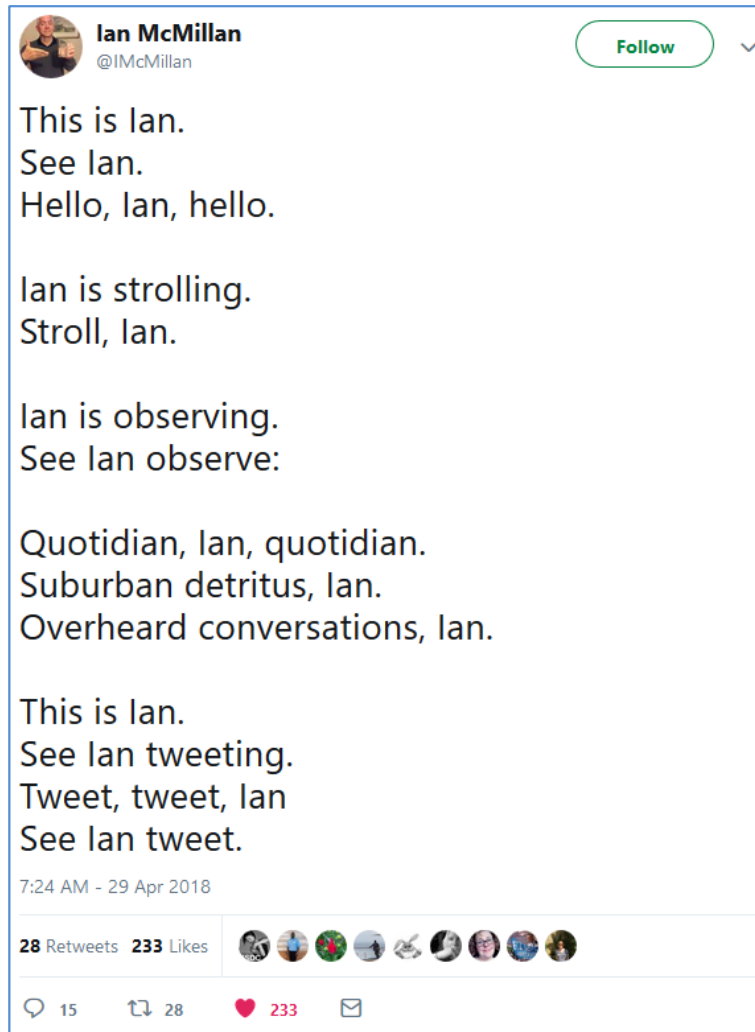
Presented with the kind permission of Ian McMillan, author, poet, journalist, broadcaster and 'Barnsley Bard,' this poem goes part way towards conveying – in a single tweet – a sense of how this study was conducted.

Foreword

> *"My flâneuse is the undetected scholar of the world around her, a connoisseur of experience. She wanders, observes and examines, tuning in to her surroundings with intense attentiveness.*
>
> *Her flânerie involves inaudibly impassioned immersion in, and expansive opening to, her environment. She absorbs and is absorbed. She pursues the poetic in the everyday. Covertly, she seeks understanding, meaning, awakening, transcendence.*
>
> *The édu flâneuse applies this nomadic noticing to the educational spheres she encounters. Places, people and philosophies cocoon her until she emerges quietly transformed."*

<div align="right">

Deborah Netolicky, The édu flâneuse[1].

</div>

Flânerie – the art of wandering, observing and rendering the city and its life – both inspired and informed this study. However, rather than the broad, bustling, boulevards of Paris studied by the first generation of flâneurs, the focus of this thesis is an altogether different 'place.'

> *Thanks to Twitter I am now more up to date with education than ever before. I now get daily professional development from hundreds of education's best 'tweeters' from all over the world[...]As soon as I started posting, I realised that Twitter is the most powerful tool for a teacher to use for PD.*

This quote from a blog post[2] by Craig Kemp, a teacher in Singapore, typifies the kinds of comments which increasingly piqued my curiosity and provided the inspiration for this study. The 'city' whose streets I intended to tread is Twitter. It is an enormous place, with a 'population' of over 330 million, who range far and wide. There is no intention however, to attempt to capture it all, since Craig's comment is more specific. It is educators on Twitter who attract my gaze, and specifically those involved in 'professional development.' Rather than pounding the streets, I shall be scrolling the tweets.

Some travellers prefer to roam guide-free, immersing themselves in the city and experiencing its vitality in the raw. Feel free to do that with this thesis, knowing that the Streetmap or 'Contents' which follow, act as reference points should you become lost.

The opening chapter serves as a 'Rough Guide,' providing an overview of where I, as flâneur, roamed. Here you'll be introduced to some of the 'characters' I met, the

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[1] https://theeduflaneuse.com/on_edu_flanerie/
[2] http://mrkempnz.com/2011/05/twitter-vs-paid-professional-development.html

'architecture' I encountered and the activity I witnessed. The Streetmap which follows may prove useful and if you struggle with the local dialect, the Phrasebook might also help. Unlike the flâneurs of old, I chose not to wander alone and enlisted travelling companions whose insights helped me see afresh; we'll meet them too.

Streetmap

Exploring teachers' professional development with Twitter: a sociomaterial analysis.

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Phrasebook

When visiting a country where one might not be fluent in the local language, a phrasebook can be useful. It is in that spirit that I offer the following reference source for readers who may not be accustomed to Twitter's vocabulary. The terms below are the ones I refer to most often within the thesis.

(Twitter's 'Glossary'[3] provided much of the source material.)

Term	Definition
Bio	A short statement of up to 160 characters forming part of your profile which you can customise to reflect your persona.
Direct Message (DM)	Private message sent between one account and another which does appear in the public timeline.
Follow (v)	To follow is to subscribe to someone's Twitter account so that their tweets appear in your home timeline.
Follow (n)	A follow results when another Twitter account follows yours.
Follower	A follower is a Twitter account which has subscribed to your account so that your tweets appear in their home timeline.
Handle	The combination of '@' symbol plus username e.g. @IaninSheffield
Hashtag	A word or phrase preceded by the hash (#) symbol e.g. #science
Like (v)	Clicking the 'heart' symbol on a tweet constitutes a 'Like' (n) and lets the author of the tweet know you appreciate it. [*This reason given for Liking is somewhat contested amongst Twitter users.[4]*].
List	Any Twitter account can be added to a self-created list of accounts, often grouped by theme.
Mention	Referring to other accounts in a tweet by including their handle.

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[3] https://help.twitter.com/en/glossary
[4] https://follows.com/blog/2016/01/tweet-likes-twitter

Notifications	The timeline of interactions between your account and others. Notifications of when interactions occur can be sent to you by email, app or SMS.
Profile	A combination of the information you choose to display (like the Bio, a profile image, location) plus some of your Twitter statistics (like numbers of tweets, followers and accounts you are following).
Reply	A response to another person's Tweet initiated by clicking or tapping the Reply icon from a Tweet
Retweet (v)	Resharing or resending a tweet from another account so that it is seen by all those who follow your account.
Retweet (n)	A tweet, authored by another account, that you forward on to all your followers.
Timeline	A real-time stream of tweets. Your home timeline will be all the tweets sent by those accounts you follow (*plus any tweets which Twitter is 'promoting' as part of their monetisation strategy*].
Tweet (v)	The act of sending a tweet.
Tweet (n)	A short message of up to 280 characters which may also URLs, hashtags, images or an embedded video.
Twitterverse	Also referred to as the Twittersphere, this constitutes the entire body of Twitter accounts. Equivalent to 'blogosphere[5].'
URL	A Uniform (or universal) Resource Locator is the address of a web page or website e.g. https://twitter.com
Unfollow (v)	Stopping following a Twitter account that you have been following.

In addition to the above, Twitter provides the inspiration for a host of neologisms, some of which became more popular and persisted, whilst others faded. Many of these can be found at the crowdsourced database 'Twictionary[6].'

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[5] https://follows.com/blog/2016/01/tweet-likes-twitter
[6] http://twictionary.pbworks.com

One of these terms has become popular amongst some teachers, as evidenced by the number who include it in their username e.g. 'The French Tweacher.' During this thesis I will sometimes use the term 'tweacher' as a shorthand form of a teacher who uses Twitter.

Within the thesis I, and sometimes others, refer to 'the 140 character limit.' At the time when those comments were made, the character limit for tweets was indeed 140 and not the 280 it has subsequently become. Accordingly it had an effect consistent with 140, rather than 280 characters.

Unlike other Twitter expressions such as retweet or hashtag, '**Like'** is found in common usage. To distinguish the Twitter 'Like' from common usage, I capitalise it throughout the thesis.

Permission was sought from all authors of the individual tweets presented in this thesis.

1 INTRODUCTION

In this opening chapter, I first explore how this area of study drew my attention. For those who may be less familiar with the platform, I provide a potted history of how Twitter came about and its subsequent development. I then briefly review the emerging research which has already explored teachers' activities on Twitter. I then state the aims of this study and discuss the approach taken, in particular by introducing the flâneur and how flânerie informed and inspired that approach. Since this study does not seek to provide a realist account, it is important to acknowledge my positionality, and it is with that in mind, in 'Personal hinterlands,' I provide a sense of my background. I close the opening chapter by providing an overview and introduction to the thesis, together with the contributions it makes to knowledge.

As the opening quote in the Foreword intimated, much like a researcher, the flâneur is seeking understanding; to comprehend what he or she observes and experiences. They both have that desire to find out 'what's going on here.' 'Here,' for the flâneur is traditionally the city through which he strolls. 'Here,' for the flâneur in me was Twitter, or more precisely, one small corner; the arrondissement where teachers are active.

This opening chapter, like a Rough Guide ("tell it like it is" travel guidebook series[7]), will reveal where 'here' is, how I got here, what I did, how, and why. It will set out what will be found within the thesis, how that came about and why it matters.

What brought me to this study

I originally set up residence in Twitter in 2009 following a nudge from a fellow student on a Master's programme on Technology Enhanced Learning. He suggested I might find Twitter 'interesting.' Inexperienced in social media, I joined as an experiment to see what I could learn. With no desire to share what I had for breakfast, nor to follow celebrities, I began by following a few educators who I already knew from elsewhere. My activity was

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[7] https://www.roughguides.com/about-us/

largely confined to my professional interests as some of the tweets from my second month show (Figure 1).

Figure 1: My early tweets

It was around six years later that I became intrigued by the burgeoning number of tweets I read echoing similar sentiments to that expressed by Craig in the Foreword. Teachers continue to make similar observations in relation to Twitter. In fact as my (formal) research into Twitter and teachers' professional learning began, between March 2015 and March 2017, I bookmarked almost three hundred tweets which expressed similar sentiments to those in Figure 2:

Figure 2: Mosaic of tweets

Each of the people in Figure 2 is, like Craig (p.iv), a teacher. When they make claims as bold as these regarding activity they undertake in their own time, in the evenings and at weekends, but which supports their professional lives, it struck me there was something of interest worth exploring. I must confess to expressing similar views to these people however, as I began seeing more and more expressing similarly effusive praise, I began to wonder whether I had become guilty of 'drinking the Kool-Aid[8].' This concern, coupled with my curiosity, provoked me to compose and submit a research proposal. In addition to the proposal being accepted, I was fortunate to be awarded a studentship. Now able to undertake the study full time, I left my job as Head of eLearning in a cross-phase independent school in the north of England.

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[8] https://en.wikipedia.org/wiki/Drinking_the_Kool-Aid

For me, coming to Twitter as a researcher rather than as a participant, was like returning to your home town after time away (even though I'd never left). Time during which your experiences shaped you differently so that on your return, not only had the place, the people, and their interactions changed, but so had you. What had been familiar, now seemed strange.

Metaphorically stepping away from 'the city' temporarily, revealed that there is a substantial body of research on teachers' professional development (Cordingley & Bell, 2012; Darling-Hammond, Wei, Andree, Richardson, & Orphanos, 2009; Timperley, Wilson, Barrar, & Fung, 2007), some of which is reaching consensus, and some which is still contested. There is general agreement on the different forms that professional development takes and the characteristics that contribute to making it effective (Desimone, 2011; Hawley & Valli, 1999; Wayne, Yoon, Zhu, Cronen, & Garet, 2008). These tend to be the areas also addressed by the emerging research into teachers' use of Twitter to support their learning. Mostly targeted towards the activities in which teachers participate and the benefits they consequently accrue (Carpenter & Krutka, 2014b; Wesely, 2013), this is commonly framed from the perspective of personal/professional learning networks (Alderton, Brunsell, & Bariexca, 2011), or by conceptualising activity as taking place within a community of practice (Britt & Paulus, 2016; Davis, 2015). Understandably, this focuses predominantly on human, social or cognitive activity, an anthropocentric view, which either completely ignores materiality (things that matter) or relegates them to the background (Fenwick, Doyle, Michael, & Scoles, 2015: p.121). One aim of this study therefore is to better understand the relationship between social media and professional development by adopting a sociomaterial sensibility which accounts for and attunes equally to all material participants. In so doing, I am aiming to allow fresh insights to emerge which illuminate this phenomenon more deeply.

As I return to 'the city' with a new role, I am both changed and the same. I remain the learner on Twitter that I was before, interact with the same people I did before, become involved in the same activities as before. I am also changed in that I am additionally a researcher. I am a researcher when I, in relations with other actors, perform 'researcher' through what Law (2004a) would call a method assemblage. I return to this briefly on page 18, but discuss it more fully in Chapter 4.

An overview of Twitter

In this section I present an overview for any visitor who might be less familiar with Twitter. Prior to the more detailed explanation found in Chapter 5, this offers a brief history of how this particular 'city' arose and what it purports to be.

> *"Twitter is a service for friends, family, and coworkers to communicate and stay connected through the exchange of quick, frequent messages. People post Tweets, which may contain photos, videos, links, and text. These messages are posted to your profile, sent to your followers, and are searchable on Twitter search.*

<div align="right">Twitter.com, 2018</div>

Facebook leads all other social media platforms with over 2 billion active users, dwarfing Twitter at only 330 million (Kemp, 2018). Nevertheless, it tends to be tweets that dominate the daily news cycle thereby inveigling Twitter into the public consciousness, thanks in no small part to the activity of the current President of the United States (Winsor, 2017).

Twitter is an amalgam of microblogging platform and social network site (SNS), upon which registered users post brief messages known as tweets. Following the general format of SNSs, participants on Twitter can link with, or 'follow,' others and thereby see their tweets. Taking their cue from the way in which blogs work, all the tweets produced by the users someone is following appear in list format in reverse chronological order. All tweets produced, unless the user has elected to make their tweets private, are released into the general stream of tweets which are visible to the public (boyd & Ellison, 2007; boyd, Golder, & Lotan, 2010).

Launched in 2006, the first tweet was sent by Twitter co-founder Jack Dorsey:

Tweet 1

From Jack's rather uninspired opening, Twitter has witnessed considerable growth, seeing an increase in the rate of tweets from around five thousand tweets per day in 2007[9] to its current figure of around half a billion[10]. The user base also saw considerable growth and as of December 2017 stood at around 320 million active users per month. Although the rate of increase in numbers of active users has begun to plateau (see Appendix A), Twitter recently turned in its first ever quarterly profit[11].

Over the years, a number of structural developments and changes in functionality have been introduced as the platform has evolved. At the outset tweets were limited to 140 characters to comply with the limits imposed by short message services (SMS) protocols, though in 2017[12] that limit was raised to 280 characters. As Jack's tweet above illustrates, the capability to include other media was not available in the beginning, but has gradually improved over the years.

People use Twitter in a number of ways: conversation; developing or maintaining relationships; informing others and becoming informed; mobilisation and social protest; seeking help and soliciting opinion; and releasing (or increasing) emotional stress (Greenhow & Gleason, 2012; Zhao & Rosson, 2009). In the biennial Social Media Survey conducted in the United States in 2016, around a quarter of online adults were Twitter users. Of these, there were equal proportions of men and women; users tended to be younger, with Twitter being most popular amongst the 18 - 29 age group (Greenwood et al., 2016).

Although Twitter can be accessed on desktop computers, laptops, tablets and smartphones, through browsers or third-party apps and applications, the majority of users (around 80%) use a mobile device (see Appendix A). Tweeting is clearly an activity which can be undertaken wherever Internet access is enabled.

As a commercial enterprise, and despite the recent rewarding financial news, Twitter remains in a precarious position. Like many other social media, it regularly comes under fire for its failure to adequately address trolling[13], abusive tweets[14], misinformation

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[9] https://blog.twitter.com/official/en_us/a/2010/measuring-tweets.html
[10] http://www.internetlivestats.com/twitter-statistics/
[11] http://www.bbc.co.uk/news/business-42987059
[12] https://blog.twitter.com/official/en_us/topics/product/2017/Giving-you-more-characters-to-express-yourself.html
[13] https://www.theguardian.com/world/2017/nov/15/russian-troll-factories-researchers-damn-twitters-refusal-to-share-data
[14] https://www.irishnews.com/news/2017/12/20/news/twitter-criticised-by-commons-committee-for-failure-to-tackle-abusive-tweets-1214903/

campaigns[15], and misogyny[16], let alone the wrath of its user base when it introduces new features[17]. For the moment, Twitter continues to defy predictions of its decline and demise, though for how much longer remains to be seen[18]. One is obliged to ponder therefore what the implications might be for the teachers who authored the tweets in Figure 2.

Finding out what teachers are doing on Twitter

The Internet has enabled teachers to exercise greater control over their professional learning, especially where they can become interconnected and form professional learning networks (Forte, Humphreys, & Park, 2012). The exchange of knowledge and resources, the dialogue which accompanies those exchanges and the subsequent reflections contribute to professional learning (Burden, 2010) and the facility to do this increased with the arrival of social media – applications specifically designed for and predicated on heightening the degree of interaction between individuals. These platforms include blogs, podcasts, video streaming, file- and image-sharing, but also extend beyond the Internet into the face-to-face world (Doessel & Freedman, 2011; Luehmann & Tinelli, 2008).

Educators have turned in particular to Twitter for the ways it allows them to forge networks with an eclectic mix of fellow educators from a wide range of educational contexts (Beadle, 2014). Participants are in control of their level of interaction and the nature of their learning, free to focus on relevant issues at times to suit them (Holmes, Preston, Shaw, & Buchanan, 2013). Teachers use Twitter to establish links beyond their local communities, enabling them to become conduits for ideas and practice to move in and out of their school. They share resources, make and respond to requests for information and in so doing, refine and develop their own practice and that of others (Forte et al., 2012). Although dialogue does take place within the Twitter platform (Alderton et al., 2011; Honeycutt & Herring, 2009; Rehm, Preussler, Kerres, & Notten, 2014), conversations are extended and developed further through other social media.

Aims

As I outlined on page 3, teachers are making bold claims of the impact Twitter has had on their learning, but these claims go largely untested. My curiosity kept throwing up questions: what, if any, professional learning is actually taking place? Where precisely is that

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[15] http://www.bbc.co.uk/news/technology-38724082
[16] http://www.telegraph.co.uk/news/2017/08/21/twitter-failing-women-taking-long-remove-misogynistic-abuse/
[17] https://www.theguardian.com/technology/2017/sep/28/twitter-users-respond-to-280-character-limit-mostly-in-140-characters
[18] https://www.newyorker.com/tech/elements/the-end-of-twitter

learning occurring, both in the online and offline worlds? How is the professional learning being enabled and undertaken? Who is involved and how are they interrelated and interconnected? It was these provocations that I began to finesse into the research questions I discuss in the next section.

These general questions constituted major areas for exploration, so I focused more tightly on how teachers' professional learning is supported through social media and specifically how Twitter enables that. The aim of this research was to critically assess the professional learning practice that teachers claim is taking place on and through Twitter. This involved exploring the aspects of Twitter that may support or frustrate that activity, the nature of the practice itself, and the wider networks within which this assembles.

These aims led to the following research questions, which informed the design, execution and analysis of the study:

- How are professional learning practices of teachers on Twitter manifest?
- How does the Twitter social media platform support the professional learning practices of teachers?
- How does professional learning practice extend beyond Twitter into the wider social media ecosystem and the 'real' world?

These questions broadly query 'what is going on here,' a question often addressed through ethnography. In the next section I introduce how flânography emerged as a hybrid approach coupling ethnographic and sociomaterial sensibilities with those of the flâneur.

Personal hinterlands

A traveller arriving in a new place is likely to have luggage. A temporary visitor might have a backpack slung over their shoulder, a tourist might bring along a suitcase, whereas a new resident may have a truck full of belongings. As a flâneur on Twitter I am no different, so in this section I offer to 'open my suitcase.'

In studies where the researcher seeks an objective view of a single, knowable 'truth,' it is important to attempt to eliminate bias, as far as is possible. In qualitative studies where the researcher may be the data collection instrument as well as interpreter, they are intimately bound within the process. Here, it is important instead to make plain through an ongoing reflexive process,

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Former Physics teacher, former Head of ELearning … and still learning. Now doctoral researcher @sheffhallamuni exploring teacher professional learning.

⊙ Sheffield, Yorkshire
⊘ cpdin140.wordpress.com
▦ Joined February 2009

Figure 3: My Twitter bio

how the researcher's background and history might influence the study. This process begins by acknowledging – amongst other factors – gender, race, beliefs, socioeconomic status, age, cultural background, political views, and how they might influence the research as it unfolds. Though important, this is not merely a matter of what effects these factors might have on research participants, but with the researcher as primary instrument of data collection, what effects they also have on how findings are presented and interpreted. It's important to also remember, that reaching the position of interacting with participants only comes after the research has been designed and planned; one's beliefs and background may also have an influence here too.

I am a white, middle-class, male from the north of England in the UK and am nearing retirement age. The first half of my career (twenty years) was spent teaching Physics in the English state secondary school system, and the second half in various roles supporting schools and teachers in implementing digital technologies[19]. During this second phase, as my interest in and enthusiasm for digital technologies grew, I became increasingly interested in furthering my understanding, so completed Masters level certifications (Technology Enhanced Learning, Innovation and Change) and gained vendor qualifications

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[19] https://uk.linkedin.com/in/ianinsheffield

(e.g. Microsoft Office Specialist Master). Towards the end of this period I also achieved status as a Certified Member of the Association for Learning Technologies[20].

Within the research environment, this positions me as an experienced (but former) teacher, with a specialism in Physics, who is now a researcher. Anyone checking my Twitter bio before will find themselves reacting differently depending on their positionality. They might see me as more or less experienced, as from the same phase of education or not, as having teacher status or it being lapsed, as having similar subject interests or not, or as having a similar or different cultural background. My positionality is therefore both relational and contingent on the circumstances. It is dynamic and the effects it produces shift from one encounter to the next.

With an ostensibly positive bias towards digital technologies, it would be natural to assume that I would be predisposed towards portraying the contribution of Twitter in a positive light. I have attempted however, to build research questions which are sufficiently neutral so as not to be seeking either a positive or negative outcome. Given some of the early blog posts I wrote prior to becoming a researcher[21], it became necessary to guard against the possibility of presenting an uncritical rendering of the data and what they suggest. Throughout the thesis, and previously through the reflexive posts on my research blog[22], I endeavoured to be as open as possible in providing a commentary on the decisions I made and the directions they took the research. It is also through the blog that I discussed any other aspects of my positionality which became significant in those particular contexts.

A 'Rough Guide' to this thesis

In the preceding sections I hoped to provide a sense of the 'cityscape' which informs this study. Sufficiently oriented, it is now possible to explore further afield and in more depth, so in this section I outline the other chapters of the thesis.

Following this Introduction, 'Hinterlands' reviews the literature which informed the study. There are three substantive sections, opening with the ways professional development and learning of school teachers is conventionally discussed. I then consider the brief history of Twitter literature, focusing particularly on the emerging segment which has drawn attention to teachers' professional development/learning on Twitter. Feeling that the conventional professional development literature might not be wholly appropriate within the context of

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[20] https://www.alt.ac.uk/certified-membership
[21] https://ianinsheffield.wordpress.com/2009/10/20/sometimes-twit-happens/
[22] https://cpdin140.wordpress.com

this study, I explore instead whether workplace learning literature might provide a more appropriate framing.

In 'Sensibilities: a flâneur's companions' I explore flânerie, explaining its place within the study and this thesis. I also discuss sociomaterial, ethnographic and ethical sensibilities, and how I assembled them within a hybrid approach I call flânography. In particular, I outline the reasons for appropriating the concepts of assemblage, multiplicity and fluidity, as proposed by de Laet and Mol (2000), Mol (2002), and Law (2004a).

In 'Assembling Methods' I present the methods involved in conducting the flânography, including those which emerged during the study itself. Included in this chapter is a discussion of the ethical issues considered prior to commencement, although the adaptive approach within a flânography meant remaining attuned to further issues as they arose. Throughout the thesis I placed <*#ethics*> markers to indicate arising ethical issues which I later draw together in Chapter 8. Within 'Assembling Methods,' I also outline the processes through which I managed and analysed data. I discuss the reasons why conventional coding, categorising and theme development were less appropriate in this study, then offer an alternative which draws on Jackson and Mazzei's (2012; 2013) notions of 'Thinking with Theory' and 'Plugging In.' I close this chapter by introducing the 'Gatherings' chapters which follow it.

In keeping with a sociomaterial sensibility, I have presented the findings from this study as a set of three 'Gatherings,' as offered by Decuypere and Simons (2016):

> *Sociomaterial description always implies an act of gathering, that is, of assembling a variety of actors that are present in a particular setting into what we have called an adequate account.*

I discuss my rationale for presenting findings in this way, on p.101 at the close of Chapter 4. In the first Gathering ('Meeting the Locals') I introduce some of the nonhuman actors, including Likes, retweets and hashtags, and how they help to make connections and establish relationships. They filter information, aggregate it, bring people together under a rallying point, but (because of Twitter) do so through a simple click or search. This Gathering illustrates how learning through Twitter can be as simple as a single click to make a connection, but when aggregated together, those simple actions enact a complex endeavour like EduTweetOz.

Through the second Gathering ('Assembling actors') I describe how educators and resources emerge through Twitter in different ways, for different purposes, resulting in different outcomes. I show how a single tweet posing a simple query, developed into a

'pop-up' mentoring episode from which a richly complex sharing, remixing and resharing episode unfolded. Exemplifying the kind of activity teacher 'communities' produce, my attention then turned to delve into two of those communities – 'Team English' and the 'MFLTwitterati' – the practices they produce and how they stay together and grow.

The 'Like' began for me as simply a method for bookmarking tweets, but it also emerged in the third Gathering ('It's Personal') as a significant actor. It acknowledges and affirms the actions of others, and in so doing, maintains relationships. For many participants, part of their experience is in establishing friendly relations with like-minded others around topics of shared interest; 'ambient affiliation' as Zappavigna (2011) terms it. Reassurance, familiarity and comfort can be cultivated through the online connections and activity, and sometimes migrate into face-to-face meetups. Exploring more widely within the data however, ambivalences bubbled to the surface: that there are drawbacks as well as benefits; that the positivity that many enjoy is sometimes countered with negativity; and that the like minds that many seek out can easily lead to an echo chamber.

By reading across and through the Gatherings, in the 'Retracing my steps' chapter, I offer two dimensions through which teachers' learning practices on and through Twitter can be conceptualised. Firstly 'compound learning' describes how practices can be understood through three meanings of compound: framed chemically (through formation of bonds and associations), financially (like interest which grows cumulatively) and as a mixture (an assortment of actors engaged in activities). The second dimension, 'scales,' explores how compound learning can be enacted across three scales: acts, activities and practices. These practices are founded on the principle of unsolicited reciprocity and are more than the simple, uncomplicated activities they might at first appear. They transform and adapt as different actors become involved, resisting easy definition. This fluid capacity to respond to local needs creates much of the value for those involved, but to exploit that potential is no simple matter. Although some might call for these practices to inform mainstream professional development frameworks, the informal, self-driven, 'pop-up' nature of teacher practices on Twitter might not lend themselves to formalisation and enclosure.

In the final chapter, 'Concluding,' I reflect on what emerged from this study, its limitations and the implications for future practice and research. I also present the contributions laid out in this thesis which include: the rich account of teacher learning practices on Twitter and how they might be conceptualised; the significant role of nonhuman participants in enabling those practices to be personalised; offering 'flânography' as a different approach; and introducing two new methods which offer potential for future researchers.

Approach

Teacher professional learning is increasingly identified as a complex process in which teacher development, pupil progress, institutional priorities and political agendas are entangled together (Keay, Carse, & Jess, 2018; Opfer & Pedder, 2011). If that shifts across online social media, a further layer of complexity is introduced. Given that social media – and Twitter in particular – have been with us for barely a decade, and the field of research is consequently still immature, I propose an alternative approach. Rather than setting this out within a 'methodology,' I offer instead a set of sensibilities assembled to guide and frame the study. In this section, I introduce how sociomaterial, ethnographic and ethical sensibilities became involved, which I then address in more detail in Chapter 3.

Any learning that takes place with or through Twitter is likely to involve social interaction, but is also doing so within a mediated environment. Some form of device is required (laptop, smartphone), an Internet connection, a software application to interact with Twitter. Twitter itself has a range of features and functions including tweets, hashtags, likes, profiles, lists and messages, and is regulated by terms of service and the 'Twitter Rules[23].' Some might propose that these aspects of materiality influence the ways that people interact with them, technological determinism if you will. Others see them as tools, there at the service of the user. However, both views separate the humans from the nonhumans with which they act. To challenge and rethink this division, throughout this study I brought a sociomaterial sensibility (Fenwick, 2016) which seeks to disrupt this dichotomy, and especially the anthropocentric view often adopted.

Seeking fresh insights, one strand of my approach was informed by actor-network theory (Law & Hassard, 1999). This proposes that both humans and nonhumans can act and are capable of exerting force as they form and reform associations amongst and within one another. All 'things – human and non-human, hybrids and parts, knowledge and systems – can be considered effects of connections and activity' (Fenwick et al., 2015: p.123). Or as Law (2009, p.141) puts it 'Actor-network theory is a disparate family of material-semiotic tools, sensibilities and methods of analysis that treat everything in the social and natural worlds as a continuously generated effect of the webs of relations within which they are located.' As such, this process of 'assemblage' provides me with an alternative approach with which to explore, describe, analyse and present the processes and practices involved when teachers are learning on and through Twitter.

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[23] https://help.twitter.com/en/rules-and-policies/twitter-rules

Another contributor to the hybrid approach I'm advocating is the flâneur. Someone curious about Parisian cafe culture might survey a number of Parisians by questionnaire or interview; the flâneur on the other hand, would prefer to be close enough to smell the coffee and Gitanes. As someone who has been metaphorically pounding the pavements of Twitter as a participant, this proximity was already afforded to me. At this point I should highlight the gendered historical origins of the term flâneur, and the subsequent failure to offer a gender-neutral alternative. Flâneur is perhaps the appropriate form for describing *my* role, but I continue to use the masculine form only in the interests of consistency.

Flânerie, Jenks and Neves (2000, p.1) claim, 'involves the observation of people and social types and contexts; a way of reading the city, its population, its spatial configurations whilst also a way of reading and producing texts.' They draw parallels with urban ethnography in which researchers participate in everyday life to better understand the city, and the lives and practices of its dwellers. Ethnography also studies people in natural settings to capture their social meanings and activities through active participation (Brewer, 2000) so shares some features with flânerie. One might wonder however, whether either of these two approaches is meaningful in online contexts like Twitter. I discuss the background of the flâneur, and how it links with ethnography more fully in 'Flânography: ethnographer meets the flâneur' (pp.52-55).

As the Internet became more ubiquitous, some researchers did indeed take ethnography online to study emerging cultural phenomena (Markham, 1998). Others straddled the online and offline worlds (D. Miller & Slater, 2000), and explored the Internet more as a cultural artefact (Hine, 2000). These early online ethnographers had to grapple with what ethnographic techniques involved when they moved online. Fieldwork and field notes, observation and sustained immersion, are foundational within classical ethnography, but when all or part of that moves online, in what ways does it need to adapt? In 'Ethnography online' (pp.48-51), I address this question in more detail by considering, amongst other things, how 'the field' might be conceptualised in the context of Twitter, what constitutes observation, and how sustained immersion assumes a different form.

Whilst ethnography has enjoyed measured success in providing fresh insights into online activity, what of flânerie? That too made the transition, picking up the topical (for the time) appellation of 'cyber;' the 'cyberflâneur' is someone who "'strolls' through information space, taking in the virtual architecture and remaining anonymous" (Goldate, 1998). Although the mention of virtual architecture provides a nod towards the materiality

associated with online spaces, Goldate's cyberflâneur perhaps understandably glosses social interactions, given its pre-social media time frame.

Flânerie and ethnography have much in common; however, there are also differences. In chapter 3 I assemble aspects from each into a unified approach which rises to the sociomaterial challenge of 'following the actors.' In a world already replete with neologisms like cyberethnography and netnography, I'd nevertheless like to offer up one more – *flânography*: a hybrid form of ethnography, amalgamating ethnographic and sociomaterial sensibilities with those of an ethical flâneur. Flânography is not just a research process, but also underpins analysis of data and the production of an account. It is responsive, adaptive, fluid, and coherent with the approach many educators adopt as their practice on Twitter.

In proposing flânography, I find myself treading new ground and tentatively feeling my way. As a consequence, in writing this thesis, I confess to taking a few liberties. In this section I have introduced some of the following themes which will now form threads running through the thesis: the spirit of the flâneur and attentive strolling; assemblage as an ongoing process; adapting, responding and capitalising on unfolding events; creating visualisations to guide, provoke and present thinking; and maintaining an ethical sensibility. In subsequent chapters and sections I will unpack each in more detail.

Conventions

Here I outline some of the conventions I've adopted for presenting information in this thesis.

Twitter professional development (TPD)

Navigating the different ways that participants and previous researchers refer to the practices in which teachers are involved on Twitter is a delicate business. Various terms including professional development, professional learning, PD, CPD, CPLD are used, sometimes interchangeably. For simplicity and consistency, I will use the term Twitter professional development (TPD) when I am referring to the activities in which teachers on Twitter become involved to support their professional practice.

Software applications

Perhaps it is somewhat inevitable in a study of online activity that website urls as footnotes might become intrusive. Throughout this study a wide variety of applications were used at different stages. In an attempt to reduce the footnote burden, I highlighted applications using the superscript^{App} and listed them in Appendix B.

Presenting data

As I discuss in 'Ethics' (pp.81-86), I have taken the rather unconventional step of crediting research participants as authors – when permission was granted – rather than anonymising their details. To distinguish between quotations from academic literature, where authors are traditionally cited by last name, I cite research participants by first name. Furthermore:

> *Quotations from blog posts will adopt this style, whilst…*

> *Quotations from interviews will be presented in this way.*

Permission was sought and obtained from authors of tweets and blog posts shown in this thesis.

#ethics

In a responsive study where a flâneur's sensibility involves being open to exploring new avenues, it is inevitable that unanticipated ethical issues would arise. As I mentioned in the 'Rough Guide' section, I have placed <*#ethics*> markers at those points within the thesis where emerging ethical issues required further consideration. Sometimes these arose as I considered different methods, and sometimes during data gathering. Although I discuss ethics more fully between pages 81 and 86, and sometimes at the points where <*#ethics*>

arose, towards the close of the thesis I summarise and reflect on these in the 'Ethics revisited' section in Chapter 8.

This Introduction served a number of functions. In addition to discussing what prompted this study and the background which helped to assemble it, I also outlined how the approach I have chosen is inspired by flânerie. In the chapter which follows, I begin to explore the literatures which help to frame the study.

2   HINTERLANDS
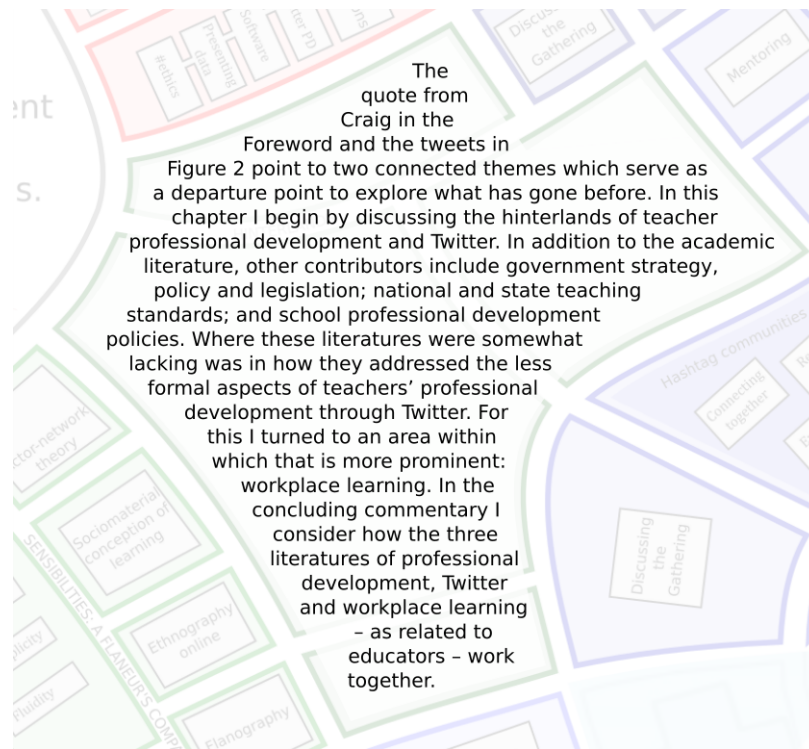
Hinterland: a bundle of indefinitely extending and more or less routinised and costly literary and material relations that include statements about reality and the realities themselves; a hinterland includes inscription devices, and enacts a topography of reality possibilities, impossibilities, and probabilities.

Law (2004a: p.160),

In a study infused with references to the city, the notion of hinterland seems apposite. In geographical terms, the hinterland of a city is the region surrounding it which sustains and supports it, but which is itself influenced by the city. The concept of hinterland for Law (2004), as summarised in the quote above, is an ontological issue in which methods and texts help to bring about scientific realities. Hinterland helps to explain how 'new realities "out-there" and new knowledge of those realities "in-here" are to be created,' (Law, 2004a, p.13) as part of the research endeavour. This is achieved through what Law (2004a, p.64) proposes as method assemblage, 'the enactment or crafting of a bundle of ramifying relations that shapes, mediates, and separates representations in-here, represented realities out-there, and invisible out-there relations, processes, and contexts necessary to in-here.' In other words, that the practices, techniques and instruments of investigative method do not merely describe realities, but actually enact them into being. I pick up this argument and

discuss it in greater depth in Chapter 3, but for the moment, I particularly want to focus on how that notion describes the hinterlands for this study.

The literatures which locate a thesis inform and contribute its hinterland. The methods used, the concepts applied and the knowledge produced by previous studies influence their successors, which seek to confirm or extend what has gone before. I refer to the hinterlands for this study in the plural since they are not only the inscribed outcomes of previous research, but include the methods which were employed to bring them into being. Furthermore, as I outlined in 'Personal Hinterlands' (p.11), my experiences and proclivities also contribute a hinterland.

The first hinterland which follows is that of professional development. I discuss the different terms used to describe it, the different forms it takes and the purposes or intentions behind it. I go on to consider the benefits which arise and the factors which contribute to it becoming effective.

Teacher professional development

Professional development: a slippery term

From the outset it is perhaps prudent to acknowledge the varied ways in which a range of terms are used across the educational literature: (continuing) professional development (and learning), professional learning, teacher learning, staff development, in-service training, sometimes interchangeably (O'Brien & Jones, 2014). Although not quite contested, some point to a distinct vagueness or lack of precision in the way professional development (PD) or learning (PL) are defined (Friedman & Phillips, 2004; Mayer & Lloyd, 2011; Mitchell, 2013). Evans (2002) might be rather harsh in declaring definitions of teacher development to be absent from the literature, though it would be fair to point out different levels of detail or precision. This spans from the 2008 TALIS report (OECD, 2009, p.49) which poses professional development simply as 'activities that develop an individual's skills, knowledge, expertise and other characteristics as a teacher' through to Day's (1999, p.4) all encompassing

> *'consists of all natural learning experiences and those conscious and planned activities which are intended to be of direct or indirect benefit to the individual, group or school and which contribute through these, to the quality of education in the classroom. It is the process by which, alone and with others, teachers review, renew and extend their commitment as change agents to the moral purpose of teaching; and by which they acquire and develop critically the knowledge, skills and emotional*

intelligence essential to good professional thinking, planning and practice with children, young people
and colleagues through each phase of their teaching lives.'

All encompassing perhaps, but framed in a particular way; what Sfard (1998) might include within the 'learning as acquisition' metaphor. I discuss this further in 'Approaches to Learning' (pp. 33-34).

Despite the range of different detail and conceptions of PD, it is possible to tease out some common themes. For some, PD is seen as a series of activities designed to improve teachers' practice. This is achieved by enhancing knowledge, skills and expertise and/or by changing beliefs and attitudes (Guskey, 2002; Knapp, 2003; Kwakman, 2002; OECD, 2009, p.49). More recently, it has become the norm to also acknowledge that the overarching goal is to improve outcomes for pupils, such as achievement, behaviour, independence and well-being (Bubb & Earley, 2007, p.4; Day, 1999).

Rather than accept this somewhat muddied state, some have sought to put clear ground between PD and PL. Timperley (2011) aligns PD more closely with delivery of information; a top-down, mandated, done-to-teachers approach. PL on the other hand is a process arising from within individuals in which they are seeking to develop their professional knowledge, challenge their assumptions and develop new meanings. It is ongoing, active, social, related to practice (Garet, Porter, Desimone, Birman, & Yoon, 2001; S. M. Wilson & Berne, 1999) and above all, self-initiated and driven (Easton, 2008). Rather than distinguish between the two, some see them subsumed under the umbrella of 'teacher change,' and encompass learning, development, growth and improvement (Clarke & Hollingsworth, 1994; Fraser, Kennedy, Reid, & Mckinney, 2007), and which consequently might require the acronym be extended to CPLD or CPDL (Cordingley & Bell, 2012). Perhaps though it would be more appropriate for the professionals themselves to define the term in the way they see fit. They 'learn, in a way that shapes their practice, from a diverse range of activities, from formal PD programs, through interaction with work colleagues, to experiences outside work, in differing combinations and permutations of experiences.' (Webster-Wright, 2009, p.705). Although an agreed definition of PD has proved elusive, there might nevertheless be value in identifying the activities with which people become involved when they are undertaking PD. In taking up that theme, and subsequently in the sections which follow, I use PD as no more than a convenient catch-all expression.

Forms of Professional Development

Increasingly there has been a shift away from professional development as one-off, standalone activities which are now regarded as ineffective (Broad & Evans, 2006; Desimone & Garet, 2015) towards a more inclusive, richer offering where the content and context contribute to the design of higher quality provision (Darling-Hammond & Richardson, 2009). This constitutes a move from what Lieberman (1995) termed 'Direct Instruction,' which failed to address how teachers learn, to 'in-school learning' which better accommodates the contextual milieu in which that learning occurs, together with 'out-of-school learning' to connect teachers into wider communities and networks and expose them to a broader set of views and opportunities.

There is a wide range of activity which might be considered to fall under the umbrella of professional development. This includes, but is not limited to: workshops, conferences, INSET days, classroom visits/observations, mentoring, coaching, reading professional literature, curriculum planning, self-evaluation, team teaching, involvement in working groups, accredited qualifications, learning networks with other schools (Education Scotland, 2014; Goodall, Day, Lindsay, Mujis, & Harris, 2005; Ingvarson, 2009; Kwakman, 2002; Mayer & Lloyd, 2011; Pedder, Storey, & Opfer, 2008). Although ostensibly varied in nature, and probably in execution, these activities are largely structured, planned in advance, and mostly directed by someone other than the teacher involved.

There are different ways in which the lists of activities that have been identified can be classified: in school or out, as individual/with others, certificated/freestanding, one-off/sustained, self-directed/mandated, formal/informal (Australian Institute for Teaching and School Leadership, 2011; Doecke et al., 2008). Those activities can also be classified as ones with a content focus (M. M. Kennedy, 1998) or more specifically, subject matter or pedagogy (Garet et al., 2016; Scher & O'Reilly, 2009). In addition to the content, Timperley et al. (2007) also identified the context within which those activities were undertaken as being significant; the people and their organisations together with the socio-cultural environment within which they worked.

Focusing unduly on classifying the activities with which PD is associated, whilst attempting to bring a semblance of order, perhaps deflects attention from more important considerations (M. M. Kennedy, 2016). Maybe what the activity is, is less relevant or important as what it does and the effects it has?

Purpose: what PD is for.

Although difficult to establish a causal chain, one of the principal goals of PD is to improve pupil outcomes (Cordingley et al., 2015; McCormick et al., 2008). This occurs when that PD is able to make a difference to teachers' knowledge, skills, attitudes and practice. Broad and Evans (2006) identify four paradigms through which those differences might be addressed:

- A 'deficit' paradigm where development seeks to compensate for lacking skills or knowledge
- A 'professional growth' paradigm where teachers are self-driven to develop their interests and address the needs they identify
- An 'educational change' paradigm where teachers move towards working at a higher or systemic level
- A 'problem solving' paradigm where development aims to remedy a particular issue.

They also acknowledge however, that some have called for a more integrative approach which brings together improvement, change and growth (Goodall et al., 2005; Lieberman & Miller, 2000). So teachers might themselves identify a deficit they have or a growth pathway they wish to pursue, perhaps to meet new assessment criteria or improve their capability to seek career advancement (Knight, 2002). The need for educational change or teacher improvement may also be externally mandated to drive systemic reforms like the National Numeracy Strategy (I. Thompson, 2000) or redress concerns such as underperformance of students identified locally or nationally (Joubert & Sutherland, 2009).

Using four metaphors to describe CPD, Sachs (2011) also helpfully distinguishes between professional development and professional learning. CPD as 'retooling' or 'remodelling' comes under the banner of PD and seeks to upgrade skills or modify existing practices respectively. CPD as 'revitalizing' or 're-imagining' however, is more indicative of professional learning and renews or transforms practice; it is more aligned with change and is driven by the individual, as opposed to being transmitted by the school or wider systems. The sense of progression from retooling to remodelling with individuals having increasing control in the process may be somewhat false; many teachers themselves will often identify gaps in their skill and knowledge and set about retooling or remodelling on their own terms. Similarly, schools may adopt professional development systems, like coaching or mentoring models, where the learning becomes transformative.

Potential political tensions between the goals and intentions of organisations or national systems, and the needs and aspirations of individual teachers begin to emerge. The collective needs demanded by educational reform and the autonomy and personal needs of individuals may not always align (Fraser et al., 2007). As Friedman and Phillips (2004) observe, CPD can equally be considered as: personal development; as part of one's professional lifelong learning; a mechanism through which the public can be assured of competent professionals who have achieve the requisite standard; and the means through which employers assemble a competent workforce. Having considered the purpose of PD from institutional and personal perspectives, there's also the primary aim of improving student outcomes (Desimone, 2009), however some argue that PD is about more than seeking the direct causal link between PD and student outcomes. Boosting staff morale or enhancing teacher feelings of efficacy or collegiality (Meissel, Parr, & Timperley, 2016) might also be considered as valid aims of professional development, ones which contribute more obliquely towards student outcomes.

Professional development is a complex process (Avalos, 2011) with a whole array of interwoven factors. Aligning needs and intentions at system, institutional and individual levels is likely to prove challenging.

Potential benefits of PD

To identify the benefits that PD brings, McCormick et al. (2008) suggest three different levels: the pupil, the teacher and the school. The latter remains under-researched, but studies have been conducted which indicate benefits to pupils (improved achievement, motivation, confidence and self-esteem) and to teachers (attitudes, knowledge and skills). Furthermore there were also indirect benefits like improved relationships between teachers and increased teacher retention.

In addition to the headline figures for pupil outcomes, teachers also identify other benefits which accrue from professional development (Pedder et al., 2008). Improved understanding of curriculum demands, meeting long-term career goals, working with colleagues and having one's views challenged were all cited as benefits arising from PD however, teachers at different stages and in different contexts have different needs. A newly qualified teacher might place accreditation towards career progression more highly than a more experienced teacher for example.

It has been argued that the benefits which manifest in the *occupational* domain (that associated with the job of teaching) are given prominence. Benefits arising within the

personal and *social* domains receive far less attention (A. Kennedy, 2011). Nevertheless, across their review, Cordingley et al.(2005) did find reports of CPD programmes producing positive affective outcomes, for example; improvements in teacher attitudes, beliefs, commitment, self-efficacy, job satisfaction, and morale. So it may transpire that teachers become more willing to share practice and try new ways of teaching (Darling-Hammond et al., 2009), to continue and extend their learning, enjoy improved motivation, increased confidence and enthusiasm (Cordingley, 2015; Goodall et al., 2005; Little, 1993). Some have argued that the social aspects of learning within communities or networks improve social capital which enables reciprocal exchange of information, improved capacity for influence (and consequently more easily achieved goals), and increased cohesion within the group (Bigsby & Firestone, 2016; Pedder, James, & MacBeath, 2005).

Though there may be both supportive and therapeutic benefits as outlined above, it is important to remain aware that many of these factors may influence teaching and learning in ways which are difficult to predict or to evidence (Rose & Reynolds, 2006). As a consequence, rather than attempting to build these factors into PD programmes in a formal, planned way, ensuring that conditions conducive to enabling them to emerge is likely to prove a more fruitful strategy (A. Kennedy, 2011).

Factors contributing to 'effective' PD

To establish whether a professional development programme or activity has been successful, it should be possible to specify the criteria for success. The range of features identified as contributing towards effective professional development has been in a state of flux. After Loucks-Horsley et al.(1996) identified seven principles through which effective PD could be identified, Hawley and Valli (1999) were perhaps somewhat premature in claiming that consensus on the 'essential characteristics of effective professional development' had been reached. The eight characteristics they offered were followed by an extensive national study of the Eisenhower Professional Development Program in the United States. From this, Birman, Desimone, Porter and Garet (2000) and Garet, Porter, Birman, Desimone and Yoon (2001) drew out six features, three structural (form or type of activity, duration, and participation) and three core features (content focused, involve active learning and are coherent with teachers' goals, state standards and assessments). Desimone (2009) suggested that consensus was being reached within the research community and distilled down the following five features that are most associated with changes in practice, knowledge and student achievement:

Content focus. The subject matter and how students learn it.

Active learning. Teachers should be involved in practical activity such as observing, commenting, presenting or analysing.

Coherence. Alignment between the activity, current knowledge and beliefs, and school, national and international policies.

Duration. The activities should be sustained over a period of time.

Collective participation. Teachers should work with colleagues and peers to build and participate within a learning community.

Even now, the list continues to be refined and Darling-Hammond, Hyler and Gardner (2017) have dropped 'coherence' whilst introducing modelling, coaching, and feedback, to take the number of features back up to seven. Although agreeing with several of these strands, Cordingley et al (2015) also noted the importance of teachers' attitudes and whether they shared the same sense of purpose. Despite partial consistency across these lists, some call into question the basis of the claims that consensus has been achieved (Guskey, 2003; Wayne et al., 2008) and call for more robust, scientific studies which allow causal influences to be established. Given that the characteristics that influence the effectiveness of professional development are multiple and highly complex, Guskey (2003) is not confident that a simple list of features, even if from high quality research, will ever be able to enable guidelines for effective professional development to be drafted. Whether there is consensus or not, predicting teacher learning based on the presence of the features of effectiveness still proves elusive (Desimone, 2009). Establishing that causal connection poses considerable challenges, particularly since establishing a causal link between the professional development activity and student outcomes might be argued to be a non-trivial, multi-stage process (Yoon, Duncan, Lee, Scarloss, & Shapley, 2007). Professional development changes teachers' knowledge and skills, which changes their practice, which in turn affects student achievement. One might ask therefore that if more sustained, intensive involvement in PD is more effective for example, then precisely how much and for how long? Is there an optimum beyond which no further gains are made? There is a sense in which if the agreed features are present, then surely PD ought to be effective, in that teachers change and adapt and students' outcomes are improved. Nevertheless even when the right features are present, sometimes teachers *don't* learn or change. Conversely there are times when the features are absent and yet teachers still learn. Kennedy (2016) recommends moving beyond the conception of "good" PD to one which embraces a more subtle appreciation of what teachers do, how they are motivated and how they learn and grow. Opfer and Pedder (2011) bemoan the 'process-product logic' in which some simple input produces an expected outcome as too simplistic, and argue instead for a more

complex conceptualisation which acknowledges the multiplicity of variables, interactions and effects, and difficulty in predicting outcomes.

Having discussed the 'professional development' referred to by teachers in the quotes in Figure 2, I now move onto Twitter itself, but open by considering Twitter in more general terms.

Twitter

Although the original purpose of Twitter was to enable people to answer the question "What am I doing," (Honeycutt & Herring, 2009), that has evolved for them now to express "What's happening" in their short messages or tweets. Since the default setting for material posted on Twitter is 'public,' anyone can visit twitter.com and search for tweets on a particular topic. Those who choose to create an account however, will see their 'timeline' upon logging in - a list of tweets they have posted intermingled with those posted by the people they follow, arranged in reverse chronological order, most recent first. Twitter allows each user to search for and select people to follow, thereby producing a personalised point of view (Gillen & Merchant, 2013). During this process, other users may choose to follow back, though there is no expectation of reciprocity (boyd et al., 2010; Kwak, Lee, Park, & Moon, 2010).

Different people come to Twitter for different reasons. Daily chatter, sharing information, conversation and dialogue, reporting news, advertising and marketing, crowd-sourcing, collaboration and exchange, seeking help and support; all constitute some of the social practices in which people engage, and are similar to the reasons why people participate in social media generally (Java, Song, Finin, & Tseng, 2007; van Dijck, 2013, p.72; Zhao & Rosson, 2009). In broader terms, Twitter has been used for education, emergencies, protest and politics, public relations, reporting dissent, and opinion polling (Rogers, 2013; van Dijck, 2013, p.73).

Running through the background of Twitter is a continual social current through which people flow. Rather than classifying it as specific intended tasks, it is perhaps more what some have referred to as "pointless babble" (Pear Analytics, 2009). Miller (2008, p.396) goes further to claim 'The point of twitter is the maintenance of connected presence, and to sustain this presence, it is necessarily almost completely devoid of substantive content.' 'Phatic media,' like Twitter are, he asserts, more about maintaining continual connection, rather than exchanging substantive communication. Tracy and Naughton (2000) return to

Malinowski's (1923, p.316) description of 'phatic communion' as discourse that 'serves to establish bonds of personal union between people brought together by the mere need of companionship and does not serve any purpose of communicating ideas", but that this 'small talk' serves an important function, even if the content appears pointless or superficial. Reichelt (2007) coined the term 'ambient intimacy' for this low-level continual contact, and claims that despite its apparent superficiality, it nevertheless adds value to people's lives. Lin, Levordashka and Utz (2016) define ambient intimacy more tightly as 'a feeling of closeness that is developed in a peripheral way (through constant and regular reception and/or interaction through social media)' and in so doing helps to form and maintain relationships on social media. It might be considered to be the oil that helps lubricate other interactions.

Within Twitter it is possible to discern both significant, identifiable activity entangled with ongoing background chatter. This may make teasing out professional development from the general noise more of a challenge. On the other hand, pulling the tangled threads apart may not be appropriate; one may be dependent on or constitutive of the other.

Research into Twitter

Although Twitter has only been around for just over a decade, it has attracted considerable research attention. The chart in Figure 4, obtained by conducting a search in Web of Science for articles with "twitter" in their title (as of 22/07/2017, but not including results for 2017), shows the extent by which interest in Twitter has increased:

Web of Science Search: "Twitter" in title field
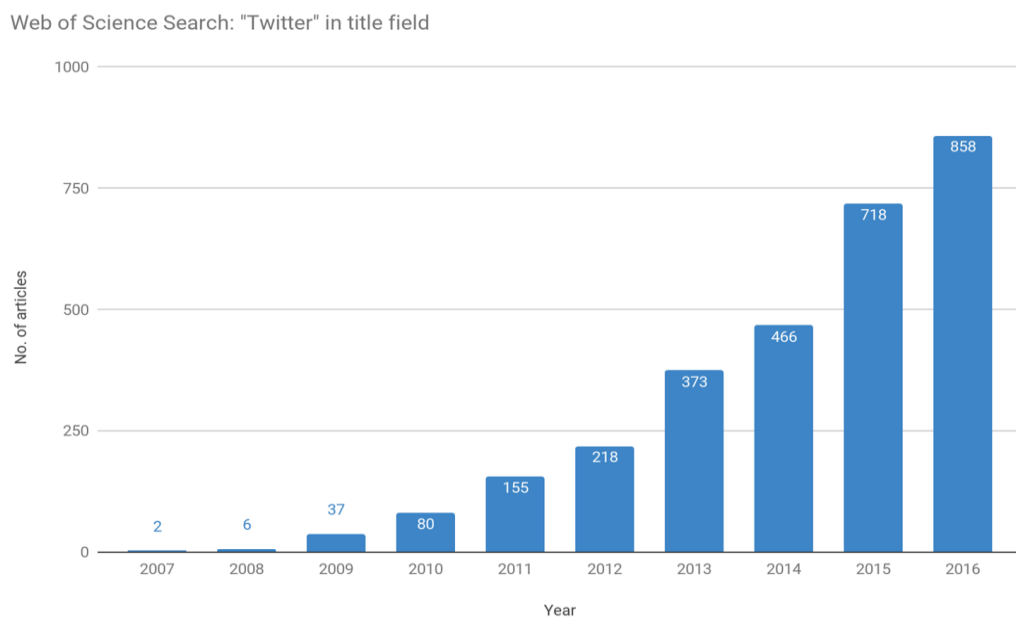
Figure 4: Web of Science search results

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The range of topics covered reflects the wide range of sectors drawn to Twitter: from medicine (Bosley, Zhao, Asch, Becker, & Merchant, 2011) to the media (Casas, Davesa, & Congosto, 2016) and sport (Parganas, Anagnostopoulos, & Chadwick, 2015) to spying (Weinberger, 2011). In systematic detailed analyses of research conducted into Twitter up until 2011, Williams, Terras and Warwick (2013) and Zimmer and Proferes (2014) revealed the extent of the fields of interest. These spanned disciplines including Business, Communication, Education, Emergency, Geography, Health, Libraries, Linguistics, Search, Security and Technical and a range of others, although of all the papers, those categorised from within an educational context comprised only 3-4% of the total. Another dimension of the research which Williams et al.pulled out was the aspect of Twitter on which the research focused; over 60% of papers focus on the message, whilst 20% attend more specifically to the user.

Twitter has been variously conceptualised using communities of practice (Lewis & Rush, 2013; Wesely, 2013), communities of inquiry (Dunlap & Lowenthal, 2009; Sinnappan & Zutshi, 2011), connectivism (C. Evans, 2014), literacy practices (Gillen & Merchant, 2013; Greenhow & Gleason, 2012), affinity spaces (Carpenter, 2015; Willet, Koehler, & Greenhalgh, 2017), third spaces (McArthur & Farley White, 2016), social capital (Gurjar & Sivo, 2017; Sajuria, vanHeerde-Hudson, Hudson, Dasandi, & Theocharis, 2015) and perhaps unsurprisingly, social network theory (Bryden, Funk, & Jansen, 2013; Jordan, 2016).

Although research into educational uses of Twitter constitutes only a small proportion of the whole (Zimmer & Proferes, 2014), it nevertheless spans an eclectic mix. Much research tends to be from higher education scholars' or students' perspectives. Studies fall into one of several camps, which for scholars include:

- Exploratory studies into what people are doing with Twitter in general terms (Hull & Dodd, 2017; Veletsianos, 2012)
- Specific uses of Twitter (Li & Greenhow, 2015; Stewart, 2017, pp.251-265)
- The outcomes or results of use of Twitter (Elavsky, Mislan, & Elavsky, 2011; Junco, Elavsky, & Heiberger, 2013)
- Guidance for others (Marr & Dewaele, 2015; Simpson & Cooner, 2016)

Studies which focus on students include:

- Exploratory studies (Bicen & Cavus, 2012; Rodríguez & Restrepo, 2015)
- How it is being used (Hamidon et al., 2013; Soluk & Buddle, 2015)

- What effect(s) Twitter has (West, Moore, & Barry, 2015)

Studies which pay more attention to the context of primary and secondary educational stages are much rarer, and those which focus solely on teacher professional development represent an even smaller subset of those. In total, thirty papers (listed in Appendix C) were returned by the search strategy outlined in Appendix D, and it is to them I now turn.

Teacher PD on Twitter

Despite the increasing number of studies on Twitter, the area of teacher professional learning within that field remains under-researched, especially that seeking to better understand the learning experiences of what Matteson (2010) terms a 'tweacher.' Researchers have found that educators use Twitter in a variety of ways including communicating with students and parents, conducting in- and out-of-class activities (Carpenter & Krutka, 2015a), and finding an audience for student work (M. Wilson, 2013). Predominantly however, the most common form of activity is professional learning (Carpenter & Krutka, 2014b) which, as discussed earlier, can be understood/interpreted in different ways.

Teachers come to Twitter for a host of reasons and by a variety of circuitous routes. Some are obliged to sign up as part of their academic studies, whether as pre-service teachers or on Masters programmes (Beadle, 2014; Luo, Sickel, & Cheng, 2017). Attending a conference provided the impetus for some, whilst others shifted across from personal use to seeking support for their professional contexts (Forte et al., 2012).

There are a number of attractors which draw teachers to Twitter. Some claim the affordances of Twitter suits their needs; it is concise, flexible, efficient and available on a variety of platforms (Carpenter & Krutka, 2015a). More importantly perhaps it is argued that people feel they can personalise their experience to their own needs by being able to choose the time, duration and place they access it (Carpenter & Krutka, 2014b; Ross, Maninger, LaPrairie, & Sullivan, 2015), however this might also be true for other platforms or other forms of online learning. Some noted that educators are drawn to Twitter because it allows them to keep up to date with current educational trends and topical issues (Carpenter & Krutka, 2015b; Cho, 2016).

The social aspects of participating seem to be important to many. Several studies revealed a sense of camaraderie between people with similar attitudes and beliefs towards teaching and learning, and from whom it is possible to draw emotional support (Carpenter & Krutka, 2014a; Davis, 2015; Visser, Evering, & Barrett, 2014). These aspects appear to be

particularly important for those who are isolated. This may be as a result of the role they occupy (an administrator/headteacher), the subject they teach (single teacher in a school), geography (remote, rural locations), ideology (a specific view of teaching and learning) or local situation (one-room schoolhouse) (Alderton et al., 2011; Sauers & Richardson, 2015; Smith Risser, 2013).

Importantly, and perhaps also a reason why some teachers tend to stay on Twitter, even when exploring alternative media, is that that is where people are. As Holmes et al.(2013) suggest, there is a 'critical mass' of educators, sufficient at least to constitute a community for its users.

What teachers do on Twitter

Teachers engage in a variety of activities as they spend time on Twitter. Some of this is consistent with what Twitter users do in general for example: updating their daily life activities with friends, families, and co-workers; sharing information, news, and opinions with interested observers; and seeking knowledge and expertise in public tweets (Zhao & Rosson, 2009). Other activity is more closely allied to their professional work: communication, class activities and professional development (Carpenter & Krutka, 2015a) The personal and the professional are classified by some as two separate realms (Xerri, 2013), and indeed some, though not all, teachers prefer to demarcate these different aspects of their lives using separate social media accounts (Forte et al., 2012).

From my reading of the literature, there are three overarching groups of activities in which teachers on Twitter engage. Firstly, **sharing**: by this I refer to the exchange of the resources they create, the tools they use, the ideas they have, the news they encounter and links to other sites. Often this is what Skyring (2014) terms 'on-sharing;' the passing-on of resources etc. they have found. If some people are sharing, others potentially receive those resources; sometimes you share, sometimes you receive (Carpenter, 2015).

Secondly, **requesting**: by this I mean the way in which educators may ask questions of, or seek support from others. Sometimes they are aware who might possess relevant expertise or knowledge and direct questions to them, but equally, queries may be broadcast out to Twitter more generally (Smith Risser, 2013). Again, this is also a reciprocal arrangement in which answers or advice may be given, rather than requests posed (Forte et al., 2012). This can be ad hoc communication which takes place when required, or pre-arranged, as in the case of hashtag chats (Greenhalgh & Koehler, 2016).

Thirdly, **connecting**: here I refer in the first instance, not only to the follower/followee relationships teachers establish through Twitter, but also to the ongoing work done to extend and maintain those relationships. It has been found that teachers connect with a wide variety of educators, taking the opportunity to become involved with communities beyond their local context (Alderton et al., 2011; Colwell & Hutchison, 2017). A fundamental aspect of Twitter is the capability to form connections and this largely underpins the other activities in which teachers become involved. From this involvement, teachers enjoy a number of benefits, but also face several challenges, and it is to these that I now turn.

How teachers benefit

A key feature that Twitter offers educators is the flexibility in how it can be used (Lomicka & Lord, 2012). Participants report having a greater degree of choice in what, when and how they learn (Beadle, 2014; Britt & Paulus, 2016). This proves to be both more convenient and can yield financial savings (Cho, 2016). It has been suggested they have access to similar and more diverse perspectives through the richer community to which they have access, both geographically (Skyring, 2014) and hierarchically (Carpenter & Krutka, 2014b). Furthermore, they are able to form sustained, mutually supportive relationships (Wesely, 2013).

Although there are benefits which are universally felt amongst Twitter users, some are specific to those with different roles. Carpenter (2015) argues that novice teachers for example might benefit from the mentoring that more experienced colleagues provide, whilst those further on in their careers can be reinvigorated, inspired and motivated. Not only do the individuals themselves benefit, but Forte et al.(2012) found evidence to suggest that many act as conduits, passing on their new knowledge to colleagues in school.

Drawbacks for teachers

What some perceive as positive aspects of Twitter, others see as negative. So whilst the character limit acts as an incentive to be concise and economical to some, Britt and Paulus (2016) reported that others see it as a constraint which restricts depth and clarity and can sometimes lead to misunderstandings (Davis, 2015). The flexibility to engage at a time of your choosing is a benefit for some, but as Beadle (2014) noted, this could also be viewed as further bleeding of professional life into personal and which thereby extends the working day. Being able to connect with and learn from like-minded people is important for some, whilst others like Markham (2013b) argue it results in homophily, and leads to

narrow and polarised views. This is what some refer to as the echo-chamber effect (Cho, 2016).

Some of the barriers people face arise as a result of local circumstance, rather than the choices they make. Wright (2010) found that some schools have policies which restrict access to certain Internet sites or ban the use of mobile (cell) phones in school. People may also face a degree of scepticism towards Twitter and that social media are not legitimate tools through which to pursue professional development (Davis, 2015), or indeed more general concerns related to privacy issues (Carpenter, 2015).

There are also broader concerns which often remain hidden or unacknowledged. In connecting with like-minded individuals, the possibility arises that other people and their views may be marginalised. Educators' uses of Twitter could, under some circumstances, reinforce privilege and social inequity (Krutka & Carpenter, 2016), although Nadji (2016, p.486) notes that educators associated with the #iteachphysics hashtag constitute a diverse group of 'minorities, women, and physics educators the world over.'

Although not mentioned by teachers in the quotes in Figure 2, in the next section I turn to workplace learning. Given that it often focuses more closely on the way people capitalise on the less formal opportunities which arise within work itself, I felt it might provide an alternative hinterland for TPD.

Learning in the workplace

As the preceding sections began to reveal, within the literature, professional development and professional learning mean different things. For (Timperley et al., 2007, p.3), professional development consists of those activities and processes provided for teachers to enable them to learn professionally, and professional learning is the 'internal process through which those individuals create professional knowledge.' Those activities and processes however, need not be solely those provided for them, but include 'formal PD programs, through interaction with work colleagues, to experiences outside work, in differing combinations and permutations of experiences' (Webster-Wright, 2009, p.705). Professional development can certainly be those activities which lead to professional learning, but might also be considered the *outcome* of that learning (Boylan, 2016) [*my emphasis*].

Although in the preceding section, research into use of Twitter often frames participants' activity in terms of professional development (Carpenter & Krutka, 2015b; Dalton, 2013;

Rodesiler & Pace, 2015), or professional learning (Cho, 2016; Li & Greenhow, 2015; Skyring, 2014), some studies take a slightly different approach. McPherson, Budge and Lemon (2015, p.134) for example, discuss how the informality of professional learning on Twitter, despite being purposeful, can also be light-hearted, yet retain 'richness, depth, and timeliness.' Dabbagh and Kitsantas (2012, p.4) offer the possibility of both formal and informal learning being pulled together within personal learning environments ("PLEs are an outcome of the tools that social media has provided learners enabling them to create, organize, and share content"). Informal learning can be loosely described as 'a process of learning that takes place in everyday experience, often at subconscious levels' (Rusaw, 1995, p.218), but it is more commonly discussed within the workplace learning literature. This offers an alternative lens through which to consider teachers' learning through Twitter.

Workplace learning

Workplace learning occurs at the intersection between two human processes: working and learning (Barnett, 2001; Sambrook, 2005). Although learning in the workplace can involve activities planned and provided by the organisation - the professional development referred to earlier - it is also 'informal learning that is unintentional and results from interaction with other co-workers' (Le Clus, 2011). Setting aside formal activities such as courses and workshops for a moment, the informal workplace learning activities that Kyndt, Gijbels, Grosemans, & Donche (2016) found from their synthesis of the literature included: reading professional literature, observation, collaboration with colleagues, reflection, learning by doing/through experience, browsing Internet and social media, experimenting, trial and error, talk with others, sharing materials and resources, and storytelling. Engaging in these activities enables teachers to improve their subject knowledge, pedagogical knowledge and skills, and develop their professional attitudes and identity. There appear to be themes here which align with those arising from research into Twitter use – talking with colleagues, sharing resources – so workplace learning might therefore provide a fruitful avenue to explore.

The workplace learning literature presents a similar problem to that of professional development, in that it has no clear or consistent definition, and those that are offered tend to be rather broad (Le Clus, 2011; Lee et al., 2004). For example, Cacciattolo (2015, p.243) positions it as 'the acquisition of knowledge or skills by formal or informal means that occurs in the workplace.' Kyndt et al.(2014, p.2393) take that a little further, suggesting it involves:

the uptake of formal and informal learning opportunities whereby employees and groups of employees
acquire knowledge, skills and attitudes that change individuals' present and future professional
achievement and organisational performance.

In these examples, workplace learning is seen through a lens of 'acquisition' and has elements both of formality and informality. In the sections which follow, I shall explore these observations further.

Approaches to learning

Learning as the acquisition of something has long dominated the way it has been conceived, but more recently, a second possibility has emerged. Sfard (1998) offered two metaphors of learning: acquisition and participation. In the former, the human mind is seen as a container to be filled with something which is acquired, developed or constructed. It involves taking ownership or gaining possession over knowledge, skills, concepts, facts, meanings etc. Verbs like acquiring, gaining, possessing, grasping and accumulating are prevalent, so once 'acquired,' like any other commodity, learning can be transferred, applied or shared.

When discussing learning as participation however, there is a subtle shift in the discourse from having to doing, from knowledge to knowing. Rather than there being a possible end state to reach – like having accumulated a body of knowledge –learning instead becomes about ongoing active involvement within a particular context. Participation is a process of becoming a more adept actor, a member within a community. Sfard does not argue for one metaphor over the other, but that both are necessary. Whilst one might be adequate for one particular area, it is unlikely to adequately cover the entire field.

Following a similar and somewhat parallel approach to Sfard, Beckett and Hager (2002) propose two 'paradigms' of learning. In the 'standard' paradigm (Beckett & Hager, 2002, pp 96-98), learning is decontextualised cognitive activity within an individual's mind whereby transparent, transferable knowledge is acquired. Missing from this account is any acknowledgement of collective knowledge within communities or organisations, or of the part that practice plays in learning. Given the way in which learning in the workplace appears to arise in and through practice, and that that is markedly different from the characteristics in the standard paradigm, Beckett and Hager (2002, p.146) proposed the 'emerging paradigm' as an alternative. Here, features of learning include how it is contextually based in experience and activity, how it is activated by learners and is often collegial, and that it is holistic and organic.

The outcome of learning in the standard paradigm is that somehow the properties of the learner are changed, whereas in the emerging paradigm, the outcome is the creation of a new set of relations in an environment. However, the standard and emerging paradigms should not be seen as polar opposites, but that the former simply presents a limited and special instance of the latter. Both Beckett and Hager's paradigms, and Sfard's metaphors, involve formal and informal notions of learning. I shall now attempt to tease apart how informality and formality are defined and conceptualised.

Formal, informal or something else?

The range of terms used to distinguish different sets of learning circumstances can be rather unhelpful. Formal, informal, non-formal, incidental and others are used, but often loosely defined or used in contradictory or contrasting ways (Colley, Hodkinson, & Malcolm, 2003). In general, the formal aspects are less contested and were characterised by Eraut (2000) as including:

- a prescribed learning framework
- an organised learning event or package
- the presence of a designated teacher or trainer
- the award of a qualification or credit
- the external specification of outcomes

Similarities can be drawn with the way Eraut has framed formal learning here, and the characteristics associated with professional development; there is a structure around which the learning has been planned, and there are intended outcomes. Learning which lacks these characteristics is classified by different people as informal, non-formal or incidental, and rather than being positioned as significant in its own right, is simply set up as a contrast to formal learning. Let me attempt firstly to distinguish the different terms.

In developing strategies for 'lifelong learning for all,' the OECD (Werquin, 2007), whilst acknowledging that definitions of non-formal learning are blurred, provided the following clarifications:

- Formal learning is always organised and structured, and has learning objectives. From the learner's standpoint, it is always intentional: i.e. the learner's explicit objective is to gain knowledge, skills and/or competences.

- Informal learning is never organised, has no set objective related to learning outcomes and is never intentional from the learner's standpoint. Often it is referred to as learning by experience or just as experience.
- Mid-way between the first two, non-formal learning is somewhat organised, may have learning objectives and could be intentional on the part of the learner.

In Figure 5 I attempt to synthesise some of the different characteristics across the three terms.

	Formal	Non-formal	Informal
Intent	Intentional		Unintentional
Structure	Learning objectives		No learning objectives
Control	External	Learner	
Duration	Intermittent	Continuous	
Awareness	Fully aware		Unaware
Certification	Certificated	Uncertificated	
Location	Specified	Flexible	
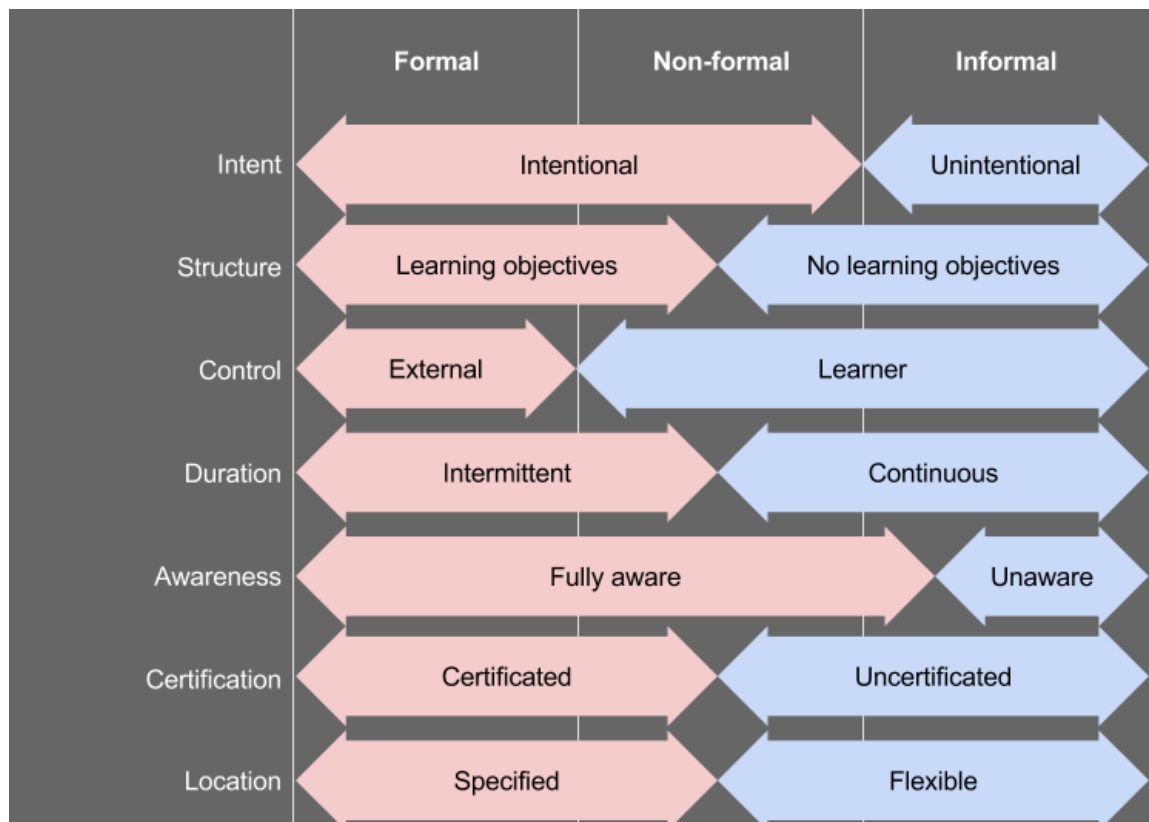
<p align="center">Figure 5: Characteristics of formal, non-formal and informal learning</p>

In producing this visualisation, its shortcomings immediately became apparent. By what criteria can the boundaries between formal, non-formal and informal be distinguished, especially given that the criteria listed represent only a subset of all those offered across the literature (Malcolm, Hodkinson, & Colley, 2003)? Recognising that specifying certification, duration and location can make it more difficult to use one term or another, Werquin (2007) advocates simplifying the criteria for classifying the type of learning to just two: learner intention, and whether the learning was planned, as illustrated in Table 1:

	Yes, learning is intentional	**No**, learning was unintended
Yes, the activity has a learning objective	Formal learning	Semi-formal learning
No, the activity has no learning objective	Non-formal learning	Informal learning

Although simplifying by reducing the number of criteria, this classification introduces a new term; semi-formal learning - taking part in activity which has learning objectives, but learning something else in addition.

Marsick and Watkins (2001) also offer formal and informal, but introduce incidental. They make the initial cut using the criteria of intent and structure - informal learning is intentional, but not highly structured. In addition, control of the learning is in the hands of the learners, rather than the institution, and the outcomes of the learning are harder to predict. Incidental learning is positioned as a subset of informal learning and is unintentional, tacit and taken for granted.

The tripartite classification is not shared by many, most preferring the either/or dualism of formal versus informal/non-formal. Eraut (2000) subscribed to formal and non-formal learning, although later substituted informal for non-formal (Eraut, 2004). Uncomfortable with the potential dichotomy between formal and non-formal/informal, instead he suggested a continuum of formality, with informal learning being positioned closer to the informal end. Characteristics of the informal end of the continuum include 'implicit, unintended, opportunistic and unstructured learning and the absence of a teacher.'

Specifying the characteristics associated with informal/non-formal learning, rather than defining it explicitly, tends to be the norm. So for example Kyndt et al.(2014, p.2393) offer this definition:

> *Informal learning is characterized by a low degree of planning and organizing in terms of learning context, learning support, learning time, and learning objectives. Informal learning opportunities are not restricted to certain environments. The learning results from engagement in daily work-related activities in which learning is not the primary goal. Informal learning is undertaken autonomously, either individually or collectively, but without an instructor. It often happens spontaneously and*

unconsciously. From the learner's perspective, it is unintentional. Finally, informal learning outcomes are unpredictable.

Within this definition, a set of characteristics, like 'context' or 'autonomy,' can be discerned, so it once more becomes possible to pull out from a range of studies a set of characteristics used in distinguishing formal and informal/non-formal learning. In seeking an overarching set of criteria by which to judge whether learning in a particular situation was informal or formal, Colley et al.(2003) questioned whether it would be necessary for all criteria indicating informal learning to be fulfilled in order for that to be classified as informal learning, or perhaps just a certain number. To resolve this they recognised firstly that any learning situation may have aspects of both formality and informality, as opposed to formal and informal learning being fundamentally different. This acknowledges the complexity of learning and that the range of different settings and circumstances in which it might occur, make it hard to condense into two or three ideal types. Colley et al.(2003) also brought together the range of characteristics, or 'attributes' as they called them, by categorising them into four clusters:

- **Process**: the learning process, whether a teacher/tutor is involved, whether support is provided and how (or if) the learning is assessed.
- **Location and setting**: where the learning takes place, whether time is a factor and what the curriculum (if any) might be.
- **Purposes**: what the prime purpose of the activity is, who is driving it and whether the outcomes are designed or unintended.
- **Content**: whether the emphasis is on propositional knowledge, everyday practice or workplace competence.

As Colley et al.point out, when one then considers a particular learning situation, it becomes possible using this heuristic to identify aspects of formality and informality. This makes it easier to analyse the nature of learning in that situation and consequently to recognise changes in learning.

The formal/non-formal/informal conceptualisation is also contested by de Laat (2012), though in a rather different way. Instead of suggesting a continuum and degrees of formality/informality, he proposes a 'hybrid' solution in which professional development is connected within the midst of professional practice. This is where the controlled organisational approach which focuses on individual skills and knowledge acquisition is

melded with the practice-driven approach involving informal processes in which learning is through participation.

> *While teachers may individually gather information at a professional development workshop, it is through their informal social network that this information is interpreted, shared, compiled, contextualized and sustained.*

(Baker-Doyle & Yoon, 2011, p.90)

The key here is recognising a balance; 'informal-formal learning' (de Laat, 2012), where informal learning is allowed to flourish, so that opportunities arising from formal activities can be capitalised on. This may be achieved through 'social learning' (Wenger, Trayner, & De Laat, 2011, p.7), namely ways in which individuals, and the groups, communities or networks they populate, learn by:

> *[…]sharing information, tips and documents, learning from each other's experience, helping each other with challenges, creating knowledge together, keeping up with the field, stimulating change, and offering new types of professional development opportunities.*

This reads very much like the literature addressing teachers learning on Twitter - sharing information, supporting one another, working collegially. In fact the heuristic offered by Colley et al.(2003) seems applicable across the Twitter teacher learning literature discussed in the 'Twitter' section (pp. 25-31), in the way it leans towards informal attributes. The learning **process** is quite open with no teacher or guide, and any support provided by other Twitter participants. There is no curriculum, and for the most part, no organised activity however, as Gao and Li (2017) and Nadji (2016) reported, some teachers take part in weekly, online discussions called 'chats' which often have a pre-arranged topic. A hint of formality perhaps? The **location and setting** for the learning is much harder to pin down, but is more likely to be at home or whilst commuting (Krutka & Carpenter, 2016), than in the workplace (school). Learning need no longer be time- or location-fixed (Mills, 2014). It is made clear that learning opportunities are available as needed, or "24/7/365" (Carpenter and Krutka, 2015), though this of course has implications when trying to balance work and personal commitments (Davis, 2015). Time is not provided for this kind of activity during the school day so those who choose to follow this path suffer a further bleeding of professional life into personal. In considering the prime **purpose** of participating on Twitter, teachers are there predominantly to learn (Carpenter & Krutka, 2014), so this might be indicating a shift towards more formality. Whilst the intent may be to learn, what is learned is not always predictable and that element of serendipity can be attractive in itself

(Forte et al., 2012). The **content** of the learning tends to constitute an eclectic mix, spanning: disciplinary discussions (Greenhalgh & Koehler, 2016); asking for or providing support for issues associated with practice (Smith Risser, 2013); and what Cho (2016) termed 'workplace vignettes' - snippets of information relating to day-to-day experiences. In these examples of content however, the outcomes are flexible, unpredictable and rarely specified or anticipated in advance, so the content cluster also leans towards informality. Overall then, applying Colley et al's (2003) heuristic to teachers on Twitter suggests that this is a more informal learning experience with some elements of formality.

Commentary

Professional development might appear on the surface to be a singular thing in the same way that skiing, swimming or singing are to non-participants. On closer inspection however, it is defined, named and conceived in different ways. A teacher attending a full-day workshop convened by an examining board and another teacher being coached by a colleague, might equally refer to their experiences as professional development. On the other hand, colleagues participating in the same school research group might refer to their experiences differently: as professional learning, as CPD, or simply as doing a project.

Establishing the purpose of PD will depend on whose views are being considered. The purpose of PD for an individual teacher may or may not align with the purpose of PD as proposed by the government. Given that the benefits of PD can accrue at different levels – pupil, teacher, and organization – serving those needs can be challenging. It is no easier when subsequently attempting to assess those factors associated with effective professional development. What makes PD effective for an individual teacher might be less relevant where pupils are considered. Establishing a causal link between say, 'collective participation' and improved pupil outcomes is also a non-trivial matter, given the multi-stage or even iterative nature of the process.

The tweets in Figure 2 illustrate that some teachers describe their activity on Twitter as PD, and as such naturally provided one avenue for exploration. The hinterland of academic literature I have outlined in the preceding sections discusses how PD is designed and structured for particular purposes, the conditions which make it effective and the beneficial outcomes for those involved. Fragments of these elements can be seen in the tweets in Figure 2. It would seem appropriate therefore to use these factors as one benchmark against which teachers' activities on Twitter can be judged. However, another view would be that, despite teachers calling it PD and despite some elements of PD (as described in the

literature) being present, perhaps this is something new, something which needs a different framing.

Since it is still early days for research into teachers' professional learning with Twitter, studies will perhaps inevitably have limitations. Of the thirty papers listed in Appendix D, five are studies which only involve pre-service teachers. Given that often, participation on Twitter was required as part of their course, rather than an activity to which they were drawn, it is perhaps wise to be cautious with some of those findings. Of the remainder, there is a natural tendency to compare findings with the features already associated with professional development:

> *"that professional learning for teachers is generally most effective when it is sustained over time, of a practical nature in an appropriate context for the learner, related closely to student learning, collaborative, involves the sharing of knowledge and affords the participants some degree of control and ownership."*

> *(Holmes et al., 2013, p.63)*

That is, if certain *features* of professional development are found in their results, then it is argued that professional learning is happening. Other studies take a similar approach but look for evidence in their data which aligns with particular theoretical stances associated with professional learning, like communities of practice (Britt & Paulus, 2016; Davis, 2015; Megele, 2014) or the somewhat related networks of practice (Rehm et al., 2014; Sauers & Richardson, 2015), communities of inquiry (Solmaz, 2016) or personal learning networks (Alderton et al., 2011; Skyring, 2014).

The twin hinterlands for Twitter research tend to be either the professional development literature, or conceptual framings, like CoP. As a result, they produce a reality of teacher professional development in their own image. By this I mean that, if one goes looking for evidence of characteristics of professional development, then one is arguably more likely to find it. If what is taking place on Twitter is an entirely new form of professional learning, then considering previous hinterlands may be less likely to reveal those new practices. Furthermore, the most common methods employed in these studies were surveys, interviews and textual analysis of tweets. Deploying conventional methods may restrict opportunities for new insights to emerge, insights which have something different to say about what teachers articulate as 'professional development' involves.

One particular tension in the research is between that which frames Twitter as formal professional development, and that leaning towards Twitter as informal (professional)

learning. Having discussed the more formal side of professional development (pp. 18-34), I looked to the workplace learning literature to offer a counterpoint. The workplace learning literature sits in contrast to the professional development literature discussed earlier; they appear to largely exist as two separate hinterlands. Although teachers express their activities on Twitter in terms of PD, were I to yield solely to the PD literature hinterland, it would bring forth its own particular knowledge from my study. This generally more formal, structured conception does not seem an appropriate fit for participation in activities conducted through a social media channel. If on the other hand, activities are better framed by their informal nature, then as I have argued, the workplace learning literature hinterland might be a more appropriate one from which to draw.

Since TPD (as described by teachers) has yet to be fully conceptualised, then looking to one literature or the other might not be entirely appropriate. TPD displays only some of the characteristics associated with formal PD programmes, yet nor does it take place physically in the workplace. There may be strands that can be drawn from both to form a more eclectic hinterland, or as Law (2004a, p.34) put it 'try to reorganise the hinterlands to generate one that is new.' One way this might be achieved is adopting an approach which encourages different methods to emerge, thereby destabilising the hinterlands which have thus far contributed. I begin that process in the next chapter by turning to actor-network theory as a source of disruption and consider how learning might be conceived when adopting a sociomaterial sensibility.

3 SENSIBILITIES: A FLÂNEUR'S COMPANIONS

I open this chapter by discussing the reasons for adopting an 'approach' guided by a set of sensibilities, rather than stating a theoretical stance from which a methodology is developed. In particular, I pick up the thread offered at the close of the last chapter and discuss the actor-network theory approach which helped guide the study, and consequently how learning can be conceptualised through that sociomaterial lens. Alongside the sociomaterial sensibility which emerges, I also argue for ethnographic sensibility, and coupling the two within the approach I refer to as flânography. In a departure from the flâneur as a solitary wanderer, observer and chronicler of city life, I introduce three companions that will accompany my traversals: assemblage, multiplicity and fluidity, as discussed by de Laet and Mol (2000), Mol (2002), and Law (2004).

In research studies, the labour of knowing the world is often split between theory and methodology; the former dealing with understanding and explaining observed phenomena, and the latter with the processes through which it becomes possible to make or test those claims. Law, Ruppert and Savage (2011) argue this separation contributes towards an unhelpful oscillation between instrumentalist and humanist understandings of social research. An instrumentalist view would claim that it is important to get the methods right in order to provide adequate representations which match the realities out there. Humanist methods involve a more constructionist view, such as phenomenology's concern with lived experience as the mean/s through which reality is generated. Neither of these seems appropriate for my study, given the post-human leanings evident in the approach I outlined earlier (pp. 8-10). One solution Law, Ruppert and Savage (2011, p.14) suggest is by seeking 'ways of rethinking knowledges, realities and methods together in the same breath.' This affords an opportunity to imagine a different social world from those offered by instrumentalist or humanist views, and to better understand the work being done by our methods in enacting that world.

Rather than offer separate theory and methodology sections, I choose instead to pick up the baton offered by Law, Ruppert and Savage and attempt to meld the two. I propose to do this through an approach suffused with different sensibilities, in which I take sensibility to mean an orientation to thinking, a sensitivity, a concern, an appreciation and an

openness (Ruppert, 2016). The sensibilities which I will bring to bear borrow from actor-network theory, ethnography and flânerie, and I shall turn to each in turn during the following sections.

Actor-network theory

Tweet 2

The author of Tweet 2 found out the hard way that hashtags can 'do' things; they can exert force. Use one way and they permit access to a stream of conversation; use slightly differently and you are out of the game. The author of tweet x consequently became involved in an altogether different activity than the one intended. I will go on to provide a more detailed exploration of what hashtags 'do' (pp. 112-133), but this initial introduction shows how participating in a social arena is not merely a matter of following social conventions. There are other actors at play who might coax and cajole, or confound and confuse. If this seems at all counter intuitive, think back to the last time you were amongst a group of people and the effect that smartphone notifications had. Whether an audible, visible or tactile 'ping,' someone's attention will likely have shifted as a result. Perhaps it is necessary to reframe what is 'social?'

Twitter may be a microblogging platform, but also falls into what is commonly accepted as a social network site. boyd & Ellison (2007, p.211) define these as:

> *web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system.*

This quote provides one example of how the human aspects of 'social' are often foregrounded, even in this highly mediated environment. Missing is an acknowledgement of the nonhuman participants without which online social networking would not be possible. 'Missing in action,' as Orlikowski and Scott (2008, p.434) put it, or perhaps like

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dark matter[24], difficult to detect, but crucial to the existence of the Universe. The laptops, tablets and smartphones; the wireless, 3 or 4G and local area networks; the routers, switches and protocols; the operating systems, apps and browsers; the texts, photos and videos; the optical fibres, telecommunications masts and satellites; the scams, bots and viruses. All contribute to the experience to greater or lesser extents, but how to acknowledge that?

Rather than making a priori assumptions of what might be found and offering categories which might explain what will be uncovered, actor-network theory (ANT) instead exposes the micro-negotiations and interactions through which people and things interact and become associated. It allows us to trace how things come together, how connections are made or broken, how they persist or decompose, and the reciprocal influences entities have on one another (Fenwick, Edwards, & Sawchuk, 2011). Crucially, it is an anti-foundationalist stance, in which nothing is predetermined until it is performed or enacted, and it de-centres human intention and action (Fenwick & Edwards, 2011b). More than that, it unsettles and disturbs some of the pre-existing categories which fail to account for the contributions of the material – the nonhumans.

As an approach capable of, perhaps even ideally suited to, dealing with messy, heterogeneous situations where movement through space and time are the norm (Law, 2007), ANT is well placed to explore activity on Twitter. The multi-modal and hyperlinked nature of the platform enables activity to extend beyond into other environments, and for external experiences and materiality to be brought in. One might conceive this therefore as an abundantly rich environment of eclectic resources, both for participants and researcher. ANT's capacity to trace movement and connections should enable it to follow the learning practices of educators on Twitter.

Despite the name, there are few who would claim that ANT is a theory at all. One of the 'nails' Latour (1999, p.15) wished to hammer home into the coffin of ANT was that of 'theory.' As Law and Singleton (2015) observe, ANT is neither predictive, nor offers social laws. Instead it should be seen more as a 'toolkit' for thinking about and studying the social and 'telling interesting stories' (Law, 2008; Law, 2009) or more specifically for charting 'practices of association.' It offers ways to help understand the world, rather than provide an overarching theory. Mol too (2010, p.261) does not see ANT as a theory, although if it is, then she suggests rethinking how theories are conceived, instead

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[24] https://www.newscientist.com/round-up/instant-expert-dark-matter/

"[...] if ANT is a theory, then a "theory" is something that helps scholars to attune to the world, to see and hear and feel and taste it. Indeed, to appreciate it. If ANT is a theory, then a theory is a repository of terms and modes of engaging with the world, a set of contrary methodological reflexes. These help in getting a sense of what is going on, what deserves concern or care, anger or love, or simply attention. The strength of ANT is not in its coherence and predictability, but [what] might seem to be its weakness: its adaptability and sensitivity."

ANT then is more of a 'repertoire,' not solid, but adaptable. This is both refreshing and liberating, whilst at the same time being intimidating and obsfuscatory. ANT may bring insights that other approaches do not, and allow or even encourage the pursuit of interesting trails. Before that becomes possible however, the vocabulary has to be grappled with and even then the methods through which that might be achieved are rarely articulated.

Fenwick and Edwards (2011, p.1) offer little comfort to those of us trying to turn the ideas ANT offers into operational practices as researchers, suggesting we 'think of ANT as a virtual 'cloud', continually moving, shrinking and stretching, dissolving in any attempt to grasp it firmly.' Like the phenomena it wishes to explore and the processes through which that might be undertaken, ANT is 'messy' (Law, 2007) and messy because that's the way it has to be. It is wise to be wary of attempting to impose order, since attempts to simplify and clarify, may also purify research methods, (Fenwick & Edwards, 2010), and in so doing repress the very things we want to understand – in this case teachers' learning practices on Twitter.

Having now introduced actor-network theory more fully, in the next section I am in a position to be able to revisit Hinterlands from the preceding chapter, and explore how learning might be conceived through that sociomaterial sensibility.

A sociomaterial conception of learning

In the Hinterlands chapter I presented how workplace learning might be conceived as either an individual, cognitive process, or as a situated, collegial practice. Both however, retain the focus, perhaps understandably on the human aspects of learning and fail to account for the materiality inevitably present; the pens and paper, books and burettes, desks and diagrams, rubbers and rulers (McGregor, 2004). Materiality matters. As Latour (2005, p.71) challenged us to compare hitting a nail with and without a hammer, or boiling water with and without a kettle, we might also consider learning in a classroom with and without a black/whiteboard. Different materials shape both practice and knowledge

(Fenwick, 2012); watching a YouTube video, reading a textbook or participating in a webinar discussion, bring forth different knowledges. Adopting a sociomaterial sensibility allows us to decentre the human subject as the focus of attention when considering knowledge and learning as either personal or social processes (Fenwick & Edwards, 2013).

Adopting a sociomaterial sensibility also involves attending equally to sociality (social negotiations of meaning) and materiality (the spaces and tools which participate in the learning). This is a relational view in which matter and meaning emerge through the associations and connections which assemble, or don't. What learning is, depends on how both the human and nonhuman participants accomplish it as practice (Mulcahy, 2014). Learning does not exist separate from the networks of associations through which it is enacted and is better conceived as an immanent assemblage (Fenwick and Edwards, 2013). The making, unmaking, reconfiguring, expanding and contracting of heterogeneous actors during assemblage constitutes the learning process. These mutations produce what Sørensen (2009, pp.125) calls liquid knowledge, typified by a continual process of reactivation and (re)formation. Liquid knowledge 'is performed as part of the flow of the ongoing mutation, not as a human possession or ability.' Learning framed in this way aligns more closely with the emerging paradigm, but goes further by accounting for nonhuman actors. The fluid learning 'does not belong to the human individual; instead, each participant is affected by mutation of the space, not in terms of "more or less" but "qualitatively" in terms of differences .'

One might playfully ask therefore, if Twitter is proposed as an assemblage, can it learn? A cognitive standpoint, built on the inner mental processes of an individual, would say no. A constructivist standpoint would generate the same response, although perhaps if Twitter was framed as a community of people, rather than an online platform for communication, then one might go so far as to say it could learn. If on the other hand, Twitter or a tweet are considered to be contributing to a learning assemblage, what then? To explore further, it might be wise first of all to distinguish between Twitter the overarching platform, and the subset of Twitter each user experiences as a result of the people, hashtags and topics they have chosen to follow, who follows them and what Twitter pushes in their direction. Twitter users experience a constant state of churn as new tweets enter the timeline, new follower-followee relationships are initiated, or others are blocked or muted. Information is viewed (or not) and processed, tweets are retweeted, some tweets receive replies, some are Liked, others become embedded in blog posts or, if they come from the President of the United States, become the subject of news reports. This mutation and flux is the fluid

learning that Sørensen (2009) proposed, or is simply learning assemblage. From both cognitivist and situated epistemologies, asking whether Twitter can learn has little meaning; without an individual person or people, there can be no learning. If learning is assemblage however, then Twitter, a tweet or a hashtag participate as part of that process; they are entangled within it. They transform, they reconfigure, they act and they bring about difference for all participants contributing to the assemblage.

A sociomaterial approach therefore enables an inspection of the kinds of learning assemblage that might emerge amongst those educators who are active on Twitter, the platform itself and the mediators through which information is exchanged. Certain practices may become stabilised, and therefore produce more significant and ongoing effects, whilst others become marginalised and disappear. One might therefore explore what needs to be assembled in order for learning to be enacted and what forms of learning assemblage consequently succeed and fail.

Learning can be conceived then as an individual enterprise of interpretation and representation, as collegial participation in shared, situated activity, or as ongoing (re)formation of webs of relations generated as a process of assemblage. These apparently different phenomena could be explained by assuming they represent different worldviews or different perspectives on the same phenomenon; interpretative, participatory or relational. To do so however, assumes a single, independent, anterior world 'out there' from which we make sense of 'in here' in order to be able to represent it. This may be consistent with a view of learning centred on the individual, but lacks coherence with the relational view in which learning is not sense-making of an anterior, exterior world, but bringing the world into being through assemblage. What an actor-network theory approach provides is a shift away from the visual metaphors of different perspectives, different views or different lenses. The alternative it offers is one of performance, interaction and enactment, of things being done. In this rendering, different performances will result in the production of different worlds, different realities. There is no anterior notion of learning, whether process or product; whether interpretation, participation or performance. What learning is depends on how it is performed. The different realities which emerge present what Mol (1999) refers to as 'ontological politics.' How institutions and individuals choose to support, guide, provide, encourage, review, record, assess or participate in professional learning will determine the learning they bring about. If their ontology assumes for example, a single, acquisitional, cognitive notion of learning, then their actions and the outcomes will perform that particular kind of learning.

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Having explored how learning is manifest through a sociomaterial perspective, I now move on to consider the empirical approach needed to tease apart some of these issues.

Ethnography online

Ethnography is an approach suited to answer research questions which address the broad aim of exploring 'what's going on here.' With its roots in anthropology and the study of social organisation and culture, over the years ethnography has developed a variable and contested character (Hammersley & Atkinson, 2007). Nevertheless, at its most basic, ethnography is described as both a process and a product; a form of inquiry and a descriptive account of the lives of writer and those written about (Denzin, 1997). The process, according to Hammersley and Atkinson (2007, p.3) involves:

> *[...]the researcher participating, overtly or covertly, in people's daily lives for an extended period of time, watching what happens, listening to what is said, and/or asking questions through informal and formal interviews, collecting documents and artefacts – in fact, gathering whatever data are available to throw light on the issues that are the emerging focus of inquiry*

This begins to highlight some of the basic features through which ethnography can be identified and conducted. LeCompte and Schensul (2010) go on to identify seven characteristics of ethnography:

- Carried out in a natural setting
- Involves intimate, reciprocal face-to-face interaction
- Accurately reflects/emphasises participant perspectives
- Uses inductive, interactive data collection and analysis
- Uses multiple data sources
- Frames human behaviour within socio-political and historical contexts
- Uses culture as the lens through which to interpret results.

Although I subscribed to the broad aims of ethnography, as outlined by Preissle, LeCompte and Tesch (1993), in that I would be looking to represent the worldview of participants through an empirical and naturalistic study using an eclectic mix of data collection strategies to construct a holistic description of a phenomenon, I also envisaged a number of issues. The first arose from conducting an ethnographic study in an online setting. How does one become 'immersed' in an online setting and gain depth of understanding, what is the nature of the field under those circumstances, and how is

culture is manifest? In the following section, I discuss these and other related issues in more detail.

Ethnographic approaches which have included the online world have come to be known by a variety of terms: cyber ethnography (Dicks & Mason, 1998), virtual ethnography (Hine, 2000), Internet ethnography (D. Miller & Slater, 2000), digital ethnography (Murthy, 2008), and netnography (Kozinets, 2009), to name a few. They are in some ways distinct, yet also share similarities and have spanned a wide range of topics: virtual communities (Rheingold, 1993), soaps and fandoms (Baym, 2000), online games (Nardi, 2009), virtual worlds (Boellstorff, 2008). There are essentially three different types, depending on where they make their stand. Boellstorff (2008), in his study of Second Life, a virtual world, was exploring an online culture within a bounded online field site and was conducting all his interactions online. The other end of the spectrum concerns ethnographies conducted where the Internet is viewed as a cultural artefact (Hine, 2000). Here the study would attend to people in offline settings, but who are using the Internet for particular purposes: '[...] if you want to get to the Internet, don't start from there.' (D. Miller & Slater, 2000, p.5). Overwhelmingly however, if the Internet is impacting people's lives, then at some point it will be necessary for the ethnographer to go there, and like research participants, straddle the online and offline worlds.

In choosing ethnography as their approach, many researchers opt for classic methods and techniques; however, some of the underlying principles can be troubled when shifting online. Arising from its anthropological roots an ethnography would often involve travelling to a place, remaining there over a protracted period of time, observing and participating in the activities of locals, whilst seeking to gain deep insights into the nature of their lives. When ethnography incorporates the Internet, where space and time are configured differently, those characteristics have to be re-examined.

In a classic study, the *place* where the researcher goes and from where the study is conducted is called the field site. This conveys a notion of spatiality; however, the topography of the Internet renders it difficult to conceive in those terms. Even where a community is associated with a particular environment like World of Warcraft, Second Life or Facebook, those applications may provide only a point of entry (Burrell, 2009), rather than a place to *be*. Rather than a location, or even the sequence of different locations encountered in a multi-sited approach, the online 'field' might be better conceived as a fluid, emergent construct which requires mobility to navigate its features. The ethnography

becomes characterised by flow and connectivity, rather than location and boundary (Hine, 2015).

If the field site is less well-defined at the outset, then this naturally leads one to consider where its boundaries might be and how they can be delimited. When and where are the right places to stop? Kendall (2009) suggests three spheres of influence which help make that decision: analytical, ethical and personal. The theories and approaches we bring to analysis help inform our decisions in choosing when and where to call a halt. The ethical decisions we take to protect or celebrate our participants often determine whether we should take a particular line or not. Finally, as a researcher we bring certain skills, capabilities and proclivities which influence the choices we make in deciding how to proceed. These influences then generate certain spatial, temporal and relational boundaries. The spatial boundaries are specified by what and where we choose to study. Temporal boundaries are generated by the time we can spend, moment by moment in each research visit, and overall for the whole study. The relationships which form between researcher and other actors specify the relational boundaries.

A fundamental element of classic ethnographic research is that of prolonged immersion within the field, or as O'Reilly (2012, p.13) terms it 'direct and sustained contact with human beings, in the context of their daily lives, over a prolonged period of time.' However, in the context of research on and through the Internet, what does sustained contact entail? It departs from the anthropological notion of being immersed in a culture by living within a community for an extended period, yet still involves participating in the mediated world and 'living part of one's life on the Internet, keeping up-to-date with and participating and collaborating in social media discussions' (Postill & Pink, 2012, p.128). Postill's regular practice involved catching up, sharing, exploring, interacting and archiving, though this is unlikely to be undertaken in long, uninterrupted periods. In the same way that participants dip in and out, check updates and attend to notifications, so too will the researcher as they switch between different media and different platforms in following participants and maintaining relationships.

Being immersed in the field, however that becomes manifest, enables the researcher to observe and learn how activities happen. They are able to gain an embodied understanding of how activities feel, beyond the verbal accounts that participants can give (Hine, 2015). What constitutes observation in the mediated online world may need rethinking. The activities one sees and in which one is engaged will often be textual in nature, temporally shifted from the moment of creation and less ephemeral than a verbal utterance or physical

gesture. The trails left behind are available for the researcher to capture through a variety of tools, so the overhead of recording action in field notes is somewhat reduced. However, the need to note one's feelings and reflections remains paramount; field notes are after all, both data and analysis (DeWalt & DeWalt, 2002). In conventional ethnographic encounters, the action is likely to be fleeting, so the need to make swift notes as soon as possible thereafter, then flesh out the details later is understandable. When the 'action' observed is in the form of an inscription to which one is exposed after the event, the imperative to immediately note its nature is reduced. As a consequence, when one begins the process of analysis, one can not only return to initial reflections, but also to the data which generated them.

Although my study exhibits some ethnographic characteristics, it is neither restricted to people, nor culture. Despite employing some of the classic methods associated with ethnography, like participant observation, formal and informal interviews, documentary analysis (Whitehead, 2005), I've also experimented with untried methods, and reimagined the process of taking notes. The 'field' in my study is not delimited to a particular place, because as Markham (2016, p.2) notes, 'the boundaries are built discursively, or through connection, interest, and flow, rather than geography, nationality, or proximity.' Immersion becomes more intermittent and reflects the experiences of other participants, although still honours the requirement for prolonging one's exposure over an extended period of time. Finally, since one is almost invariably obliged to be looking into the past, whether by a minute, an hour or a day, and what one observes is often textual exchanges, the act of observing changes.

For all these reasons, I describe this study as one to which I bring an ethnographic sensibility, rather than conducting a strict ethnography. This sits comfortably alongside the sociomaterial and ethical sensibilities I also choose to adopt. A sensibility suggests a sensitivity and capacity to respond to what one encounters. It follows the principles of Hine's (2009; 2000) 'adaptive ethnography' in being able to accommodate and respond to situations and issues as they emerge. This ethnographic sensibility is manifest through the flânography to which I now turn.

Flânography: ethnographer meets the flâneur

Flânerie, the activity in which a flâneur engages, has perhaps unsurprisingly gained traction as a concept within the field of urban geography (Schutt, 2017; Wolfe, 2017). Jenks and Neves (2000) describe it as both a theoretical concept and a kind of method for

understanding the social life of urban contexts. Emerging at the turn of the 19th century, the flâneur, as portrayed first by Balzac and subsequently Baudelaire (Elkin, 2016b)[25], is an artist whose ambulatory experiences provide inspiration from the city for his work. Note the masculine form, for the capacity to freely wander 19th century streets was almost entirely the province of men. In 'The Painter of Modern Life' (Baudelaire, 1964), Baudelaire's flâneur is well placed to serve witness to the rise of modernity during a time of great change in Paris.

Often credited with rejuvenating awareness of flânerie in the 20th century, Walter Benjamin's account opened in 1927 as an article for a newspaper, then developed into an essay, followed by a series (unfinished, due his untimely death), and eventually translated into English and assembled into a book: The Arcades Project (1999). Curating and interpreting the works of Baudelaire and many others, Benjamin presents the flâneur as a 'poet of urban spaces' whose gaze collects the transitory and fleeting (Tester, 1994, p.7). Equally at home in the cafes or on the boulevards of Paris, his purposeful strolling made him a collector of social knowledge and producer of texts (Skees, 2010). As someone who 'should/could not merely mingle with the crowd, but is an interactor and thus a constitutor of the people's crowd-like-ness' (Jenks & Neves, 2000, p.9), this notion seems to align with an actor-network sensibility.

As I observed on p.15, the flâneur and ethnographer share common approaches; they are both concerned with people and places, and both seek to produce detailed description as a result of careful observation. Ethnography constitutes both a processes and a product, so too flânerie. As a form of ethnography, Flânography is nevertheless distinct, having differences which I will now attempt to set out.

From the time of Malinowski's (1923) study of the Trobriand Islanders in which shells, beads, necklaces, armbands, and canoes formed an integral part of ritual and economic exchange, materiality has featured prominently in ethnographies. One might argue that the material appears as a cultural artefact, an adjunct to, or product of culture. Alternately, some might view tools and material practices as *producing* culture. A sociomaterial sensibility on the other hand troubles these views, resisting the decoupling of the human and nonhuman, attending closely to the relationships which produce 'things,' and decentring humans and culture as the focus of study. When that focus instead becomes assemblage, a different form of ethnography is required. One solution might be to conduct ethnography

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[25] https://www.theparisreview.org/blog/2016/08/25/radical-flaneuserie/

with a sociomaterial sensibility in a similar way to Kohn's (2013) posthuman exploration of the Amazon rainforest. Flânography, for me, offers one way to integrate that sociomaterial sensibility, but also incorporate the other elements to which I now turn.

The second issue I wish to address concerns mobility, and although the ethnographer is often mobile, following activity from place to place, I feel movement for the flânographer is subtly different. The way I scroll and scan through the Twitter timeline, then follow links from tweets to other tweets and elsewhere on the Web, nods towards the wandering, strolling, nature of the flâneur. The sense of pace is more leisurely; casual almost, but doesn't stray into idling or plodding. There are resonances with Latour's (2005, p.9) ANT-infused researcher as a 'workaholic, trail-sniffing, and collective traveller,' but less so with White's (2001, p.16) '*aimless* stroller who loses himself in the crowd, who has no destination and goes wherever caprice or curiosity directs his or her steps' [*my emphasis*].

Not only does mobility involve traversing online spaces, but also shifting through time as blog posts authored minutes or months ago are observed. Asynchronous conversational exchanges may unfold over days. Each 'stroll' the flânographer takes may only occupy a few minutes and consequently render a partial account, yet each contributes cumulatively to the emerging picture. 'Immersion' for the flânographer is not typified by intensity, but by accretion through return visits. Since browsers maintain a record of the locations visited, it is a short step to see this by imagining a flâneur wearing a GPS-enabled tracking device. Browser history becomes like a Strava heatmap[26] and provides that ongoing, cumulative record of where and when the flânographer was mobile.

The notion of 'mapping' one's mobility is the third element of a flânography, and in which the flânographer traces out pathways of experience. This is not restricted solely to data gathering however. Observation, ongoing sense-making and mapping during the course of traversals are manifest in each of three phases – data collection, analysis and presentation. I use 'traversal' here in a similar way to Lemke (2004), as temporo-spatial movement across settings and activities. It is about being mobile by following and making interconnections and associations. The flâneur's sensibility means applying the same strategy consistently across the strands of the study. One aspect of this involves generating visualisations which attempt to render visible the traversals, whether through the 'field,' through the data, or in the findings. Although Rizk and Birioukov (2017, p.3271) see the flâneur as a non-

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[26] https://www.strava.com/heatmap

participant within the field of inquiry, they propose the capturing and presentation of visual images as a fundamental component of flânerie research:

> *Through the visual images, the reader is able to join the flâneur on a "stroll," and simultaneously understand how the researcher engages with a specific setting. However, the flâneur's experiences are not given privilege over other forms of knowing and learning*

Rizk and Birioukov (2017) captured and presented photographic images, whereas flânography for me involved screenshots and visualisations. For example, in composing field notes, rather than extended textual passages describing and reflecting on the observations, I used MindView[App] to couple together data and the traversal which produced them within a visual form (See Figure 6 which I discuss in more detail in 'Participant Observation', pp.62-69).

Being invisible is not unusual for an ethnographer, whether that's through covert research, such as in Holdaway's (1983) insider research on the British police force, or simply prior to being afforded the opportunity to declare one's status as a researcher. A further difference in my flânography is through a different form of invisibility; almost being there 'in plain sight.' As Skees (2010, p.285) notes, 'The individual in cyberspace, as the flâneur in the arcades, is isolated and yet undetectable,' and is therefore a different detached observer than the embodied ethnographer can be. When observing,
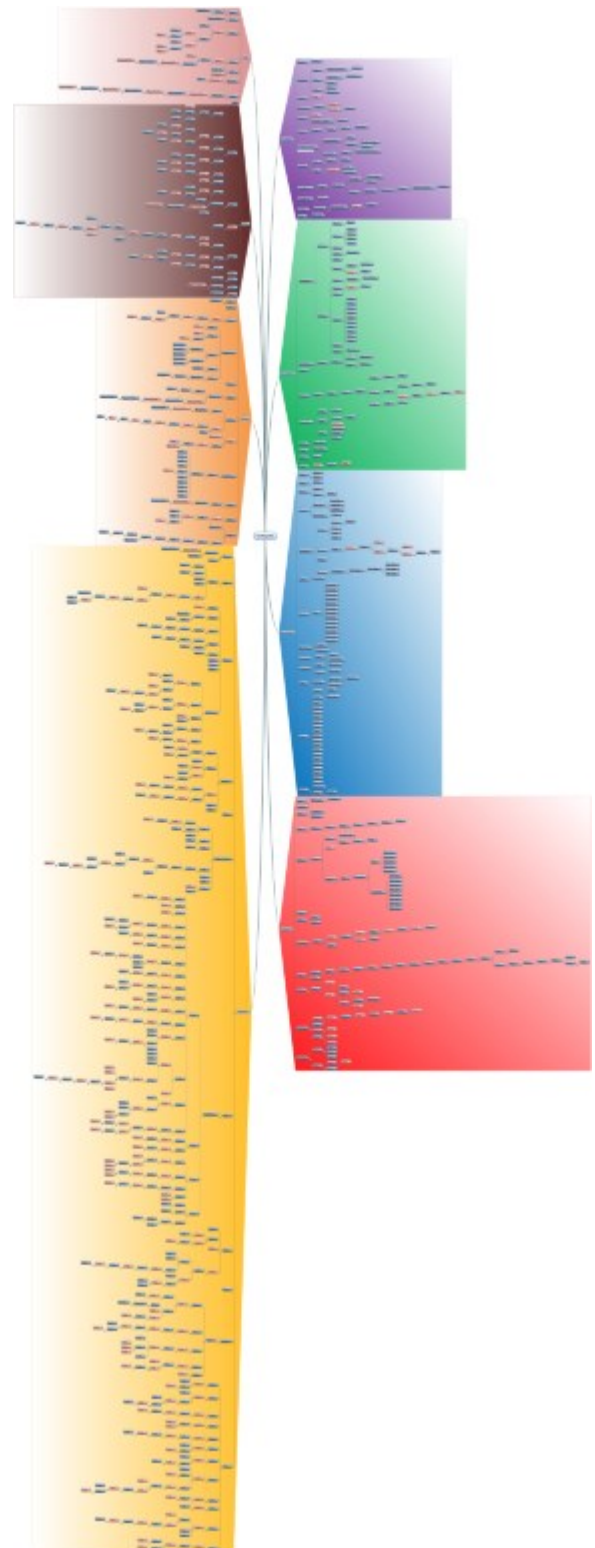

Figure 6: Field notes mind-mapped

rather than participating, the flânographer is inevitably hidden from fellow participants. As McGarrigle (2013) notes however, one nevertheless leaves swathes of digital footprint data for Twitter and other online platforms to hoover up. Invisible to human participants perhaps, but not to platform algorithms and network traffic databases. One might frame this as sociomaterially-adjusted visibility.

As a chronicler present on the cusp of significant change, of commercialisation, urbanisation and (in Paris) Haussmannisation, the flâneur straddled the threshold between the old and new. As Hogan (2016, p.388) noted, in Baudelaire's work, the flâneur was ideally placed to interpret modernity, and had 'a key role in characterising and understanding the vastly changing city of Paris.' The widening of boulevards, introduction of electric street lighting, and conversion of alleyways into 'Arcades,' were both subjects of study for the flâneur, but also contributed to his practice. It is that close association with witnessing transition that I offer as the final way flânography differs from ethnography. Cyberflânerie, for Hogan (2016, p.382), 'can be thought of as a 'threshold' methodology; a new way of looking at social relations in changing times with attendant methodological benefits and shortcomings.' When social media begin to participate in professional activity, one might argue that constitutes 'changing times.'

For my study, I choose to leave behind White's (2001, p.16) 'aimless stroller,' and also decline to follow Benjamin's more purposeful, intentional, though still somewhat detached flâneurs; they were too divorced from the activities of those they observed. Instead, the flânerie I adopt for this study requires involvement, participation and visibility; being of the crowd, in the crowd and *with* the crowd. Not only a crowd of people however, a *sociomaterial* crowd. I propose *flânography* as a hybrid approach arising from ethnography and flânerie, and informed by an ANT sensibility.

A flâneur's companions

Unlike the flâneur, I do not intend to travel alone and, taking a lead from Boylan (2013), I will be sharing my travels with three ANT-imbued companions: assemblage, multiplicity and fluidity. I have chosen them for their perspicacity and their capacity to reveal something new about the phenomena under study. Although, as Bueger (2013, p.339) claims, 'ANT researchers explicitly refuse to be nailed down to a limited set of theoretical terms. "Using" ANT in research practice means to invent and reformulate earlier ideas in the context of actual problems and situations,' I choose to at least commence the endeavour with a manageable coterie of companions. Rather than 'theoretical terms,' and in

keeping with the theme of this chapter, I see them more as a set of sensibilities which complement one another.

Assemblage

The 'actor' in actor-network cannot be separated from the hyphenated term; they are one and the same. An actor-network is likely to be co-constituted with other actor-networks, whether as part of, or composed from them. For example, a smartphone could be described as being enacted by microcircuits, apps, passwords, touchscreen, camera, keyboard characters, notifications and more. Alternately it could be described as part of a social network in which people, laptops, smartphones, apps, wireless signals, avatars, statistics and emojis. But of course any of the aforementioned could be an actor-network in its own right.

An alternative view to conceptualise this is through the notion of assemblage. Law (2004, p.42) describes assemblage as 'a process of bundling, of assembling, ... in which the elements put together are not fixed in shape, do not belong to a larger pre-given list but are constructed at least in part as they are entangled together.' He posits that there is little difference between actor-network and agencement (the term coined by Deleuze and Guattari which, when translated by Massumi (1987, p.90), became assemblage). It would be wise here to note that assemblage acts as both noun and verb; hybrid assemblages of ideas, symbols, materials and meanings are more than static agglomerations, but are always active in reconstituting themselves (Fenwick & Landri, 2012). They connote 'active and evolving practices rather than passive and static structures' (Verran, 2009), so seem particularly appropriate to explore professional learning. Fenwick and Edwards (2013) classify learning as a 'materialising assemblage,' rather than merely a cognitive achievement or way of interacting. Actor-network theory then enables us to trace how assemblages are sustained and maintained, how they reconstitute themselves, how they produce other objects and how they might decay.

Assemblage is part of the team so that I am less tempted to focus on actors as individual entities, sitting in isolation from one another and coming together to be connected. It will remind me to attend to actor-*networks* and the ways in which the effects they produce change when different sociomaterial elements are included or excluded.

Multiplicity

In reviewing the outbreak of foot and mouth disease in the UK in 2001, Law and Singleton (2015) presented it not as a *single* disease, but several. For vets, foot and mouth is a

condition within the body, revealed by the symptoms apparent during examination. In the laboratories where confirmatory tests were performed, foot and mouth was a virus; an antigen-carrying, antibody-provoking sub-microscopic particle. For the epidemiologists attempting to track the spread of the disease, foot and mouth was a traceable condition that spread from location to location through a susceptible population. Rather than taking this as the different *perspectives* of vets, laboratory technicians and epidemiologists viewing foot and mouth as a single reality, sociomaterial approaches show this is as a host of different practices are being performed in different places – multiple realities. With a global northern/western metaphysics, this is a far from easy concept to grasp, but this is where I must go.

Other analyses which illustrate multiple realities include the management of alcoholic liver disease (Law & Singleton, 2005), the different 'salmons' that are performed in a commercial fish farm (Law & Lien, 2013), the clinical and statistical performances of anaemia (Mol & Berg, 1994) and the enactment of educational policies (Fenwick & Edwards, 2011a).

With multiplicity on board, I am better attuned to different possibilities. Rather than being drawn towards a plural perspective view of a single reality, I remain open to the possibility of multiple realities being enacted by different assemblages.
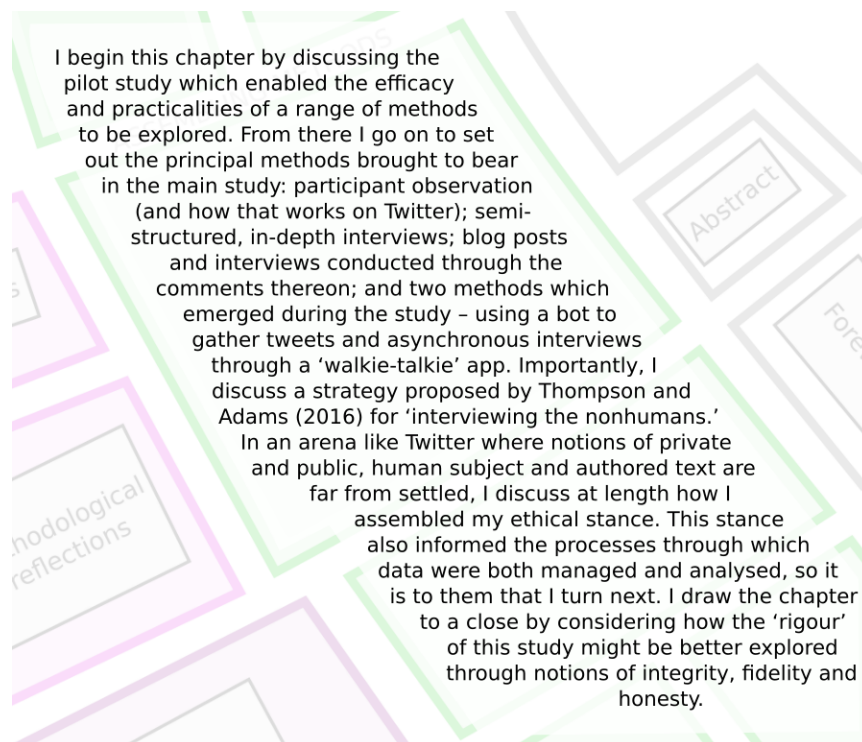
Fluidity

Once the possibility of multiple realities is accepted, the next step is to ask how those realities are related to one another, and the ways in which they dovetail or interlace with one another, or indeed don't and are held apart. Realities may hold their form through discontinuity or by Othering one another, or indeed they may hold together because they flow into one another (Law, 2009). Whereas in 'Early-ANT,' relations are ordered by the circulation of *immutable* mobiles which maintain their form, in later versions, the same objects and texts flow, but also change shape as they move; they are *mutable* (Moser & Law, 2006).

In a classic study which illustrates these principles, de Laet and Mol (2000) described the design, distribution and performance of a device for pumping clean water to supply villages in rural Zimbabwe. The 'Bush Pump' was designed simply so that when parts wore out, they could be replaced with whatever was to hand. As a consequence the pumps changed as they accommodated local needs. They are a fluid technology because they vary over time; they are flexible, adaptable, responsive and travel well. For longer term performance and across a variety of locations, fluidity proved to be precisely what was needed. Whilst in

this case, fluidity proved to be valuable, that cannot always be taken for granted. In their study of alcoholic liver disease (ALD), Law and Singleton (2005) found it to be a mutable mobile; one that shifts and adapts itself according to circumstances. In this study however, the shape changing fluidity of ALD might also involve changing name and become manifest as alcoholic cirrhosis or alcoholism, none of which could be considered acceptable or desirable outcomes. This final companion, fluidity, helps me remain sensitive to relations that change and mutate (Sørensen, 2009) and might therefore reveal emergent possibilities and improvisation (Burnett, 2017).

In this chapter I set out how I assembled an approach based on assuming a set of sensibilities, rather than laying out strict methodology. I have outlined how flânography constitutes a form of ethnography with distinct features; a form: which addresses assemblage rather than culture; which adopts a sociomaterial sensibility; where mobility is experienced and mapped differently and is manifest across data gathering, analysis and presentation; and which is comfortable with and within transition and change. In the chapter which follows, I will discuss in more detail how this flânography was assembled, the accommodations which were made and the challenges which arose.

4 ASSEMBLING METHODS

I begin this chapter by discussing the pilot study which enabled the efficacy and practicalities of a range of methods to be explored. From there I go on to set out the principal methods brought to bear in the main study: participant observation (and how that works on Twitter); semi-structured, in-depth interviews; blog posts and interviews conducted through the comments thereon; and two methods which emerged during the study – using a bot to gather tweets and asynchronous interviews through a 'walkie-talkie' app. Importantly, I discuss a strategy proposed by Thompson and Adams (2016) for 'interviewing the nonhumans.' In an arena like Twitter where notions of private and public, human subject and authored text are far from settled, I discuss at length how I assembled my ethical stance. This stance also informed the processes through which data were both managed and analysed, so it is to them that I turn next. I draw the chapter to a close by considering how the 'rigour' of this study might be better explored through notions of integrity, fidelity and honesty.

Pilot Study

A pilot study is often conducted to test the adequacy and efficacy of the proposed methods in the context of a larger project (van Teijlingen & Hundley, 2001). The intent here was to reveal issues and barriers related to recruiting potential participants, to explore the use of oneself as a researcher in a culturally appropriate way and to test and modify interview questions (Kim, 2011). Although familiar with Twitter as a participant, conducting a pilot study also allowed me to gain familiarisation *as a researcher*. Drawing from Schensul, Schensul & LeCompte (1999), Barley (2011) outlines four components which assist familiarisation in an educational context: 'map the setting, learn the routines and rules of the school, locate and build relationships, and negotiate a researcher role.' These proved useful as I renegotiated my role within Twitter and beyond.

Data gathering instruments

I designed the pilot study to incorporate six methods:

1. Participant observation - in and beyond Twitter (though still online).
2. Semi-structured, in-depth interview - convenience sample of a teacher self-identified as using Twitter for professional development.

3. Blog post analysis - discourse analysis of a blog post discussing Twitter use for professional development.

4. Focused observation - on a single individual's Twitter behaviour over a period of 1 month.

5. Blog interview - using the 'comments' section of a blog post to conduct an interview.

6. Focus group - conducting a focus group through the medium of a Twitter hashtag chat.

The ethical issues which were encountered and addressed are discussed at greater length in Ethics (pp.81-86).

Outcomes

Given the range of methods being tested and that this was a pilot study, conducting a full and rigorous analysis for each, then synthesising those findings would neither be appropriate, nor practical in the time available. The table in Appendix F takes each of the methods in turn, summarises my observations, perceived advantages/disadvantages, and whether I felt it was appropriate to take each forward into the full study. As can be seen, **participant observation** was chosen as an unobtrusive method to obtain naturalistic data arising from participants and their behaviours. **Semi-structured interviews** provide access to participants' views and beliefs which may not be manifest in their activity on Twitter. An archive of **blog posts** authored by educators on the topic of Twitter was curated. This archive offers a source of pre-existing material akin to that used in documentary analysis, but one through which it may be possible to engage the author(s) in dialogue. The decision not to take the remaining methods forward was on the basis that they didn't yield fresh insights, or that similar data could be obtained within the other methods.

In the next section, I discuss the principles which guided the main study and the methods which were finally used.

Methods

Different methods produce or perform different realities. Settling on a single method would therefore produce a narrower view. Since it was not my intention to seek the 'whole truth,' but instead to reveal new truths, I elected to employ several methods, some of which were carried forward from the pilot study, together with one new method, 'thinking aloud.'

Participant observation carried out on Twitter involved three elements: scanning my timeline, conducting searches for tweets containing particular terms, and following hashtags and other actors. This would sometimes involve ethnographic interviews – brief, one-to-one exchanges with participants through Twitter. I also
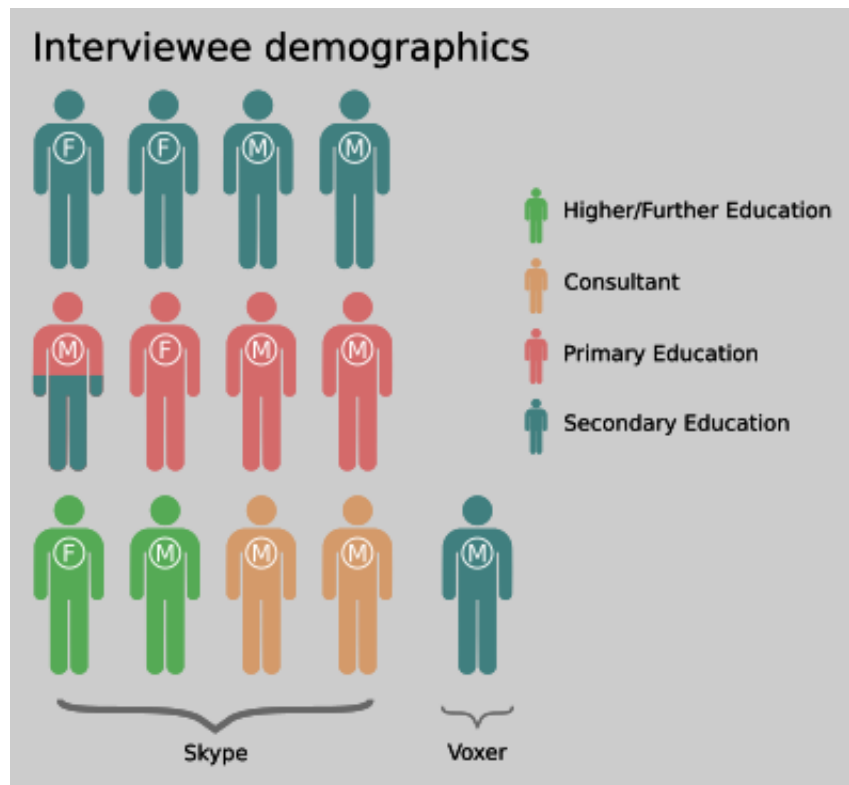

Figure 7: Interviewee demographics

conducted twelve pre-arranged, semi-structured interviews using Skype, plus one asynchronous interview using the Voxer app. Demographics of those who completed interviews – from the 12 females and 12 males invited – are shown in Figure 7.

I also initiated eight 'interviews' with blog post authors by using the 'comments' feature. Of these, three subsequently developed into some of the above in-depth Skype interviews. In the sections which follow I explore each of these methods in more detail.

Key participants

Finding the appropriate term for some of my research participants has proved challenging given the extent to which they chose to become more actively involved in the research. This perhaps reflected the general participatory nature of the environment. When someone becomes aware that someone else is seeking information on a topic, then they will often point them towards any information they come across, or of which they are already aware.

I use the term 'key informant' merely as a starting point from which to explore further. For Payne and Payne (2004, p.2), key informants are:

> *"[...]those whose social positions in a research setting give them specialist knowledge about other people, processes or happenings that is more extensive, detailed or privileged than ordinary people,*

and who are therefore particularly valuable sources of information to a researcher, not least in the early stages of a project."

These people have more information to impart and are generally more visible than 'ordinary' informants. This doesn't seem to capture the nature of those in my research, who would baulk I suspect at the idea that they are somehow special. O'Reilly (2009) sees the term more loosely, capturing people who '[...]become central to the ethnography for one of a number of possible reasons,' but quoting Spradley (1979) who describes 'encultured informants' as people who '...are consciously reflective about their culture, and enjoy sharing local knowledge…' brings me closer to my experiences.

I 'knew' some of my encultured informants prior to commencing my research; we had exchanged posts on Twitter and each other's blogs. They were therefore naturally curious about my research and interested in seeing how it unfolded. They occasionally commented on my research blog, or referenced it in some of their posts. But if they saw a tweet, blog post, podcast, video or article they thought might be related to my research, they would bring it to my attention. As the research unfolded, other people also joined the ranks of 'encultured informants;' a handful of those I interviewed continued to provide information long after our initial contact.

Given the extent to which these people voluntarily participated in the research, perhaps 'key participant' might be a more apt description. 'Participant as Co-researcher' might be appropriate, but Boylorn (2008) proposes participants be *invited* to become more deeply involved, from the initial inquiries of the investigation to findings and conclusions. That wasn't the case in my study, where those participants who did become more involved did so as a part of their ongoing participation in the social web. They found something that sparked their interest; they joined in, became involved on their terms and were free to drop out as they chose. They might therefore be categorised as co-researchers, based on a looser and more participant-centred set of associations.

I discussed my thoughts at greater length in a blog post[27], which attracted one response from one of the people concerned who expressed the view that 'informant' was a rather loaded and unappealing term, and for him, 'participant' was the preferred option.

Participant observation

In a conventional ethnography, participant observation involves observing and participating in the activities of cultural members in their natural setting over an extended

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[27] https://cpdin140.wordpress.com/2017/08/28/participant-contributor-or-co-researcher-which-are-you/

period of time. Planning observation involves considering a number of factors: what, when and who to observe, how to record observations, and what to do with those observations subsequently (Kawulich, 2005). Participant observation can be used to seek a holistic understanding of a phenomenon which is objective, accurate and, when used with other methods, increasingly valid (DeWalt & DeWalt, 2002). For Schensul, Schensul and LeCompte (1999), it provides the means through which a researcher might get a feel for what is happening, how things are organised and to begin to establish relationships with informants.

Whilst I identify with some of those aspects, for me things were noticeably different. I wasn't embarking on my participant observation without prior knowledge and experience as outlined earlier. I had in fact been a participant for a number of years. I already had a 'feel' for the situation (albeit not from the researcher perspective), had a sense of how things were organised, and had already established some relationships. Nor was I seeking an 'objective, accurate' record of the phenomenon. Mine would ultimately be a partial account, informed by my prior experience and understanding.

Observation can involve attending to the setting, the people who are present and how they interact, the events which take place, and the conversations which are exchanged. Throughout the observation, and where appropriate, notes should be made which are subsequently written up in more detail and supplemented with reflections which might inform subsequent observations. Spradley (1980, p.78) suggests a number of elements which could provide a starting point for observations, including: space, actors, activities, objects, events, acts, time, goals, and feelings. In a physical context, one might have a sense where attention should be drawn to observe those elements. With its different spatial configuration and distorted sense of time, Twitter obliges the researcher to think differently. Participants may share the Twitter platform, but what each person sees and experiences will be different, depending on the device and application they use (Gillen & Merchant, 2013).

Participant observation is not only about being present and merely observing. The act of participating enables a better understanding of the phenomenon however, one is obliged to consider whether it is possible to both observe and participate. Gold (1958, pp.219-222) offered four stances that might be taken: complete participant, participant as observer, observer as participant and complete observer. Spradley (1980, pp. 58-62) describes a similar typology of five steps ranging from non-participation, through passive participation to complete participation. Whilst a researcher might choose a particular role, or have one
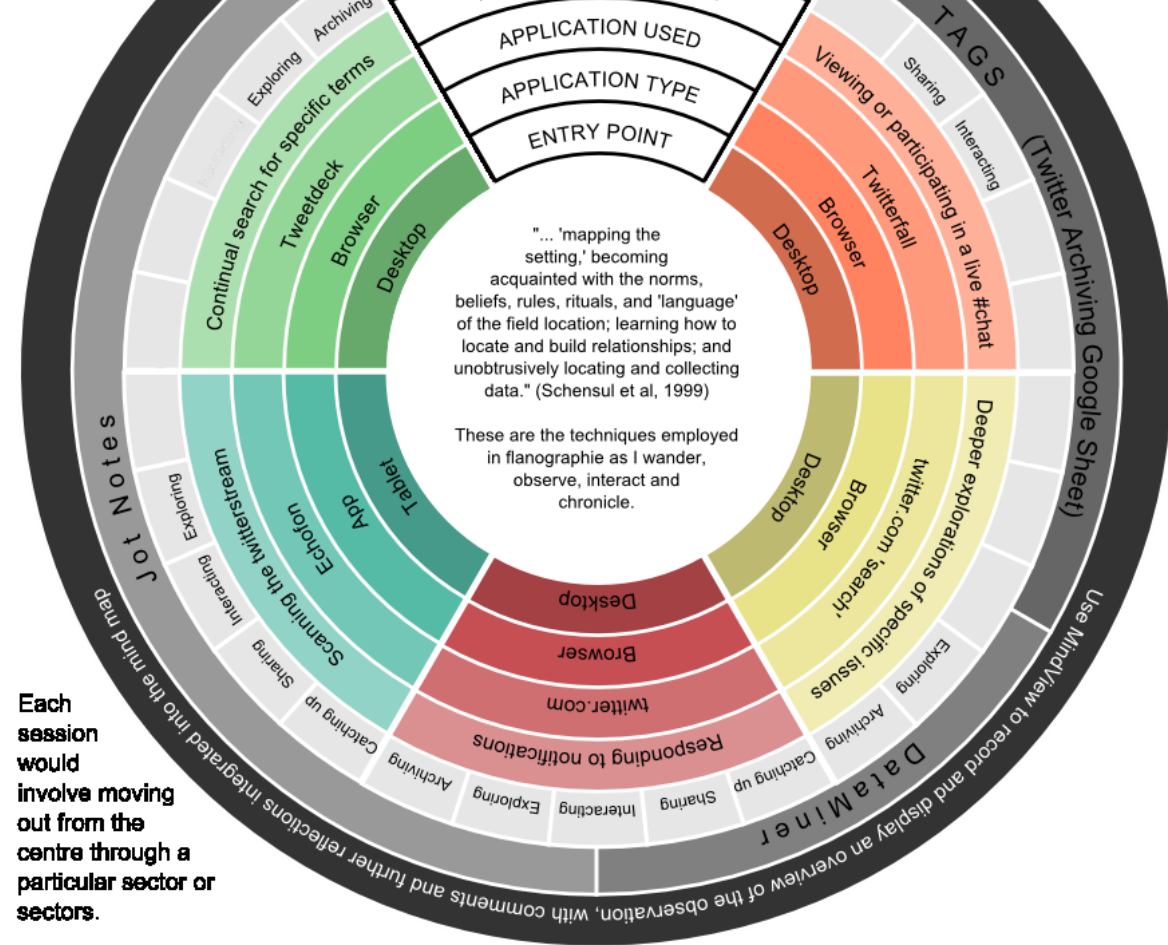
imposed upon them, for me, it was about adapting to the circumstances in which I found myself. There were times when I would be participating in the way I always had; for example by retweeting tweets, by sharing links to resources, or by answering queries people posed. At other times I would be solely observing. But this reflects the way that people use Twitter more generally, switching between times of active involvement and more passive observation, or in the vernacular, 'lurking.'

When asking 'How does one conduct "participant observation" of Twitter?' Markham (2013a) expresses the view that it is not possible to transfer participant observation from physical contexts to the mediated social space of Twitter. That may indeed be the case if participant observation demands observation of other people involved in the activity itself. What an observer also on Twitter actually sees is the outcome of that behaviour and activity, after it has been mediated.

I explored Twitter in several ways: a daily scroll through my timeline, scanning the tweets and retweets from the 3500+ educators I follow; focused searches every few days (usually using Tweetdeck^{App}) for tweets containing specific terms e.g. "professional development" AND "twitter"; 'attending' particular 'events' like hashtag chats (which I explore further in the next section); and following particular hashtags. Figure 8 summarises the different activities which took place during these different observation sessions.

Figure 8: Visualising participant observation

In addition to the field notes that these produce and which I will discuss shortly, the tweets gathered as data consist of single tweets, brief exchanges between two or three people, and the much larger exchanges from hashtag chats. [*For the reader keen to know more about how I conducted an observation session, I have recorded a 'thinking-aloud' of a typical session on Twitter*[28]]

When I scan Twitter, I'm constantly seeking tweets which attract my flâneur's gaze. This attempts to identify activity that I might attribute as professional learning and involve participation with, and observation of, people and places, tablets and Twitter, Likes and links, and hashtags and homepages. In addition, I'm also open to people discussing their

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[28] https://cpdin140.wordpress.com/2017/05/21/what-do-i-do-when-i-do-twitter-2/

professional learning in general, and particularly when they mention Twitter. Tweet 3 is one example which caught my attention:

Tweet 3

At the heart of this tweet is a link to where the issue is discussed more fully, so I'd follow the link, which in this case is an article, but could easily be a blog post, video or podcast. If what I found there had something more to say about Twitter and PD/PL, I might want to simply take a note of what it said, or if I felt I needed more clarification and commenting was available, I might pose a question with a view to entering a discussion. In some cases, that one article or post might have links to other sources, so I'd follow them until the trail ran cold (no further mention of Twitter PD/PL). In the above example, I took things no further, since the article itself didn't really help me answer my research questions.

As I continue to scroll through my timeline, I might encounter tweets which mention Twitter and PD/PL in the tweet itself and I might want to follow that up with a question to the author as an ethnographic interview-style exchange. Occasionally tweets might mention ongoing or forthcoming 'events' of interest such as hashtag chats discussing Twitter and PD/PL. In these cases I'd make a note to 'attend' live, or follow up after the event. Figure 9 is a screenshot of my timeline with some typical tweets.
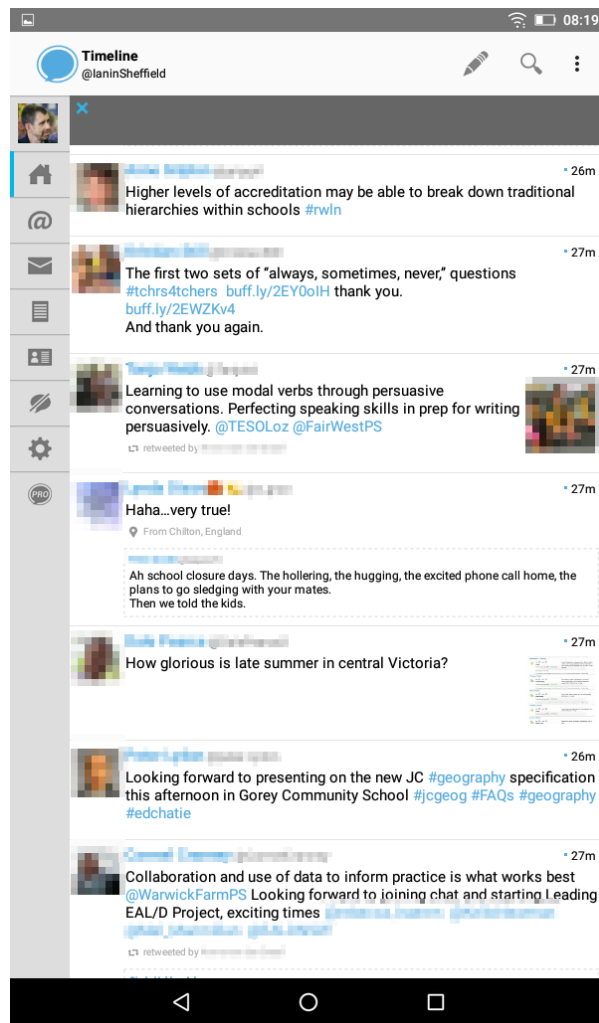
Figure 9: My timeline on a tablet

In ethnographic observation it is usual to make mental or jot notes if appropriate, then subsequently work them up into more detailed field notes. The digital world tends to be more 'sticky' than real life and traces of exchanges and events are left behind. By keeping a record of the url of tweets, posts, articles etc, I could return to them later. I always felt there was less need to be there and record what was happening 'in the moment.' This asynchronicity was the accepted way that things worked, so the imperative to make rapid, accurate observations, followed up swiftly in more depth so that details didn't become forgotten was not required. My initial notes at the time would include URLs, a brief description of the background, plus any immediate reflections such as this example in Figure 10:

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Links	Observational/Jot notes	Reflections
https://twitter.com/█████/status/7952576609 58511104 https://medium.com/█████/the-trouble-wi th-twitter-in-education-3950872399#.eebrcuja7 https://twitter.com/█████/7951068227052 58496 https://twitter.com/█████/status/794918495 930777600	Just checking through Tweetdeck on the "professional learning" AND twitter, and the "professional development" AND twitter columns. The first tweet listed was a 'quote' tweet, although I'm not sure about the tweet content and what was being conveyed - "Using Twitter as a professional learning network is "legacy thinking". #ThePowerOfTwitter". I sent a tweet to ██ asking for a little more. The quoted tweet was simply a notification by ███s of a post he had been reading by ███ ███ on Medium "The Trouble With Twitter in Education." ███ using the title as a quote from a skeptic so he can articulate the alternative viewpoint. The tweet from ██ ████ linked to the same ████ ████ post.	████ post is worth returning to and engaging with, as in ████ The ████ tweet attracted a lot of positive attention. Why? Following ████ s
https://twitter.com/█████/status/79434003 5344666625 https://twitter.com/█████status/79420180 6373027841 https://twitter.com/█████'/status/7939357 2447926 6816 https://twitter.com/█████/status/79139958 4039788545	█████, ██ was providing a link to a blog post by ████ ████ "6 Ways to Use Twitter To Enhance In-School Professional Learning", which needs unpicking further. ███████ was posting a graphic (as an answer to a #g2great chat question) illustrating different characteristics of professional learning, and claiming that Twitter delivers them all. 13 RTs & 14 Likes hints at the popularity. It would seem from ████████ tweet that he attended a session by ████████. There are a number of replies to the tweet echoing similar sentiments and ████ also includes two hashtags "Using Twitter to grow your own professional learning. Thank you ████████ ! #mespachat #principalsinaction" - increasing reach? ████████ appeared to be posting a question to a chat "Q6. How does Twitter and Twitter Chat help you build a Professional Learning Network (PLN)?	chat question by Twitter searching for responses provided a practical way of retrieving particular answers. Curated content lists provide rich pickings as a form of snowball research gathering technique - the 'spiralling outwards' that danah boyd discussed. The

IAN GUEST Nov 7, 2016   Resolve

Could also try advanced search techniques, if time interval needed specifying - shelf-life of searches?

Figure 10: Jot notes snapshot

I then transferred the details across to MindView[App] to keep track of all my activity, and where I could expand on the preliminary notes I'd begun to write, but complement them with reflective comments.

In addition to more general flânography like that described in the previous section, there are also more time-delimited 'events' which I 'attended' on Twitter. Hashtags are an amalgam of the hash or pound sign (#) plus a word or phrase, for example #edutwitter. When hashtags are included within a tweet, they become interactive; the Twitter algorithm turns them into an interactive element, which when clicked, initiates a search for all tweets containing the hashtag. This means hashtags can serve to pull all tweets on particular topics together and become a helpful, albeit limited, co-researcher in participant observation.

Educators are using hashtags on Twitter in a variety of ways but one particular strand of use attracted my attention. Hashtag chats describe a phenomenon where educators gather around a particular hashtag to participate in a discussion:

"[...]a many-to-many communication, where each message is addressed to more than one potential receiver and may be answered by more than one potential replier"

(Megele, 2014, p.47)

They usually take place in scheduled timeslots, have one or two moderators and often have a handful of prearranged questions on a particular topic. Some may involve a dozen or so people whilst others may attract hundreds. Variously conceptualised as communities of practice (Gao & Li, 2017), groups (Cook, Kenthapadi, & Mishra, 2013), personal learning networks (Luo et al., 2017) and third places (McArthur and Farley-White (2016), following Oldenburg (1989)), Twitter chats have become an increasingly popular activity on Twitter (Carpenter and Krutka, 2015).

Approximately three hundred educational chats take place each week[29], but rather than seeking and monitoring specific chats, I elected to pay attention to only those which fell within my flâneur's gaze. If I saw a tweet which referred to a chat in which the topic of teacher learning or professional development was being discussed, especially in the context of Twitter, then I would pay attention. This was done in two different ways. Initially, if the chat was a time when I could 'attend,' having participated in chats prior to commencing my research, I felt this was somewhat familiar ground. I could therefore monitor the chat as both observer and participant. Ethically I felt somewhat uncomfortable however, since questions I posed in the chat were often addressing my research needs, rather than addressing the chat topic. It could be argued therefore that I was disrupting or intruding on their activity, though I was never made to feel that was the case. [*Here I lay down the first of several <#ethics> markers which I gather together later in Chapter x*] Instead I subsequently chose only to *observe* during the chat, then to follow up later with any questions I had. Often this might be the following day.

Chats can be very intense, often with several hundred and even over a thousand tweets during the course of an hour. It can be difficult to monitor the flow of conversation using the chat hashtag and the standard Twitter search application. Participants often use an application like Tweetdeck[App] to help manage and respond to the flow of information; I chose to do so too. In addition to Tweetdeck, I also used TAGS[App] (Twitter Archiving Google Sheet) to collect the tweets for later analysis and for me to review the chat for any tweets I had missed due to the frenetic pace. Given the international distribution of chats, it wasn't always feasible to be 'present' at the scheduled local time, so TAGS helped here too. In total I followed seven chats, listed in Appendix G.

Interviews: semi-structured, in-depth & ethnographic

Three principal interview techniques were used in this study, each fulfilling a different role: ethnographic; in-depth, semi-structured; and app-enabled, asynchronous. Interviewees were 'selected' in different ways in each of the three techniques, and sometimes even within the same one. Participants on Twitter are often geographically and temporally dispersed across different time zones, rendering face-to-face meeting unlikely. Ethnographic interviews were mostly conducted on Twitter, semi-structured interviews mostly through Skype and app-enabled interviews through Voxer.

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[29] https://sites.google.com/site/twittereducationchats/education-chat-calendar

Ethnographic interviews

Conducting participant observation, and *being* a participant within Twitter often involves asking and responding to questions with fellow participants. I take this form of interview to be 'friendly conversation' (J. P. Spradley, 1979, p.58), rather than as a result of a pre-arranged meeting with a pre-planned set of questions. 'Ethnographic' interviews are spontaneous and respond to issues as they arise naturally. They are typified by their brevity, usually being of much shorter duration than other forms of interview, both in time and number of exchanges. In addition, since they are being conducted on Twitter, both questions and responses may be restricted by the character limit. 'Direct messages' on Twitter have fewer restrictions however, they can only be exchanged where the parties concerned have enabled that feature[30].

In spite of these restrictions, asking questions is quick and easy, can target a wide range of people (Marwick, 2013) and responds to issues that participants have initiated and because of the public arena within which the questions are asked, may open the discussion more widely <#*ethics*>. Although a conventional ethnographic interview might also be conducted in a public place and within a group of people, it is unlikely to be viewed by as many onlookers as it might on Twitter. If the issue being discussed is slightly more sensitive, then moving to the somewhat more private space of direct messages offers one option. In addition, asking a question mediated through a social networking platform in this way provides greater 'distance' between researcher and respondee.

It is one thing to *observe* activity during an ethnographic session, but switching role to that of engaged participant requires declaring one's status as a researcher. <#*ethics*> How to declare one's status *and* ask a question within the character limit is another matter. My solution was to include the hashtag #4MyResearch in any opening question I posed. Unless they are very new to the platform, tweachers [*see Phrasebook*] understand hashtags and invariably use them themselves. By signposting my intent through the hashtag, anyone viewing the tweet then has the opportunity to check my profile where my status as a researcher is further confirmed, and where I provide a link to my research blog. Whilst this relies on a potential respondee exercising that option, it is perhaps more than might be available to someone in a similar position in a face-to-face (f2f) exchange.

All tweets where I asked a question were captured in my research notes together with a direct link back to the tweet. I then recorded the exchange in Mindview (pp.88-89), which

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[30] https://support.twitter.com/articles/14606

maintained a record of the remainder of the exchange, even if the original tweet was deleted <#*ethics*>.

Semi-structured, in-depth interviews

A semi-structured in-depth interview provides an opportunity for a participant to talk at greater length about their activity and experiences (Morris, 2015). An interview guide is used, but sufficient latitude for the interviewee to raise the issues of importance to them is allowed. This strikes a compromise between the researcher attempting to answer their overarching research questions whilst providing the space for new issues to emerge.

There are different ways of assembling a sample of potential participants from which to request interviews. If looking to generalise findings, one might aim for a representative sample from the population under study. Since I wasn't seeking to do that, and nor was I seeking empirical or theoretical saturation, I used both purposive and snowball sampling (Maykut & Morehouse, 2005). Initially, I approached potential interviewees if they made a remark on Twitter or wrote a blog post in which they made claims about how TPD. Some people responded to the few tweets I posted requesting participants. Some were aware of my research through my research blog and offered to participate, or in some cases suggested other people. Thirteen people were interviewed in total; their background information can be found in Appendix H. The variety of interviewees enabled a range of views from across the range of educational phases and sectors, and from a variety of international (English-speaking) contexts.

Each participant was invited to become involved and provide their consent privately <#*ethics*>. Participants might feel increased pressure to accede to the request if it was made in the public arena of Twitter. Instead, where email addresses were unavailable, a direct message was sent which provided a link to the Participant Information Sheet (see Appendix I) together with the opportunity to give their consent through an online form (Appendix J). At this point, they were offered the option to choose their preferred communication medium. All but one chose Skype, although in three cases participants elected voice-only communication. An initial interview guide was produced, but amended slightly for each interviewee to address any interesting points they had made prior to the interview, or to make the most of their particular context. An example can be found in Appendix K.

What I have described so far is largely conventional within the realm of an Internet study however, as a long-time participant on Twitter and having prior knowledge of the norms,

values and behaviours of the people with whom I was associated, I elected to pursue a less conventional path. Rather than the recordings simply being an intermediary between interview and transcript, I chose to convert them into podcasts for posting online. This was of course only done with participants' permission, requested at the point of seeking consent and outlined in the Participant Information Sheet (see Appendix I). As a producer and consumer of other podcasts, I am aware how this form of media can sometimes reach different audiences, and was keen to entertain the possibility of making these data more open. This would increase the exposure of the contributions of those participants comfortable to do so, and potentially make the 'raw data' available for other researchers in a way that interview methods rarely do. It also means that one strand of the data which helped to generate my findings would be openly available for scrutiny or for different interpretations. Of the thirteen interviewees, those who consented to their interviews being podcast can be found at https://www.edutalk.info/category/cpdin140 (as of August, 2018).

Asynchronous interviews: Voxer

Voxer[App] is a live messaging and push-to-talk (walkie talkie) app for smartphones. It

> *"[...] features live and recorded voice – if you push the button to talk, you can be heard on the other end as you speak, but everything is also simultaneously recorded so you and the recipient(s) can play back any message later."[31]*

It also has integrated text, photo, and location sharing; additionally subscribers can talk with individuals or groups of people.

Although not in my original plans, Voxer was an application mentioned by three interviewees. As a non-user I had little more than a peripheral awareness and hadn't considered what the implications might be for my research. When a fourth interviewee (Joe) went beyond mentioning and suggested I might use a similar app for my research (Anchor[32]) that he had found useful, I felt I had been prodded enough. Joe intimated that Anchor was to conventional long-form podcasts, what Twitter was to long-form blogging, so people familiar with Twitter would understand the short-form, micro-media principles. I set up an account on Voxer, then repurposed some of the questions from my interview guide into a format which would enable potential respondees to answer them within the

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[31] https://voxer.com/faq#
[32] https://anchor.fm/app

app recording limits. I reconfigured the interview Participant Information Sheet and consent form and posted six questions at the rate of one per week.

The outcomes were mixed. I didn't press this hard through all the social media channels I had available because at this point, I was not short of data. As a consequence, the response rate was low and I only received responses from two people. However, one of them (Aaron) was a participant who had previously suggested he would be open to an interview, but couldn't find the time to commit to a date. Voxer enabled him to participate in the research when it was convenient and at times and places of his choosing. Over a series of exchanges, the responses he provided were equivalent in duration to someone who had participated in the longer, pre-planned interviews. The conversations on Voxer can be private or public; one respondent chose a private stream and the other public. Of course it became necessary to rethink the ethics with the different affordances this space offers. The asynchronicity enabled Aaron to participate where he might not otherwise have done. He was also able to choose for how long he replied and the themes he wished to explore without interference from an interviewer. He could also drop the exchange, effectively withdrawing consent, more easily than might be possible in a f2f or Skype^App exchange; in synchronous exchanges it is not uncommon for threads to be left hanging. A discussion in a public stream offers those same advantages and in addition (though this didn't happen here) allows other people to contribute and react to one another in a similar way to how they might in a focus group interview. I feel that the potential of this kind of technology remains to be explored.

Missing masses

Conducting interviews in the ways just described runs the risk of once more privileging the humans, assuming it is only they who have things to say. It is easy to slip into the dichotomous world of humans and nonhumans as distinct entities and thereby attend solely to those who 'speak.'

Consider the 'Like' button in Twitter. As a nonhuman, how might it be interviewed and allowed to 'speak?' What would it have to say? How can I report that? This can be done through a different method entirely. Through observation for example, the researcher sees what nonhumans are doing, although unfortunately then becomes the one to render what was seen. Kennan, Cecez-Kecmanovic & Underwood (2010) were troubled by this and noted that allowing humans to speak *for* the nonhumans meant that something could be lost. Instead they advocated a more anthropomorphic approach in which, rather than speak *about* nonhumans in the third person as is usually the case, they spoke *as* them. By spending

time becoming familiar with the ways and doings of nonhumans, and observing their world from within, one becomes aware of their interactions with other actors and grants them imaginary voices.

Adams and Thompson (2011; 2016) offer a different way of approaching the problem in which interviewing an object is viewed as attempting

> "[...]to catch insightful glimpses of the artefact in action, as it performs and mediates the gestures and understanding of its employer, involved others and associations with other objects[...]"

In the next section, I explore how this thinking helped me 'interview' the nonhumans.

Interviewing objects

In the preceding sections, I discussed semi-structured in depth interviews and participant observation. In the following section, I move onto the blog posts I read and the exchanges with their authors. Although one might hope the materiality within the transcripts, posts and tweets might emerge, it would be easy to slide into a predominantly anthropocentric view. To guard against that, I turned to Adams and Thompson (2016, p.6) and sought to 'mobilize posthuman insights through making the digital and its objects available for critical interrogation.'

To interview objects, or nonhumans, Adams and Thompson (2016, p.16) offer eight heuristics as somewhat messy starting points for further experimentation or refinement. In deploying the heuristics, the researcher 'starts out on a footpath taken by others before, but with an eye for surprises and a willingness to make unexpected detours' (Adams and Thompson, 2016, p.20) – not unlike the approach a flâneur might take. This clearly will not be interviewing in the same way I undertook with human participants. Drawing on the etymological roots of 'interview,' an encounter involves 'seeing each other, visiting each other briefly, having a glimpse of' (Adams and Thompson, 2016, p.17). To interview an object then is more about capturing insightful glimpses of it in action as it associates with other human and nonhuman actors.

The eight heuristics were assembled as a result of the authors' experiences using phenomenology and ANT in their research:

- Gathering anecdotes
- Following the actors
- Listening to the invitational qualities of things
- Studying breakdowns, accidents and anomalies.

- Discerning the spectrum of human-technology-world relations

- Applying the Laws of Media

- Unraveling relations

- Tracing responses and passages.

They are offered as possible approaches to inquiry, rather than a prescriptive fixed set of rules to follow, and as such, it may be that not all will be applicable in a single study. Listed in the summarised form above the heuristics don't reveal their full strength, so I shall now attend in more detail to those which I adopted in my study. I open each section with some of the questions Adams and Thompson offer through which to conduct the 'interview.'

Gathering anecdotes

Describe how the object or thing appeared, showed up, or was given in professional practice. What happened?

A sociomaterial anecdote seeks to describe and show what happened, acknowledging the participation of both human and nonhumans at one and the same time. It need not be '*factually* correct, but it must be *fictionally* true' (Adams and Thompson, 2016, p.25) [their emphasis] in reassembling the observed moment. Gathering anecdotes proved particularly potent in this study, illuminating how tweets, hashtags, profiles and other actors became significant in the assemblage of teachers' practices on Twitter. In some instances, these were created by participants through their blog posts, but mostly by me during the time I spent observing. In reassembling those practices, anecdoting is itself a process of assemblage, and thereby becomes enfolded within the practices and activities it recounts. As I discuss later, one of the reasons I elected to call my 'Findings' chapters Gatherings was to credit the role of this heuristic in enacting those chapters

Some of those adopting more realist epistemology might apply the term 'anecdotal evidence' pejoratively, since it can offer no claim to reliability, validity, accuracy or verifiability. Yet anecdotes do not set out with those aims. Instead they provide richly descriptive stories which do not shy away from, but emphasise their contingent nature.

Following the actors

Consider the main practice you are interested in. What micro-practices are at work?
Who-what is acting? What are they doing? Who-what is excluded?
How have particular assemblages come together? What is related to what and how? What work do they do?

Applying this heuristic presented me with an embarrassment of riches. I was never short of actors to follow, whether the hashtag in general, specific educational hashtags, #chats, particular Twitter accounts, the retweet, or the Like. In each case though, it is less about the object and instead turning to what it does – untangling the practices which the object enacts. Those objects which do things, implicate others and become involved in webs of relations – in assemblage – were the ones which attracted my attention.

This and the previous heuristic sit particularly comfortably within a flânography I feel, attending as they do to following and chronicling trails. I have attempted to present the Gatherings in ways which honour this heuristic by following the actors.

Listening for the invitational quality of things

What is a technology inviting (or encouraging, inciting, or even insisting) its user to do?
What is a technology discouraging?

Becoming attuned to invitations that objects extend makes manifest practices that otherwise might have remained hidden. It can also serve as a precursor for the preceding heuristic in establishing which actors to follow. Devices extend audible, visual and haptic invitations on an ongoing basis, whether a smoke alarm screaming the toast has burnt, a monitor's LED showing it's gone to sleep, or the vibration of a mobile phone indicating an incoming call. Becoming attuned to these and other invitations then enables the researcher to explore what activity subsequently unfolds. Twitter colours clickable text – like hashtags, mentions, urls – a different colour to the default black. Anyone but the first-time Web user will be aware this colour change invites a click. In the first Gathering, I explore the invitational qualities of hashtags, profiles and other Twitter actors.

Studying breakdowns, accidents and anomalies

What happens if an object breaks or is unexpectedly missing? What practices then become more visible?

When technologies behave faultlessly, they invariably fade into a taken for granted background. When smooth, unbroken activity is interrupted, those same technologies suddenly leap back into the foreground and once more become visible. Breakdowns allow glimpses of other actors and practices which might otherwise remain hidden. When Twitter changed the Favorite button to Like, this breakdown drew my attention much more closely than when Favoriting had been no more than mundane bookmarking. I explore this further in the 3rd Gathering and choose to retain the US spelling of 'Like' to remain consistent with how it was displayed on Twitter.

How have particular gatherings come to be and how do they maintain their connections?
What unintended realities come into being as everyday practices unfold?
How do different sociomaterial worlds come to be?

This heuristic takes 'follow the actors' a stage further through attending to the ANT concept of translation. It requires the researcher to explore assemblages; how actors enrol one another, connect and assemble, reassemble and disassemble. By what means are they coaxed and cajoled into forming and reforming relationships? Particular practices don't become stabilised by default; they require ongoing work to maintain, or develop and extend them. In the 2nd Gathering I explore how two self-identified communities, Team English and the MFL Twitterati, hold together and draw in new actors to support their curriculum-related practices.

Blog posts

Blogs are a form of online journaling where the author writes posts which are generally presented in chronological order, most recent first. They may also include images, audio and video, and of course hyperlinks to elsewhere on their blog or to other web pages. If the author enables commenting, then other people can write comments which appear in threaded form after each post. Blogs offer a number of options for the researcher. In some instances, participants are recruited by asking them to keep a blog which then provides data in a similar way to diarying (Harricharan & Bhopal, 2014). Rather than in this solicited form, *unsolicited* blogs offer access to publicly available, naturalistic data (Hookway, 2008), though as mentioned previously, one must be wary of the apparently 'public' nature of online content, including blogs <#*ethics*>. Some argue that publicly accessible (archived) textual material is available to be freely used since it is not 'human subject' research (Walther, 2002). Others take a more nuanced view that producers of online content may make their offerings available as 'publicly private' or 'privately public' (Lange, 2007). That is they may partially restrict access using permissions settings, or that their material is fully accessible, but that they hide their identity.

For this study, only blog posts where the identity of the author was ostensibly clear were included. In addition to making it plain that they were writing to share their educational experiences, if commenting on their blog was enabled, I took it they were inviting interaction. Of course, someone new to blogging might not be aware that comments are

usually enabled by default, so this was also borne in mind. Once more, if I chose to ask questions through the blog comments, I declared my status as a researcher.

Clearly it would be possible to find blog posts on the topic of teachers learning through Twitter by undertaking a conventional search. I chose not to follow this route however, since it became clear during participant observation that people regularly shared links to blog posts, some of which were congruent with my research interests. These provided one source of data, although I was also often directed to specific posts by people who were aware of my research interests.

The criteria I brought to bear to decide whether a post would merit further investigation began with whether it was authored by an educator. I then explored if they were discussing Twitter in the context of their own learning, or that of other teachers. I paid less attention to posts which discussed the use of Twitter in more general educational contexts, such as for use in the classroom, although there was naturally some crossover. In total, I logged fifty-five blog posts which met the aforementioned criteria. Of these I elected to analyse 24, beginning with those on which I added a comment hoping to explore some issues more deeply with the author.

Thinking aloud

One evening, sitting on the sofa and scrolling through my Twitterstream, I was struck by the *offline* experience in which I was immersed, and how this was likely to be very different to that of other Twitter users. I don't for example, have a smartphone to provide notifications if I've been mentioned or messaged. I then began to wonder how I might access other people's embodied experiences. What kind of device were they using and what application? Where were they located? What time of day was it? Were they devoting their undivided attention to Twitter, or was it something to fit in alongside other activities? What did they do and what were they looking for when scrolling through their Twitterstream … if that's what they did at all? It struck me that visiting the people and observing them as they used Twitter might not be necessary. Given that they are likely to be using a device with a built-in microphone, perhaps they could narrate and record what they were doing? I tried this for myself and produced an example recording which I then posted to my research blog, together with a Guide, a Participant Information Sheet and link to a consent form[33]. I initially called them 'audio arcs,' being unaware that this method was already established as 'thinking aloud' and has been used in areas such as usability testing

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[33] https://cpdin140.wordpress.com/about/participant-information-audio-arcs/

(Olmsted-Hawala, Murphy, Hawala, & Ashenfelter, 2010), psychology (Van Someren, Barnard, & Sandberg, 1994) and online learning (Beach, 2012). Often this method is used to provide the researcher with insights into what the participant was thinking whilst engaged in an activity. That was true for me too, but I was also trying to capture a sense of the materiality of the surroundings and the effect that might be having on the experience of the participant.

Unfortunately no-one responded to the requests I put out through Twitter to take up this challenge, although once more, I didn't apply too much pressure for the same reason mentioned in 'Asynchronous interviews: Voxer' (p.73). I did however mention it during one of the interviews and the interviewee indicated that they simply didn't use Twitter in that way. For them it was a series of brief encounters, rather than an extended visit in the way that I tended to. They said they had seen my tweets, but couldn't think of a way to capture what they were doing when it involved such irregular and fleeting activity.

@PLDBot

One of the ways I bookmarked tweets to which I might wish to return later was by 'Favoriting' them. Bookmarking was one among several ways people used the Favorite button. In late 2015, when Twitter changed the Favorite button to Like, the semiotic shift prompted me to reconsider how my bookmarking of tweets might now be considered by the tweet authors. To address this I opened a new account solely for the purpose of bookmarking tweets I might want to return to later. This also afforded the opportunity to automatically capture interesting tweets that I might miss whilst away from Twitter. @PLDBot[34] was the result. The choice of name was driven to a large extent by <#*ethics*>. I wanted to be clear that this account was a Bot and therefore the functions it performed would in all likelihood be automated. To clarify further, I included the Bio as shown in Figure 11.

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[34] https://twitter.com/pldbot

Figure 11: PLDBot profile page

I also included a link back to my research blog to provide further information and so that anyone with questions or concerns had a point of contact should they need it.

Lacking the coding skills to automate 'Liking,' I found a Google Sheets Add-on at Labnol.org which would create a simple, configurable bot using a few simple instructions[35]. The first expression I used instructed the bot to 'Like' any tweet which contained the phrase "professional development." I then monitored the tweets being 'Liked' but found my choice of term to be too broad; tweets which were not at all related to teaching were 'Liked.' Amending the term to "professional learning" fared slightly better, but I couldn't get the script to accept Boolean expressions like "professional learning" AND twitter. In the end I was never comfortable about leaving the script running in my absence in case it initiated an adverse reaction from someone to which I couldn't immediately respond <#*ethics*>. As a compromise, I set the script running when I was at the computer engaged in other work, but available to react should anything arise. I still felt however that the bot wasn't discriminating well enough so in the end decided to use it merely as a storage container for tweets I manually 'Liked.' What I did do was to use Tweetdeck from the @PLDBot account which allowed me to use more extended search terms and monitor both at once. 'Liking' a tweet could be done manually quite easily from within Tweetdeck (Figure 12).

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[35] https://digitalinspiration.com/product/twitter-bots
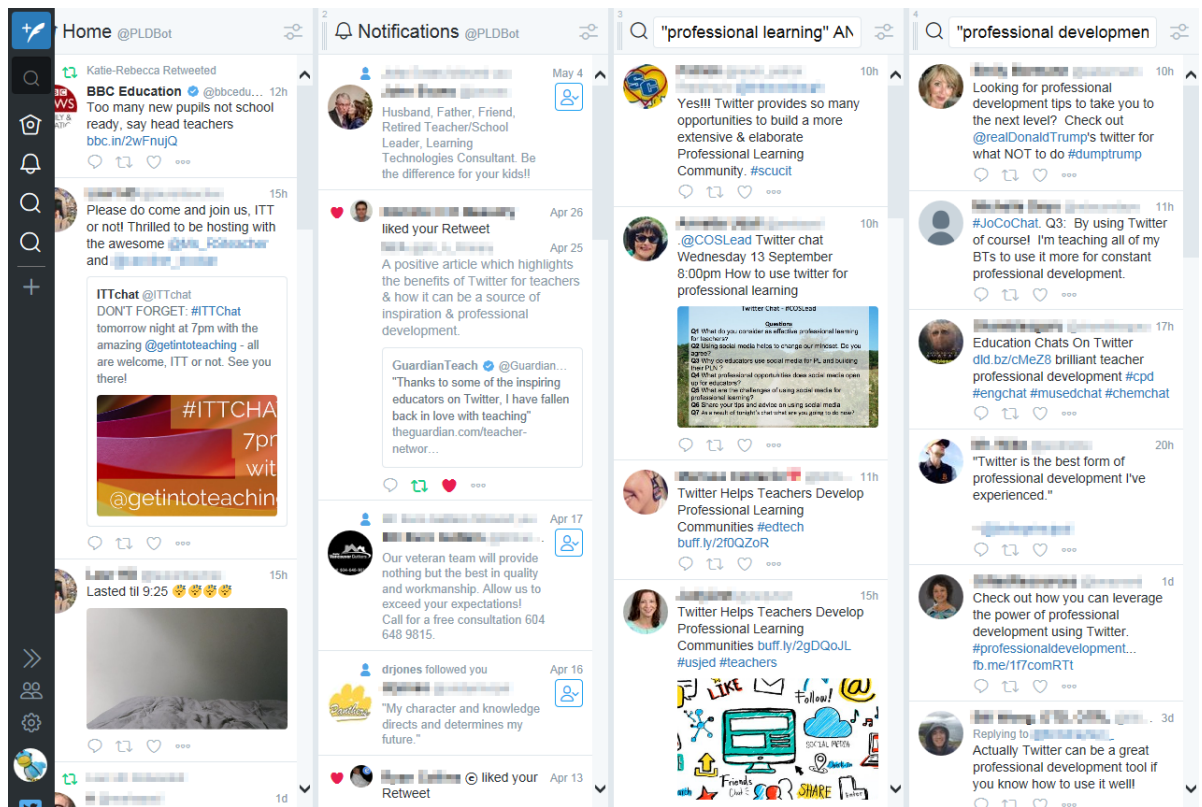
Figure 12: Timelines in Tweetdeck

What was completely unexpected was the extent to which other accounts engaged with the bot <*#ethics*>. I discuss this further in 'Ethics revisited' (p.254).

Ethics

From the moment I first considered undertaking this research study, ethical issues immediately became apparent. Although the formal stages of making ethics applications for a pilot and subsequently main study are where one's ethical thinking might begin, it continues through the data collection phase, on through analysis and presentation, and remains as a duty of care through the publishing of the thesis through open access policies[36]. Instead of completing an ethics submission and feeling the job was done, I continually developed and adapted my ethical sensibility, enabling me to become attuned to situations as they arose. As Hine (2015, p.188) puts it 'Ethics becomes a constant reflexive process, rather than a prior stance to be laid out in advance.' That does not preclude us however, from planning and preparing for possible eventualities using the experiences of others and the guidance provided by professional bodies.

This is more than ensuring beneficence and non-malfeasance for immediate research participants, but bringing an ethical sensibility to consider wider effects. What are the

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[36] https://www.shu.ac.uk/research/ethics-integrity-and-practice/open-access-publication-policy

ethical issues bound up in the choices we make when selecting particular software applications to support our research? What are the consequences of publishing our research through predominantly text-rich media?

In the following sections, I will outline some of the ethical issues which I considered prior to commencing the research study proper and which fed into the formal process for seeking ethics approval. As I mentioned earlier, where ethical issues presented themselves during the course of the study, I highlighted them using <#*ethics*> and have gathered these together to discuss further in 'Ethics revisited' (pp.252-254).

Precedence - how has other research is this field addressed ethical issues?

I have so far found 30 papers written between 2011 and 2017 which focus on professional learning of teachers in the context of Twitter. 17 used a single method and the remainder, multiple methods; these included social network analysis, interviews and surveys, but around half (14) involved a close analysis of tweets. Verbatim tweets were quoted in 9 papers; 7 of these anonymised usernames, 1 appeared to use non-pseudonymised usernames and the other disclosed all details, having sought permission from the participants. In only one paper did the author clearly state their ethical stance; Rehm and Notten (2016, p.218) were of the view that '[…] if researchers only collect publicly available data from social media, which requires no password to obtain, concerns about confidentiality and trust can be relaxed." Their social network analysis methodology, enabled data to be presented in aggregate form only, and from which individuals could not be identified.

Unsurprisingly, given the emerging nature of this field of inquiry, a common approach to ethical issues remains to be developed. This thesis aims to contribute to those ongoing deliberations.

Sources of guidance

The principles which underpinned the decisions taken in my ethics submission include ethical guidance provided by professional bodies and associations, and our statutory obligations under the Human Rights Act, Data Protection Act (in the UK & Europe) and copyright law. However, the guidance associations provide rarely address Internet-mediated research specifically (American Educational Research Association, 2011; American Sociological Association, 2008; BERA, 2011; Social Research Association, 2003). Although the ethical issues which arise in a study of this nature are similar to those in an offline context, Henderson et al.(2013) caution us 'social media have particular affordances, and

concomitant consequences, that make them unlike other research contexts.' Fortunately, some bodies have produced more targeted guidance: The British Sociological Association (2017) provides a specific annexe (2016), the ESRC Framework (2015) includes a section specifically addressing Internet-mediated research and the British Psychological Society (2017) has a separate publication solely devoted to this topic. Of course the guidelines produced by the Association of Internet Researchers (AoIR) (Ess, 2002; Markham & Buchanan, 2012) proved particularly helpful in developing my ethical sensibility.

This study focuses on teachers' use of Twitter for professional learning, and teachers in this context would not usually be considered 'vulnerable' (by virtue of age, disability, physical or mental health, being in a dependant relationship or a recent immigrant), as defined in many ethics guidelines produced by professional associations (see next section). Nor are they engaged in activity which is either illegal or socially undesirable. The educational topics and themes discussed are not sensitive (e.g. for example participants' sexual behaviour, illegal or political behaviour, experience of violence, abuse or exploitation, mental health, their personal or family lives, or their gender or ethnic status; (Economic and Social Research Council (ESRC), 2015). The primary focus is Twitter, an environment which:

- is openly public by default
- has an architecture which encourages sharing and reposting of information e.g. retweets and 'Share on Twitter' buttons found on other sites.
- has norms and expectations that what you tweet may be made visible elsewhere - usage of tweets by the media (and at the UK Prime Minister's despatch box[37]), users commonly curating tweets using tools like Storify[App].

As a participant observer in this arena, I have chosen to make my status as a researcher clear in my Twitter profile, together with a link to my research blog (Figure 3).

Ethical challenges associated with Internet mediated research

The table in Appendix L lists the methods used, both during the pilot and main studies, discussing how each of the following issues applied in each method.

Private - Public distinction: there are three intertwined contextual factors here: how the space is perceived; the nature of the information being shared; and the intended audience, which Rosenberg (2010) condenses into 'Researchers must base their ethical decisions on a community's purpose and participants' expectations of privacy.' This is no straightforward

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[37] UK Parliament. (2016, February 10). Prime Minister's Questions [Video file]. Retrieved from
https://youtu.be/8DGYeoP7xTU?t=22m25s

matter and Marwick and boyd (2011) ask us to consider whether all participants share a common understanding. When engaging with potential participants online, or in discussing their contributions in reports and publications, each instance needs careful considerations on its own merits. (See next section for a discussion of anonymity)

Informed consent: advice from professional bodies generally begins from the premise that informed consent should always be sought. There is a recognition however, that that might not always be necessary if certain conditions are satisfied: that the data is in an open, publicly accessible space, and that the risk to participants is minimal (Bruckman, 2002). The different methods being employed in this study required different responses.

Sensitivity, distance and level of interaction: when considered together, these three factors can help researchers decide whether consent is more likely to be required. If the researcher will be interacting closely with participants on a sensitive topic and in an area which is more private, seeking consent will be paramount. Figure 13, adapted from McKee and Porter (2009), summarises the interplay between these three factors.

Degree of Interaction	Topic sensitivity	Public vs private	Is consent necessary
High	High	Private	Likely
↕	↕	↕	↕
Low	Low	Public	Not likely
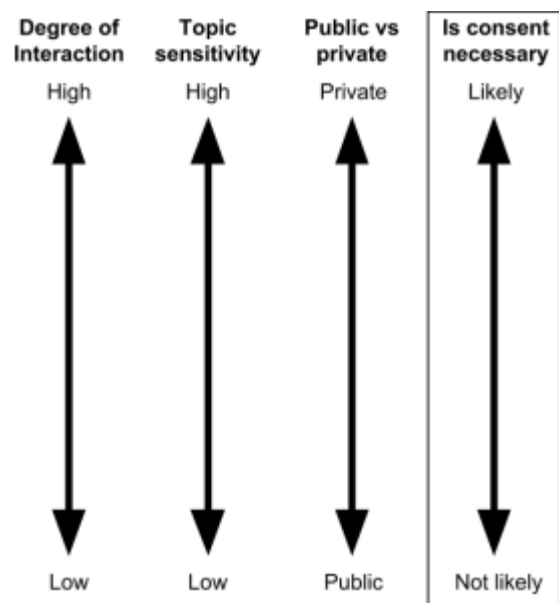
Figure 13: Ethics criteria continua

Human subject versus textual artifacts: although some claim that inscriptions on the Internet can be considered published texts, the AoIR (2012) guidance argues that, especially with social media, it becomes difficult to detach the text from the person. Where human subjects produce 'published' works however, we are obliged to reconsider issues of anonymity.

Unobtrusivity: the Internet and social media enable researchers to observe behaviour without influencing it, since their presence may not be apparent in the same way it would be in offline spaces. Research conducted in this way can be considered less impactful on participants and is akin to 'lurking.' This term may have negative connotations, but is considered acceptable behaviour in many online spaces (Nonnecke & Preece, 2000). However, if methods involve covert research, one must be mindful of Hine's (2011, p.3) entreaty that 'although we might be able to easily access data using unobtrusive methods,

this does not make them 'ethically available.' When conducting research in Facebook, Coughlan & Perryman (2015, p.156) clearly stated and defended their ethical choices:

> *Our position is that as we are conducting observation-only research on passive participants in the public sphere, it is ethically defensible to neither join the groups we are researching, nor disclose our status as researchers.*

The views of social media users seem to support this stance. Beninger et al.(2014) found that Twitter users in particular were less concerned that researchers might use their tweets, nor did they feel their consent was required. Users felt that Twitter 'had easier privacy settings, both to use and understand.'

Anonymity

Conventionally, research participants are afforded both anonymity and confidentiality; that the data they provide will only be available to those specified, and that all features which might identify them will be removed before making the findings more public. However my experiences as a participant on Twitter suggested it was necessary to revisit that stance.

The arena from which potential participants were drawn is highly participatory, where members generally adopt a performative approach. The norms of the space include a sense of sharing what you have and what you know; people acknowledge and give credit to those who have supported or helped them. I'd like to contend that this participatory space invited a more participatory research approach. As Grinyer (2002) noted, researchers have to balance the need to protect participants from harm by hiding their identity, whilst preventing loss of ownership 'on an individual basis with each respondent.' This is manageable, provided the sample size is small, as it was for the interviews in my study. Consequently I proposed a shift in emphasis from 'human subject' towards 'authored text.' This was achieved by allowing interviews to contribute to the participatory culture, and where participants gave their permission, releasing the interview recordings as podcasts (streamed online audio files). Links to the audio files were embedded in a web page associated with the research project, the interviewees were named and their contribution credited. This represents an attempt to move beyond the notion that participants are merely sources of data to be mined. In Corden & Sainsbury's (2006) study for example, participants responded positively when offered a copy of the audio recording of their interviews and were given the opportunity to amend their responses, though few felt it necessary to take up that option.

This is a very different approach to that found in most studies, but is not without precedent. In the 'edonis' project[38], part of an EdD study, David Noble conducted a series of interviews with teachers on the theme of leadership in educational technologies. When interviewees gave permission, the interviews were posted online. It could be argued that this proposed approach is only one step further on from conducting 'interviews' in visible online public spaces like blog comments, forums, and some chat rooms.

In addition to interviews, I brought the same sensibility to presenting tweets, and where authors gave their permission, credited them in full. Seeking that permission needs to be undertaken sensitively and where possible through non-public channels – Twitter's direct message for example. To assist in deciding whether consent to publish a tweet is needed, Williams, Burnap and Sloan (2017) produced the decision-making framework presented in Appendix N. For example, they propose that seeking permission to publish tweets from public figures is not required. This framework guided the choices I made in publishing tweets and was also usefully applied when publishing blog post comments. Where multiple tweets are presented in a timeline view, and the focus is not on the individual tweets, but on their overall effect, identifying features were pixelated or otherwise obscured.

If participants' identities are not disguised, both potential risks and benefits become more significant. Table 2 summarises possible risks and benefits:

Table 2: Participant risks and benefits

Risks	Benefits
Loss of privacy which could lead to exposure to ridicule and/or embarrassment.	Direct: Increase in participant agency, moving beyond the notion of participants merely as sources from which researchers abstract data.
Change in future circumstances which renders what participants originally said to be viewed in a less-positive light.	Direct: Makes provision for participants to amend or extend what they said in the original interview.
Increased attention through increased exposure. This could be perceived as either a risk or benefit and would depend on the participant's preferred online behaviours.	Indirect: Increasing the awareness and understanding of the wider community of issues associated with professional learning and social media.

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[38] http://edonisproject.blogspot.co.uk/2008/12/edonis-project-introduction.html

Data management

As a qualitative study employing multiple methods, this project produces, amongst other things, a 'Mountain of Words' (B. D. Johnson, Dunlap, & Benoit, 2010). Those words arise in a number of different ways, through different media channels and have differing degrees of ephemerality. They present themselves in a range of formats and require different ethical sensibilities; the audio recording of an hour-long, semi-structured interview is very different from a tweet. The University procedures for commencement of a doctoral programme required me to complete a Data Management Plan. This makes good sense practically, but also signals ethical sensitivity to potential participants that you are not treating lightly the generosity they have shown in sharing their words with you. In the spirit of this study, although it said 'Plan' in the title of the document (see Appendix P), I saw it more of a sensibility, a touchstone to which I could return when new issues emerged. Some aspects of the Plan were inevitably fluid and were adapted to accommodate the different directions that the research took.

The data which were assembled in this study were informed by, but did not include those from the pilot study. They were collected principally between October 2016 and June 2017 however, I obviously continued participating in Twitter, so occasionally after that date, spotted something of interest that I felt compelled to explore. The nature and sources of data are summarised in Figure 14.
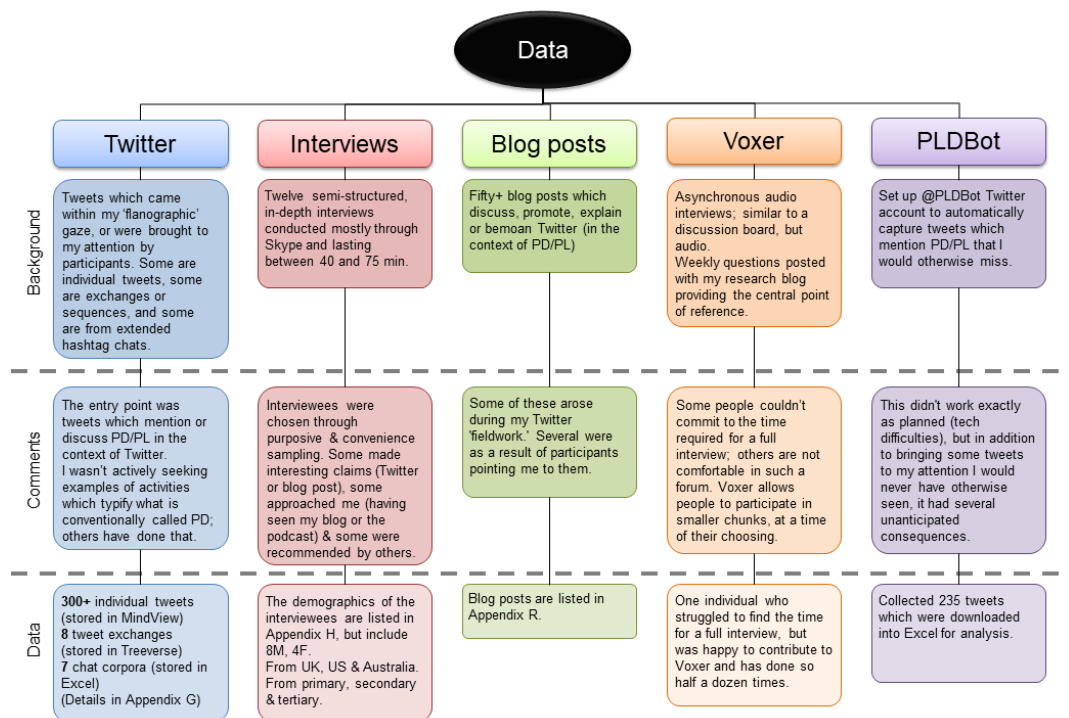
Figure 14: Visualising data and how they arose

As each set of data was produced, it was imported into NVivo[App]. Although NVivo was not used for coding and categorising (see 'Data Analysis,' p.90), it nevertheless provided a useful way of keeping the different data sets within a click or two of one another. The capability to move seamlessly across and through the data, connecting together various points of interest proved crucial for exploring as flâneur, as I shall discuss in 'Analytical moves' (pp.92-94). It also enabled texts to be annotated and observational notes to be added, all within the same environment.

Twitter

Any data which were produced on and presented through the Internet have associated urls (Universal Resource Locators, or web addresses). These were stored offline in the first instance so that the sources could be accessed at any later time. For
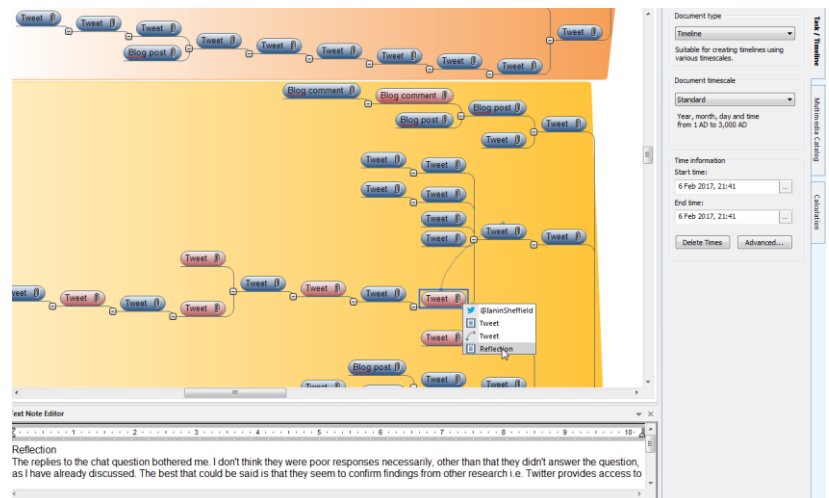
Figure 15: Field notes in MindView

example, each tweet has a unique url e.g. https://twitter.com/IaninSheffield/status/895374729435111424, so these were recorded, but clearly don't particularly lend themselves to analysis. If I collected tweet urls 'manually' such as those in my research notes, the tweet text was also copied into the notes. Where a slightly longer Twitter exchange took place, all urls were recorded, but rather than listing them together with their tweets, they were recorded manually in MindView together with the accompanying tweet text. By displaying them this way, the flow of the exchange became easier to visualise (See Figure 15. The 'full/extended' version is shown in Appendix Q). Later in the study I became aware of an application called Treeverse[App] (see Figures 23 – 26) which would automate some of that process and turn a multiple tweet exchange into a visualisation. Once more, the tweet urls, tweet text and sequence were stored.

In Twitter chats, there might be hundreds of tweets rather than just a handful. Capturing them manually would be extremely time consuming, but here I was able to borrow from the 'big data' researchers' toolbox, even though the volume of tweets in a Twitter chat might only be 'small' data by comparison. Several options were available, and even though

I was limited to those which don't require programming skills, there were still plenty from which to choose[39]. I settled on TAGS[App] as the means through which to capture larger numbers of tweets.

Audio interviews

Both audio interview methods (Voxer and Skype) produced mp3 files. I transcribed the files initially into a Google doc which was later downloaded as a Microsoft Word doc and imported into NVivo. The reason for not transcribing directly in Word was that Google docs allow Voice Typing i.e. with a microphone, you can dictate directly into the document. As a two-finger typist, it was marginally quicker for me to listen to the audio files, then dictate what I heard into the Google doc, rather than type it.

As mentioned in the 'Anonymity' section (p.85), where participants gave their permission, the audio files were uploaded to EduTalk, an online educational podcasting channel.

Blog posts

In the same way that tweets have a unique url, so too do blog posts, so these urls were also recorded. The posts needed for analysis were converted into PDFs and downloaded, then uploaded into NVivo. It is easier and safer (for privacy and confidentiality) to annotate and comment on PDFs than directly onto the Web.

Visualisation as recording device

A wide range of tools is available to help visualise data. Visualisations are often used to present data in a more understandable way than in arrays of numbers; this can help the researcher in their analysis and in presenting their findings. I discuss this further in 'Visualisation as analaytical technique' (pp.94-95), but here I want to note that some tools which help to *produce* visualisations can also *store* the data. Treeverse that I mentioned on page 89 for example, gathers the tweets in an exchange and stores them within a single file which, when opened by a browser, produces a visualisation rather than a tabular set of data.

During participant observation, I might see or become involved in an exchange of tweets. Rather than collect the urls to each tweet as a list, I felt the need to maintain some sense of the thread of the exchange, including other sites which might be drawn in. I used MindView, as discussed on p.89, not only to provide a visualisation of the individual exchanges, but also to store the overview of all activity. MindView held copies of data

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[39] http://socialmediadata.wikidot.com/

(tweets, blog post summaries), metadata linking back to the originals, and reflective comments, all in a visual interface. An alternative way of producing 'field' notes.

Data analysis

As I wrote my PhD project proposal, I fully intended to undertake a conventional analysis. The process would be largely inductive and involve close reading of the data with the intention of developing themes and concepts. Data would be imported into NVivo where it could be organised and analysed by drawing on Saldaña's (2013) methods. Specifically, an iterative first cycle would involve coding (where a priori codes are drawn from the literature review), descriptive coding (identify topics in that which was observed) and process coding (using gerunds to highlight actions). A second cycle would use Miles and Huberman's (1994) pattern coding to seek themes, relationships, recurrences or commonalities. However, the more I read the literature, the better my appreciation of what adopting a sociomaterial sensibility entailed, and the clearer the tension between an ANT-suffused flânography and the proposed analytical approach became. The principle of gathering insights through wandering freely was in danger of being lost.

As presented above, there is an assumption of linearity, of a sequence in which interpretation of the data falls between gathering them and presenting findings. It assumes a primary, discoverable reality waiting to be uncovered, then accurately represented through language. There are knowable themes which exist, and through a systematic process of analysis, the researcher can reveal and report them. As Lenz Taguchi (2012, p.269) observes, this is a process of sense making which positions the 'subject of research as the source of meaning that enables the researcher to construct a coherent and interesting narrative.' The subject/object and knower/known binaries are brought into question by actor-network theory, so for me to approach analysis by attempting to interpret what an interviewee *really* meant would be inconsistent, to say the least.

An alternative to the above is offered by what has been termed by its proponents as 'post-qualitative' (Lather & St. Pierre, 2013). This makes plain the trap into which I fell, succumbing to the tradition carried forward in humanist qualitative methodology, where research problem, research questions, literature review, methods of data collection, data analysis, and representation all follow naturally on from one another. This assumes a beginning, a knower, an object; that there is a field of reality (the world), a field of representation (the book) and a field of subjectivity (the author) (Deleuze & Guattari, 1987), or in my study, Twitter professional development (TPD), my thesis and me. Instead,

this tripartite division can be considered an assemblage where the field of reality (Twitter and tweets, blog posts on the Internet, interview questions and responses), the field of representation (field notes and memos, visualisations, subsequent narratives), and the field of subjectivity (participants and researcher) are interwoven and enmeshed into a heterogeneous whole. The aim is not to seek underlying meanings, but map relations and think about how things work together (Mazzei, 2013).

'Plugging in'

If mechanistic coding of data and the reductive compression of those data into themes to produce uncritical representations of activity is an inadequate approach, then what is the alternative? I chose to turn to Jackson and Mazzei's (2012; 2013) notions of 'Thinking with Theory' and 'Plugging In.' They offer these as an antidote to the reductionism that coding and thematic analysis produce and consequently preclude dense, multilayered treatments of data. Their intention is to 'decenter some of the traps in humanistic qualitative inquiry: for example: data, voice, narrative, and meaning-making' (p.262) and accept that the data will be partial, incomplete and undergoing a continual process of being *re*formed. This desire to move beyond the solely human tellings seemed coherent with ANT which, through its symmetrical approach, also seeks to destabilise the anthropocentric view.

'Plugging in' is a term borrowed from Deleuze and Guattari (1987, p.4)

> *When one writes, the only question is which other machine the literary machine can be plugged into, must be plugged into in order to work*

To exploit, rather than cope with, the wealth of texts which formed their research assemblage (transcripts, theoretical tomes, traces of data, field notes, articles) Jackson and Mazzei (2012) employ a technique they call 'thinking with theory.' This requires maintaining a sense of the theories, concepts, fragments, selves and sensations as data is read and reread, worked and churned. The researcher uses theory to think with their data, or data to think with theory, as texts are read with and through each other, as they are plugged in. Knowledge emerges as the assemblage forms and reforms, so therefore resists stable meaning, completeness and definitive conclusions. Jackson and Mazzei (2013, p.264) contend that 'plugging in creates a different relationship among texts: they constitute one another and in doing so create something new.'

I elected to borrow the principle of 'plugging in' from Jackson and Mazzei as a way to help understand and analyse the data. The 'theories' upon which I drew were the three travelling companions of assemblage, multiplicity and fluidity introduced in 'A flâneur's companions'

(pp.55-58). Figure 16 helps to illustrate how these concepts were plugged into the different data streams.
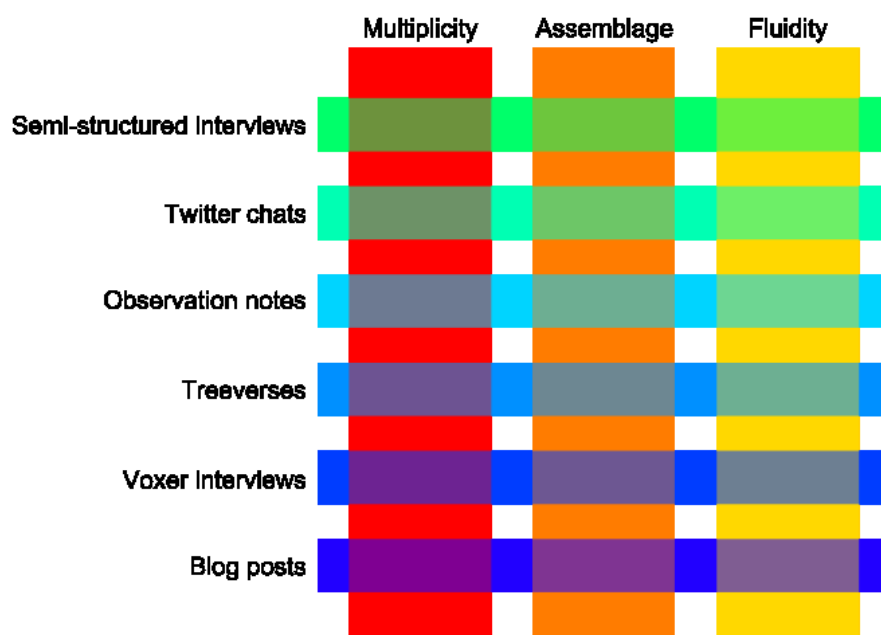
Figure 16: 'Plugging in' concepts

Like a tartan (plaid) in which the threads are interwoven, but different, because here the warp and the weft *intra-act*, rather than interweave. The different strands of data are read with and through three sociomaterial concepts and at the points of intersection, it is neither one thing nor the other, but something new which emerges.

When the data are revisited, a process of data walking (Eakle, 2007, p.483) is employed in which you explore the data 'as if you were an open and receptive traveller in a new and unknown territory that you want to make familiar before designing an itinerary.' Like the flâneur in a new city making notes as he strolls; where did I go, what did I see, what caught my eye, what did I think? This manifests itself in some of the visualisations I produced which incorporated a sense of where I'd travelled, what I'd seen, what I'd thought, embedded with the directions to return (i.e. using hyperlinks). So it was through flânerie that the three concepts presented themselves as possibly offering routes to fresh insights by plugging in. Reading and rereading the transcripts, tweets, blog posts, notes and memos allows me as a researcher to begin to use this data to think with the concepts, in addition to using the concepts to think with the data.

Analytical moves

Analysis was a multi-stage process, although not one which proceeded linearly from start to finish. It first involved a series of back and forth iterations moving between and across the

different data sources. As data offer themselves either as words participants deliver during interviews, tweets that appear through observation, or blog posts at the end of hyperlinks, analytical seeds begin to germinate during this period of familiarisation.

The second stage of analysis began when I later revisited the data. This involved 'data walking' as described in the previous section. This seemed particularly appropriate in a flânography and helped me to answer 'what is going on here?' This was not a process of data reduction or distillation, but as Eakle (2007, p.483) proposed, 'data walking is an expansive means that avoids closure.'

The third stage also involved re-reading the data, but this time expanded them by adding comments, annotations and appending memos. Transcripts or blog posts viewed by word processor or PDF reader were annotated using the integrated commenting features. Tweets or brief exchanges of tweets were stored in MindView which had its own tools for appending comments or adding memos to nodes, as illustrated in Figure 15. In this stage I was adding my impressions and reflections alongside those made by participants.

Although I had decided against using NVivo for coding, it nevertheless proved a useful single location in which transcriptions, observational notes, tweet exchanges and blog posts could be stored (see Appendix R). The search, query and retrieval features meant that emerging ideas could be explored more easily across different data sources and consequently allow connections and links to be made between data, comments and memos. In addition, I was also able to bring all my comments from across all data sources together and export them in a single document. I now had the wherewithal to read individual or multiple data sources, together with or apart from my appended comments. With all the data or comments easily accessible, I was able to more easily read the data through the concepts of assemblage, multiplicity and fluidity, or indeed through the ideas I was beginning to develop.

I also employed a supplementary analytical process when attempting to make sense of the data in different ways and through different perspectives. Composing visualisations was a similar process for me, to that which creating mind maps was for Reason (2010, p.3): '[…] this process places a structure onto the material – it makes sense of the material in a way that is a mixture of finding sense from within and imposing it from without.' This was less about finding a way to present the data and more about visualisation as a 'thinking tool;' finding ways to visualise data allowed me to become more intimate with them. I explore these issues more fully in the next section.

Visualisation as analytical technique

It may seem somewhat incongruous discussing visualisation within a section on data analysis, especially if one considers it to be no more than communicating data clearly, efficiently and succinctly. This becomes compounded since visualisation is most often associated with quantitative data which are presented as bar charts, graphs, pie charts and scatterplots, amongst others (Chandler, Anstey, & Ross, 2015). Less attention has been paid to visualising qualitative or textual data (S. Henderson & Segal, 2013) with these often presented using narrative and the occasional table or matrix (Sloane, 2009). This may not be entirely fair when applied to ethnographic research where maps or drawings are sometimes used to convey the locality, flowcharts for activity and organisational charts for hierarchical membership. Taussig (2018) for example, integrates drawings into his ethnography, seeing drawing (both process and product) as revealing new ethnographic understandings. I'd like to trouble the notion that visualisations, in whatever form, function only as summative representations.

In the same way that 'ethnography' applies both to the research process and the research output, visualisation shares the same semantics. In both Miles and Huberman's (1994, p.11), definition of visual display as 'an organized, compressed assembly of information that permits conclusion drawing and action,' and Lengler and Eppler's (2007) 'a graphic representation that depicts information in a way that is conducive to acquiring insights, developing an elaborate understanding, or communicating experiences,' the analytical power of visualisation is referenced. However, in both cases there is the sense that visualisation is a product from which insights may be gleaned.

Summarising data as a visualisation can be considered part of the process of data reduction (Miles and Huberman, 1994), or as they later termed it 'data condensation' (Miles, Huberman, & Saldana, 2014, p.12). Whether viewed as reduction – and therefore implying that some things have been lost or discarded – or condensation which implies concentration, both seek to reduce the complexity of the data to enable meanings to be drawn. I tend on the other hand to follow Madden (2010, p.148), who offers data analysis as a 'broadening' process which adds value, but rather than solely 'undertaking more reading, more thinking, and especially more writing,' as he suggests, I also include the process of visualisation. I see this as an opportunity for producing 'thick data' (Latzko-Toth, Bonneau, & Millette, 2017). Thickening for Latzko-Toth et al.(2017) involves 'adding layers' which supplement the data with richly textured information from contextualisation,

thick description and signification of participants' meanings. Aspects of these are encapsulated within visualisation, the thickening process I choose.

As the flâneur might approach a city district from different directions, or arrive there via different modes of transport, I elected to use different applications to visualise the data. The different features and restrictions that each offered obliged me to assemble the data, to manipulate them, to read them differently, and consequently draw fresh insights, or as Hendrickson (2008, p.120) terms it, 'the visual processes of coming-to-know.' Some visualisations probed data from a single source like participant observation, whereas others spanned two or more sources. Some required me to produce them from a 'blank sheet' and involved different mental processes from those which were partially automated. Because it was *producing* the visualisations that was the important factor for me, rather than the product, not all made it into the thesis. [I have included a sample in Appendix T to provide a sense of the variety which emerged]

Integrity, fidelity and honesty

> *How can an inquirer persuade his or her audiences (including self) that the findings of an inquiry are worth paying attention to, worth taking account of?*

For Lincoln and Guba (1985, p.290) scholarly rigour is about trustworthiness and the arguments which can be mounted to make the case. However, assessing the quality of research findings is far from straightforward and is contested in a number of ways. Traditionally, research quality has been judged using the criteria of validity, reliability, generalisability, and objectivity. My research project is neither built on a realist ontology, nor a positivist epistemology, nor does it employ quantitative methods. It will come as no surprise therefore that the aforementioned criteria hardly seem appropriate; however, nor do those outlined by Johnson and Rasulova (2017) which are somewhat inspired by them, like confirmability, dependability and transferability. These all assume a reality 'out there' which can somehow be known 'in here.' With an actor-network theory sensibility, reality *can* be out there, independent of the knower, but *only if it is made that way.*

> *Realities are made. They are effects of the apparatuses of inscription. At the same time, since there are such apparatuses already in place, we also live in and experience a real world filled with real and more or less stable objects.*
>
> (Law, 2004, p.32)

What emerges from my research will be made through the practices and methods I have employed. Although the apparatuses by which validity, reliability and so forth are inscribed will indeed be appropriate for some studies, I'd argue they are less relevant in this study.

Another option is provided through Tracy's (2010) 'Eight "Big-Tent" Criteria' produced when seeking to distance herself from the charge of pandering to post-positivist derived criteria. She contends that high quality qualitative methodological research can be judged by the presence of (a) a worthy topic, (b) rich rigor, (c) sincerity, (d) credibility, (e) resonance, (f) a significant contribution, (g) ethics, and (h) meaningful coherence. These are presented as 'universal' criteria, that is, to be considered quality research, each of these criteria must be satisfied. This and the other approaches mentioned so far fall into what Burke (2016) and Sparkes & Smith (2009) have termed the 'criteriological approach.' This propounds the belief that 'criteria for judging qualitative research need to be, and can be, predetermined, permanent and applied to any form of inquiry regardless of its intents and purposes' (B. Smith & McGannon, 2017, p.14). They see the universal application of criteria as problematic in how it requires any, and all research to be judged in 'preordained and set ways' (which of course was precisely the reason proposed as one means to address the criticisms of the positivists).

An alternative to criteriology is offered through the 'relativist approach' proposed by Sparkes and Smith (2009). For them criteria are a socially constructed list of characterising traits, applied in a manner that is contextually situated and flexible. These lists are not fixed in advance, but are open-ended, responding to what unfolds by adding or subtracting characteristics as required. This feels somewhat woolly, leaving itself open to the charge from realists that 'anything goes.' However, proponents of a relativist approach counter on ontological grounds, claiming that there is no social reality independent of our interests to act as a reference point against which to judge claims to knowledge. The only option when judging the quality of research is to appeal to 'time and place contingent lists of characteristics to sort out the good from the not so good' (J. K. Smith & Hodkinson, 2009).

Given the ontological views I expressed earlier, a relativist, rather than a criteriological approach seems more coherent with my study. I also feel that using some of the original terminology (trustworthiness, rigour etc) carries baggage, so I propose to use terms which are less used, and for me, describe better the characteristics on which this project should be judged. It is my hope that the reader, for it is they who will be the arbiter of the quality of this research, feel that it has been conducted with integrity, fidelity and honesty. To that

end, I offer the following characteristics assembled from different studies (Elliott, Fischer, & Rennie, 1999; Lincoln & Guba, 1985; Lincoln, 1995; Richardson, 2000; Spencer, Ritchie, Lewis, & Dillon, 2012; Tracy, 2010) to suit the circumstances within which *this* research was conducted: a worthwhile topic for study, rich rigour, sincerity, transparency, ethical, authentic and coherent.

Thanks to tweets from the President(s) of the United States, amongst others, Twitter is presented to the public through traditional media outlets on an almost daily basis. Twitter not only provides a source of news for the media, but in addition a distribution channel. Education is not immune, with schools and teachers making use of Twitter in numerous ways. This study, in seeking to shed more light on one aspect of the phenomenon, but also on an important aspect of teachers' lives (as described in 'Aims,' pp.7-8), is therefore particularly timely and relevant, making a **worthwhile topic** for study.

The time I spent formally 'in the field' spanned ten months, between October 2016 and August 2017, however the time I spent as a participant prior to the study also provided valuable acclimatisation. Although there is no ideal time for being in the field, my time spent formally and informally has allowed me to gather sufficient and relevant data to enable me to make and substantiate the claims in Chapters 8 and 9. Teachers' professional learning practice may indeed be partly on Twitter, but is also with and through it, using other spaces where appropriate. These spaces are connected and interwoven, online and offline, simple and complex, so require, if not demand, a range of techniques to explore them. As described in 'Methods' (pp.60-79), I have used both a range of methods through which to explore the activities of interest, and explored the views of a number of people. This is perhaps closer to what Richardson (2000) describes as crystallization, rather than methodological or respondent triangulation. It is not about verification through different perspectives, but more about adding richness through an attempt to access different realities enacted by different people and things. The range of appropriate methods, informed by relevant theory, has contributed to the production of abundant data, from which a thorough analysis was conducted. As such, I argue this constitutes a **richly rigorous** study.

On page 9, I provided a statement of my positionality. However, this is not to make potential biases visible, but to begin the process of outlining the hinterland I bring to this study. I have already stated that I offer this account as a partial one. It is partial as a result of the particular method assemblage through which data were enacted, and partial since the analysis highlighted some data whilst backgrounding others. I laid out the methods

involved in 'Methods' (pp.60-79), how the data were gathered in 'Data management' (pp.87-89), and how the analysis was performed in 'Data analysis' (pp.90-95). Together with the background information on participants to be found in Appendix H, these provide an audit trail of how the study was conducted. This is less about replicability and more about making clear what I've done, how that was done and the rationale behind particular choices. Making plain how the study unfolded, although important, fails to reveal the ongoing reflexivity through which decisions were discussed, adjustments were made and consequences considered. This was one of the functions that my research blog served and I felt it was important that those reflections took place in the open and were available to be scrutinised by the people with whom I was conducting my research. Further reflective comments can be found within the research notes I was making whilst formally in the field, then later as reflective memos during analysis. These factors contribute to undertaking a more **sincere** study and being as **transparent** as ethics allows.

It was my intent to conduct this study in alignment with the ethical guidelines provided, albeit not exclusively, through the Association of Internet Researchers (Markham and Buchanan, 2012), British Educational Research Association (2011), the British Sociological Association (2017) and the Sociological Research Association (2003). This means having respect for, and fulfilling my obligations to society at large, to fellow researchers, to my university, and above all, to research participants. I have outlined the steps being taken to do this in 'Ethics' (p. 82), but in summary this is an ongoing process of developing an **ethical sensibility** throughout the planning, preparing, researching, analysing and writing of this study.

Throughout the Gatherings (Chapters 5 – 7) I sought to employ rich detail to illustrate the situation within which the research was conducted, aiming for 'thick description' as Geertz (1973) terms it. I have attempted, where possible, to illustrate my interpretations with examples which are as faithful as possible to the original accounts that participants provided. When quoting tweets for example, rather than strip the text from its surroundings, where participants gave their consent, I rendered the tweet in full. This also means the tweet assemblage; hashtags and hyperlinks, mentions and timestamps, and other contributing actors, are available for inspection. Similarly, in addition to quotations from interviews – where participants' provided consent – the interview recordings have been posted online. Not only does this contribute to an ethic of transparency, but also provides access to the full accounts from which interpretations were drawn. Whilst 'member checking' might be more appropriate in an account seeking to get closer to a single truth,

instead, my research blog offered the opportunity for member reflections or to provide feedback through the comments. Some participants did so there, whilst others took to their own blogs to reflect, one even producing a piece of poetry. The contributions and reflections which emerge feed back into the research and may help to enhance or elaborate what has already emerged.

The different elements of any story should be woven together in a coherent fashion. The same is true of quality research. I sought to do this both internally, by achieving a natural flow through the research design, execution, analysis and interpretation, and externally by drawing upon other theories and previous research into this area (Lieblich, Zilber, & Tuval-Mashiach, 1998). Maintaining a clear and consistent line of argumentation and proposition can help to contribute to a **coherent** account.

It is important for quality research to have an impact, though that might be achieved in different ways. For example, it may offer fresh insights or new ways of thinking, to make a significant or substantive contribution to knowledge. As I outline in more detail in 'Contributions' (pp.254-257), this study makes a contribution to empirical and methodological knowledge, through the techniques used, and the findings which emerged. Alternatively, it might have an effect on those who participated in the research, what Lincoln and Guba (1989) term authenticity. The responses to questions I posed on blog posts, to questions in interviews, comments made on my research blog and in blog posts some respondents wrote subsequent to their participation, suggest both ontological (the study provides participants with new insights into their own situations) and educative authenticity (the study helps participants to better understand the position of other interest groups) (Nolan, Hanson, Magnusson, & Andersson, 2003). Given that all of the above were written in the open, it is feasible that some of these reflections affected others.

Introducing the Gatherings

A common way to present analysis of data in a thesis or other report is by allocating chapters to emerging themes. In 'Plugging in' (pp.91-93), I explained why I declined to undertake a thematic analysis leading to generalisable conclusions, so in the chapters which follow, I present an account of *my* analysis of the data. I call these chapters 'Gatherings,' drawing on the work of a number of authors, but predominantly Law (2004: 160), for whom Gathering is:

[...] a metaphor like that of bundling in the broader definition of method assemblage. It connotes the process of bringing together, relating, picking, meeting, building up, or flowing together. It is used to find a way of talking about relations without locating these with respect to the normative logics implied in (in)coherence or (in)consistency

Or put more concisely (Law, 2004, p.156), Gatherings are 'Forms of craftings. Processes of weaving.' From page 55 I discussed assemblage, not as a noun, a settled and fixed entity, but an ongoing active process of entanglement. So too with the Gatherings I offer. Whereas Law proposed Gatherings as method assemblage, I offer Gatherings crafted and bundled from data, and to some extent, the literatures. They are of course obliged to be fixed at least temporarily within this thesis; 'a local and momentary gathering or accomplishment, rather than something that stays in place' (Law, 2004, p.129).

Some might see this wilful avoidance of arranging findings into neatly defined packages as abrogating one's responsibilities as researcher. One reason I present my analysis as Gatherings is that it is consistent with flânography, and how teachers experience Twitter professional development (TPD). As I discuss later in Gatherings revisited' (pp.231-236), it is often messy, not laid out as structured, planned CPD sessions might be. Although this presents challenges for analysis, the techniques of 'plugging in' and 'reading data through data' described in the 'Data Analysis' section, become important strategies. Insights which consider the implications of the data and speculate on possible consequences are woven through the Gatherings, but drawn together at the end of each.

In presenting the Gatherings, I have assembled a variety of actors and data, and through sociomaterial description, followed Decuypere and Simons (2016) in producing 'an adequate account.'

[...] it is an account (not a neutral rendering of facts) that is aimed at being adequate (that is, that makes a description of the actors gathered in such a way that these actors can 'speak for themselves', instead of being 'spoken about').

To that end, the Gatherings are rich with data in the form of tweets, quotes from blog posts and quotes from interviews. In 'Interviewing objects' (pp.74-76), I outlined five of Adams' and Thompson's (2016) heuristics through which I interviewed nonhumans; one of these was 'gathering anecdotes.' Gatherings as the means to present those anecdotes seems coherent therefore. The heuristics not only 'help researchers attend to the role of thingly gatherings of research practices' (T. L. Thompson & Adams, 2013, p.356) but in my case, encouraged me to produce thingly **G**atherings. As such, my thingly Gatherings are

'important actors, complicit in co-creating the happenings of the world' (T. L. Thompson, 2016, p.481) and are of course, partial accounts of those happenings.

There are of course a multitude of other Gatherings which I could have assembled. In addition to presenting the same findings through alternative Gatherings, there were inevitably completely different Gatherings which could also have been offered. The doctoral research process imposes certain constraints; there is only so much time and space. I chose to present these three Gatherings to confirm the findings of previous research, but also to build upon and extend it. Furthermore, within these Gatherings, I offer new insights not revealed by previous research.

Each Gathering uses a tweet or quote as a point of departure. In the same way a flâneur might assemble and recount a trail through the city, I once more followed the actors to weave, present and rationalise what was gathered along each path through the data. As Skees (2010) notes, during a stroll through the Arcades, the flâneur becomes 'a collector of social knowledge.' The Gatherings which result are neither uniform, nor share similar structures and formats; this reflects my experience as flâneur and researcher, and arguably, teacher learners on Twitter. The Gatherings retain the 'messy lumpishness' that Fenwick and Edwards (2010, p.144) warn can be lost by 'well-intentioned efforts to know [the interesting complications of the world] and make things clear.'

Ethnographic inquiries often open with a description of the research setting (Oliver, 2008) - the backdrop or context within which action occurs. However, Law (2004b, p.22) cautions that for the researcher:

> *[...] there is **no distinction between the individual and the environment**. There are no natural, pre-given boundaries. Instead there is blurring. Everything is connected and contained within everything else. There are, indeed, no limits.* [original emphasis]

Nevertheless, for the first Gathering I elected to present what might normally be considered the context, although for me, was about introducing some of the principal nonhuman actors associated with Twitter. I did this for two reasons: to strive to ensure that the nonhumans weren't relegated to merely providing the background, and secondly, to help provide a degree of orientation for readers who might be less familiar with Twitter. These introductions were more about what these actors do, rather than what they are, especially in relation to TPD. Special attention is given to the 'profile' and how that plays a part in encouraging connections. The tweet which opened this Gathering pointed to other significant actors like the hashtag, and in following that I then discussed how it enables and

marshals hashtag chats - regular, time-limited, topic-driven discussions. I conclude this Gathering by exploring how many of these actors coalesce within a complex, rich activity called EduTweetOz. This Gathering moves from TPD as simple, one-click acts, through more involved actions involving more actors, through to complex activities.

In taking a tweet as an initial prompt, the second Gathering begins in a similar way to the previous one, but then opts for a different course. With no need for further introductions, this single tweet leads to three different aspects of TPD: what mentoring looks like when performed through Twitter; how resource sharing is much more involved than a simple exchange of resources; and how Twitter participates in self-identified communities assembling and holding together.

The third Gathering uses a breakdown (Twitter changing Favorite to Like) to unravel how significant the act of Liking can be, both from participants' perspectives, but also from that of researcher. By 'Liking' tweets as a form of bookmarking, I was able to gather a corpus of tweets in which educators mentioned Twitter in the context of their learning or development. The remainder of this Gathering explores the breadth of the issues raised by these tweets (and elsewhere), including the importance of being able to personalise the experience, but especially the ambivalences which emerged. Although participants like those in Figure 2 seem to portray Twitter in a largely positive light, given the space downsides also emerge.

The Gatherings are similar only in the way each traces a path through the data to illustrate different aspects of TPD. A flâneur could take a visitor on tours of his city which emphasise architecture, history or commerce. Alternately, he could wander more freely, illustrating highlights or significant features. It is this latter approach I adopted for the Gatherings, rather than perhaps attempting to address each research question or emerging theme with its own Gathering. I feel this is more coherent with the way teachers enact TPD and also more consistent with how data are gathered by the flâneur.

5 GATHERING: MEETING THE LOCALS

The tweet is arguably the base currency of Twitter, and despite having a restricted character limit, it can carry a rich range of information and do considerable work. This Gathering takes several cues from a single tweet and explores:

- some of the features of Twitter including the tweet, the profile and the hashtag, and the activities in which they're involved;
- a tweet and how its different constituents participate in teachers' learning practices;
- how connections are made and sustained, the importance they have in learning and some of the drawbacks which result;
- what hashtags do in general and more specifically how they marshal hashtag chats;
- the complex and multi-faceted EduTweetOz – a #RoCur account – referred to in the opening tweet. How it is assembled, the actors involved and the practices they enact.

Aaron Davis 🏡
@mrkrndvs
Follow

A #RoCur Reflection readwriterespond.com/?p=2656 another @twitter reflection @IaninSheffield

> **A #RoCur Reflection - Read Write Respond**
> Reconsidering a week as EduTweetOz and the lessons I learned.
> readwriterespond.com

3:58 AM - 30 Oct 2016

1 Retweet 1 Like

Tweet 4

I didn't spot Tweet 4 during my participant observation; it found me and invited my attention. I will return to that matter shortly, but for the moment I offer it as a city guide – one of those single-sided overview maps that hotels sometimes provide. A new visitor to Paris might choose the Louvre, Montmartre, Tuileries and Arc de Triomphe and add them to their first day's itinerary. Tweet 4 works in a similar way, providing notable points of interest worth closer exploration.

Anyone familiar with Twitter might quickly identify various elements within the tweet, but I intend here to inspect each of the constituents in a little more detail, since they will provide the points of interest on this tour. In Figure 17, I've added numbers to the various points I intend to draw out. I hope to illustrate that a tweet is far more than its 140 (or 280) character limit.

Figure 17: Elements of a tweet

There are some components of this tweet which are found in all tweets, although they may present differently depending on the device being used to view them. 1, 2, 3, 8 and 9 fall into this category, whilst the remainder are (partially) at the discretion of the tweet author. I now intend to take each in turn and expand some of the brief descriptions found in the Phrasebook on page x.

① Bio

This condensed version of the full Twitter bio (Figure 18) has three components: the bio pic, full name (which may or may not be the account holder's real name), and the handle (the @ symbol plus other characters). The tweet author is the first presented item of information, at least for those reading left-to-right and top-to-bottom. When

Figure 18: The Twitter Bio

viewing on a computer other than a tablet, hovering over any part of the bio pops open a summarised version of the author's profile. If this is someone I wasn't already following, but I found their profile 'interesting,' I have an easy route to connect with them by clicking the Follow button. What constitutes 'interesting' will clearly differ from person to person.

② Follow button

Having read someone's bio, immediately to the right is the Follow button. This is pressed to follow that person and thereafter see their tweets appear in your timeline.

> *There are many different strategies around whom you should follow or not follow. The purpose of following educators and #edtech leaders on Twitter is to learn from their posts. Be intentional about who you follow because it's their posts you will see in your Twitter feed.*

The Bio working with the Follow button assist connecting, one of the practices many educators discuss as being a foundational activity on Twitter, and which I discuss at greater length in 'Connecting' (pp.108-113).

③ Further actions

Almost hidden next to the Follow button is a drop-down list of optional further actions associated with the tweet (Figure 19).

The first two enable sharing the tweet beyond Twitter, although there are other ways of doing that whilst keeping the tweet within the platform. Muting, blocking and reporting offer ways to address tweets and other Twitter accounts producing effects

Figure 19: Optional actions

some might consider negative. All of these serve to reduce activity on Twitter in one way or another, which might explain why Twitter has chosen to hide these options behind a tiny drop-down arrow symbol. 'Moments' are ways in which tweets can be bundled together, perhaps under a particular theme.

④ Hashtags

Appending the hash (or pound) sign to the front of some text creates a hashtag – #RoCur in Tweet 4 for example. Although not part of the Twitter infrastructure, hashtags were one of several actors assembled from within the user community itself and have taken on significance for their flexibility and the range of different functions they now fulfil.

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[40] https://www.iste.org/explore/articleDetail?articleid=921

Tweet 5

In Tweet 5, Laura combined two hashtags which work both individually and together in different ways. In 'The Hashtag' (pp.112-122) I begin to unpick the work that hashtags do for teachers on Twitter, whilst in 'Hashtag chats' (pp.123-133), I turn my attention to the specific hashtag Aaron used in Tweet 4.

⑤ Links

By typing or pasting a url or web address into a tweet, Twitter's underlying code automatically turns it into an active hyperlink when the tweet is posted. This means that anyone reading the tweet can go to the web address with a single click – much easier than having to copy the url and then paste it into a browser. Although tweets may impose limits on the space available to authors, the capacity to include links to any other place on the Web extends their potential immensely, as Robert[41] remarked:

> *If anything, the problem that people face is one of curating the best and most relevant links, blogs and articles. Twitter links to an almost limitless online library.*

Like the Follow button, the link can connect people together, but in addition, it connects them with other information. The link in Tweet 4 took me to Aaron's blog post where I learned about his participation in EduTweetOz, and as a result was intrigued to find out more about what involvement did for people's practice.

Actor-network theory encourages the researcher to 'follow the actor.' Whilst the hyperlink can be considered an actor in its own right, it is an important facilitator in allowing us to follow other actors. I was able to explore EduTweetOz activity, and the places it appeared, by following hyperlinks.

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[41] https://robfmac.com/2014/05/31/what-twitter-means-to-me/

⑥ Mention

By including my Twitter handle (@IaninSheffield) in his tweet, Aaron gave me a 'mention.' Doing this causes the person mentioned to be notified, assuming they have notifications enabled in their Twitter account settings. The mention is a useful way of 'knocking on someone's door' as Aaron phrases it, and can be a useful way of bringing something to people's attention in a more direct way than simply hoping they'll spot your tweet in their timeline. If a particular person isn't following you, the mention is also a way of reaching out to them, perhaps with a view to making a connection, as André advocates in Tweet 6.

André J. Spang
@Tastenspieler

Follow

A6 Connect to the participants of a chat, after the chat is over. Fave or retweet their tweets or mention them. #EDchatDE #JubileeEdition200

7:39 PM - 6 Mar 2018

1 Retweet 1 Like
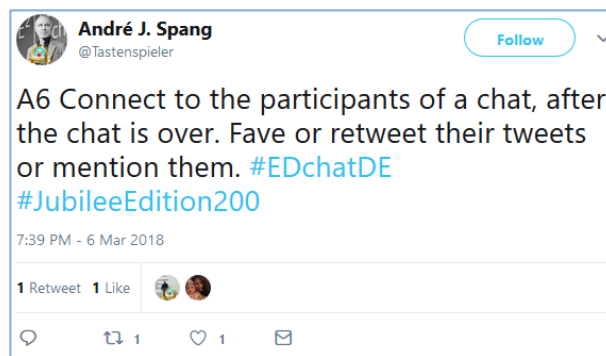
Tweet 6

⑦ Preview

When a link to another location – for example a blog post, an image or a video – is incorporated in a tweet, then if the source page has the relevant code, Twitter can recognise that and assemble some of the content from the page into a 'card.' Twitter cards[42] can encourage the reader of a tweet to visit the resource to which the link is pointing by providing a small preview. The Twitter card is also hyperlinked so clicking on the card takes you straight to the site.

⑧ Retweet and Like statistics

This small panel shows the statistics for how many times the tweet has been retweeted or Liked. Alongside the figures tiny bio pics of those who retweeted and liked the tweet are displayed. Although small in size, they offer another possible opportunity for making connections; they are interactive, and as in Figure 18, pop open a preview pane showing the abbreviated bios of those concerned.

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[42] https://developer.twitter.com/en/docs/tweets/optimize-with-cards/overview/abouts-cards

⑨ Reply, retweet, like, and message buttons

The first three buttons in this panel also show the number of times the tweet has been replied to, retweeted or liked however, they also allow each of those actions to be performed. Clicking on the first button for example, pops open a window in which a reply to the tweet can be typed and sent. It is from here that actions can be performed which: (a) extend the life of the tweet (Retweet), (b) open communication with the author and begin a dialogue (Reply), or (c) provide feedback to the tweet author on how their tweet was perceived (Like). It should be noted however, that I have only offered one way that each of the buttons might be used; they can also be used with rather different intentions or produce effects other than those intended which I will discuss further in forthcoming sections.

Connecting

Lauren Rodger
@laurenrodger
Follow

Replying to @jonesieboy

Twitter can challenge my thinking, inspire me,
connect me with like-minded educators,
make me feel part of a learning community.

10:18 PM - 28 Nov 2016

1 Like
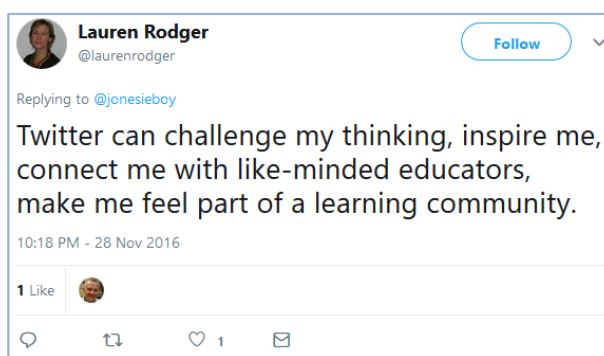
<div align="center">Tweet 7</div>

One of the most frequently mentioned activities when teachers discuss their use of Twitter is 'connecting,' and that the purpose of connecting is to learn. Principally, they're seeking connections with other people, but also to link between different spaces, for example, between Twitter and blog posts. This is one example of how the hyperlink discussed in 'Links' (p.106) becomes so significant. Useful connections teachers make are often with other teachers, especially those who share similar interests, passions, and are of a 'like-mind.' Whilst connecting with specific individuals can lead to strong and trusting relationships forming and reforming, there's a recognition that by doing so, you are also connecting with the extended network of other connections that *that* person benefits from; it's a cumulative or even exponential process. Knowing the importance of making and maintaining connections, some teachers or Twitter accounts like @EduMatch[43], openly act

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[43] https://twitter.com/edu_match

as brokers in bringing together people and things they think would interest or assist one another.

Twitter, like other social media platforms, simplifies and encourages the process of making connections through the Follow button. Each new person followed establishes a new connection and that simple act may attract a reciprocal follow and the potential to begin a relationship. Finding people to follow can occur randomly from the tweets which appear in one's timeline; if a tweet from someone not currently followed appears (perhaps from a retweet by someone you do follow), the Follow button makes it easy to follow that new person. Alternately, some seek out new connections by following hashtags of interest and seeing who is tweeting using those hashtags. Retweeting, Liking or replying to other people's tweets briefly brings you to their attention via the notification they receive; this can sometimes serve as a nudge, and coax someone into following you.

> **Elizabeth Hutchinson**
> @Elizabethutch
>
> Follow
>
> A3 I would retweet if I wanted others to read or if I wanted to let them know I found it interesting.Hoping to start a connection #satchatwc
>
> 3:57 PM - 18 Feb 2017
>
> 4 Likes
>
> 4

Tweet 8

This kind of activity is not only useful in initiating connections, but also renews and maintains those relationships. As Deborah puts it:

> *Twitter's kind of the glue almost, in terms of the relationships. That tends to be where I connect with people.*

The transnational landscape across which Twitter stretches allows connections to be made beyond one's school or local area. In addition to educators with different backgrounds and from different educational contexts, it is possible, as Joe noted, to establish links with 'experts:'

> *You might let's say get an NQT, who has said … or maybe like a PGCE student who says 'Right I've got to write this essay on using phonics in the languages classroom.' So that person might tweet that question out there and then you might get the expert in the country or the*

experts in the country saying 'oh well actually you should look at this, this and this' or 'have you tried this?

Having access to a much broader landscape makes it easier to connect with people who might share your professional interest, even where that is somewhat niche. Hashtag chats mentioned in the previous section, can assist in making connections, as Greg[44], although otherwise somewhat critical of chats, observes:

You probably aren't surrounded by people at your school who share your enthusiasm for discussing educational issues and so the hashtag chat allows you to link up with people from all over the world who are just as geeky as you.

For some people, rather than seek out like minds, the opportunity to be exposed to different views is an important factor when considering connections:

Kathryn Morgan
@KLMorgan_2
Following ⌄

A1: I use it to challenge my ideas/beliefs etc. Always good to learn from others, be open-minded & curious. Connectivity is key. #UKEdChat

8:14 PM - 9 Feb 2017

1 Like

💬   🔁   ♡ 1   ✉
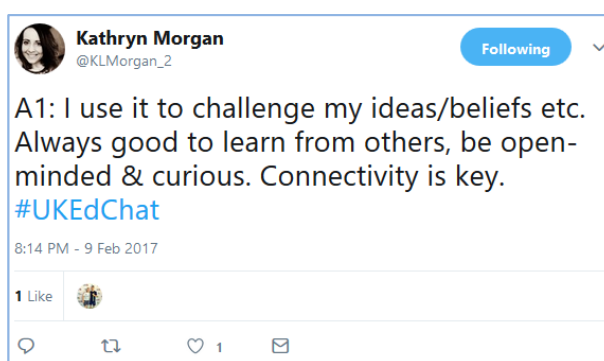
Tweet 9

The connections which are seeded in 'Following' practices on Twitter sometimes develop into more fruitful and meaningful relationships. These connections are often cemented through face-to-face encounters, sometimes serendipitously as paths cross at conferences, or often intentionally arranged 'meet-ups.' The warmth of these exchanges and their importance in strengthening the relationship should not be underestimated, as Sarah mentioned:

So the face-to-face is just … it just feels magical after you've talked to someone for so long on Twitter and then … first when you start connecting with someone on Twitter and then you, you chat with them on a Hangout, then that's like a different feeling, and then when you actually see them face-to-face so you can shake their hand and you know, give them a hug, then that's, that's a whole different ball park right there.

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[44] https://gregashman.wordpress.com/2015/10/17/education-hashtag-chats/

Where face-to-face meeting is not possible, or even if it is, playful, creative exchanges can bolster what might otherwise be rather shallow connections. The EduMatch community that Sarah founded connects professionally through Voxer, Google Hangouts and Facebook to discuss educational issues and collaborate on professional projects like the books they co-wrote ('Snapshot in Education' 2016 and 2017[45]). However, a third book they produced was 'The Teacher's Recipe Guide,' and at the time of the interview, they were discussing another less serious project:

> *There's been some talk of a … a mix tape [laughs] which is our newest project that we'll be looking into, since so many people in the group are musical, then a couple of days ago, someone said 'hey we should just get together and make a CD' and I mean [laughs] y'know that's just going to be something for fun that we're thinking of doing*

This lighter side to participation in EduMatch appears to help to cement the relationships which form and serve to continually renew the connections.

The online world appears to be in a state of continual churn, with new platforms or features coming and going. It might be surprising therefore to find that connections made through Twitter could offer a degree of stability. When teachers move schools or take on new roles, perhaps even in different countries, their real world connections become disrupted or even severed. As Aaron notes however, Twitter relationships remain stable during the transition.

> *I do find Twitter and social media and all those communities and tribes that I belong to as really quite interesting because they sort of exist outside of this temporal nature of where I work, where my contract is and so forth. They're connections that y'know, if change five jobs, I've still got these connections. And many of the people that I know have changed jobs several times, but it's the connections that have remained in a strange way.*

In addition to the benefits outlined, connecting with others also has its drawbacks. The time taken to create an initial connection may be minimal – clicking the follow button, mentioning someone in a tweet – but assembling then maintaining and nurturing a useful network of connections can be time-consuming.

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[45] http://www.edumatch.org/books
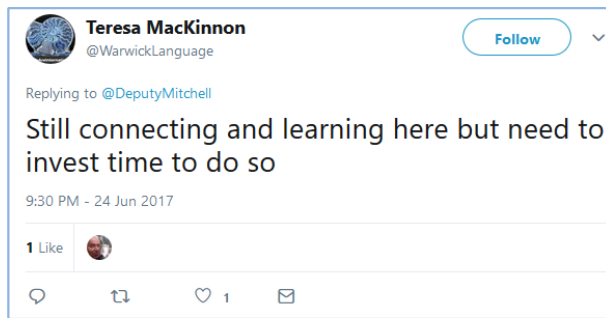
Furthermore, in surrounding oneself with like-minded individuals, it is recognised that opinions and ideas get continually bounced around in what many call an 'echo chamber,' limiting the exposure to fresh ideas. Similarly it becomes difficult to innovate when more radical, or even just different*,* views find it harder to penetrate the 'filter bubble' generated by your 'in-group.' Twitter and its algorithms may also contribute to the filter bubble. As mentioned, the Follow button encourages connecting, but so too does the 'Who to follow' panel (Figure 20) found on the right of the home page, which offers updated suggestions for people you might consider following. Is this panel helping bring like-minded people together or reinforcing the filter bubble? Since the recommendation algorithms are hidden, *many* Twitter users remain oblivious to the *hidden* factors which seek to influence their behaviour.
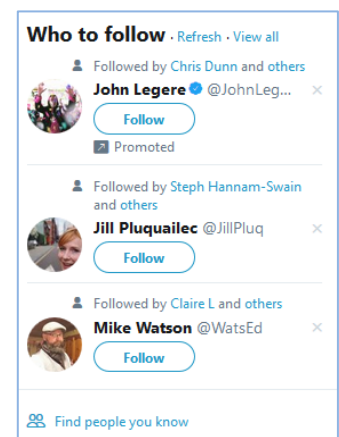
Figure 20: 'Who to follow' panel

So whilst connecting is generally portrayed as a good, there are drawbacks, even if they are articulated less frequently. I take up these ambivalences in more detail in the third Gathering.

As briefly noted earlier in this section, another tweet constituent that sometimes assists in making connections, also makes its presence felt in other ways. Time now to follow the hashtag.

The Hashtag

The hashtag is both singular and multiple, consisting of the hash (or pound) symbol intimately bound with a string of characters which may be a word or phrase e.g. #education, and can therefore adapt to different needs. Beginning life in Internet Relay Chat, it migrated to Twitter somewhat appropriately, in a tweet (Tweet 11):
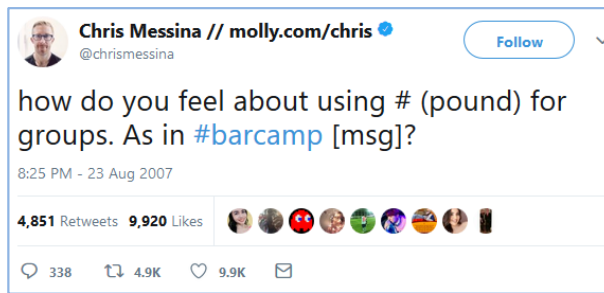
Tweet 11

From a modest birth it has gone on to have much greater significance, penetrating the public consciousness through such meaningful initiatives as #BlackLivesMatter[46] and #MeToo[47]

In an educational context, the hashtag has taken on a number of different roles:

- Curriculum areas – hashtags which assist teachers specialising in teaching particular areas of the curriculum e.g. #GeographyTeacher

- Communities - groups of people who share a particular interest e.g. #mlearning

- Geospatial - hashtags which help those in a particular region find one another and discuss local issues e.g. #edchatie (teachers from Eire)

- Time-limited - these hashtags materialise for a particular time, often for the duration of an activity e.g. #WeeklyBlogChallenge17

- Celebration - hashtags promoting the efforts of others, like our schools or pupils e.g. #pedagoo

- Solidarity - in which the hashtag often indicates support for a particular issue or initiative e.g. #WomenEd

- Well-being - hashtags which gather people in activities geared specifically towards their physical or mental health e.g. #teacher5aday

- Backchannels - there are a multitude of hashtags which come into being to enable communication and discussion around particular events like conferences e.g. #bett.

Some of the aforementioned have a long history (in Twitter terms), some are more recent and others ebb and flow as the calendar unfolds. Whilst they may only consist of a few characters inserted into a tweet, they nevertheless can have significant effects. When used in conjunction with the Twitter search function, they enable threads of tweets, sometimes

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[46] https://en.wikipedia.org/wiki/Black_Lives_Matter
[47] https://en.wikipedia.org/wiki/Me_Too_movement

posted over extended periods of time by hundreds of people, to be assembled together. They extend the reach of individual users beyond the list of people they are following and thus can help to forge new relationships. It would be remiss however, to see them as bound to tweets; their reach extends further still.

In the following sections I will explore three hashtags and the work they do in more detail. In some instances, the hashtag translated me into its network, even if only for a while, whilst in others, my role was more of an observer, watching from the outside.

#satchatwc

Beth Houf
@BethHouf
Following

Hope you can join special guest @MsKraushaar on #satchatwc this morning! #satchat #leadupchat #tlap @burgess_shelley

#SATCHATWC 2/18
7:30 AM PST
MAKING TWITTER
MEANINGFUL
-SPECIAL- GUEST: @MSKRAUSHAAR

1:25 PM - 18 Feb 2017

18 Retweets 17 Likes

Dave Burgess, Tara M Martin, Melody Hapner and 7 others

17 18   17
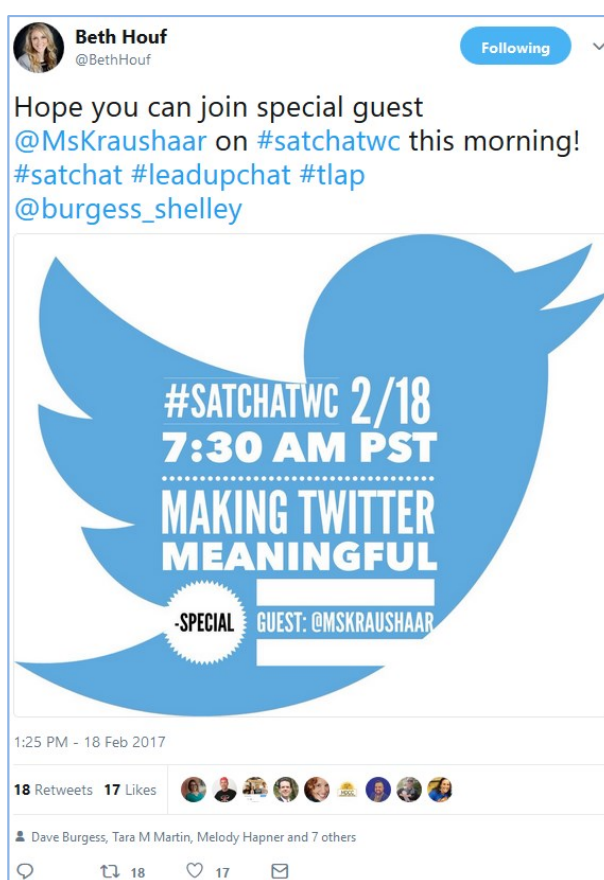
Tweet 12

Some hashtags, like #satchatwc, are used to provide a hub around which an educational discussion can take place. This genre is worthy of further discussion in its own right, so I take up that topic in 'Hashtag chats' (pp.122-133). Here I introduce the hashtag chat through the specific example of #satchatwc, an educational chat which takes place on a Saturday and is initiated on, but not limited to, the west coast of the United States. I intend to focus on one particular chat which took place on the 18th February 2017 and was discussing professional learning.

Prior to each #satchatwc, a number of tweets are posted promoting the event. In Tweet 12 the hashtag works with others, presumably with the intention of exposing the tweet to a wider audience, or indeed making participants in #satchatwc aware of other chats in which they might be interested. At this stage, some potential participants will not be following the hashtag, so this could be considered an invitation to become involved.

Often chats begin with participants being encouraged to provide a little background. In Tweet 13 Heather capitalises on this and adds a further hashtag. This may serve to invite those following the regional #OrEdChat hashtag into #satchatwc, or indeed make those engaged in #satchatwc aware of Heather's 'local' chat.

Heather
@hmarrs24   Following

Good morning #satchatwc! I'm Heather Marrs
3rd Gr T and EdTech Teacher Leader in
Southern Oregon #OrEdChat

3:31 PM - 18 Feb 2017

2 Likes

2   2
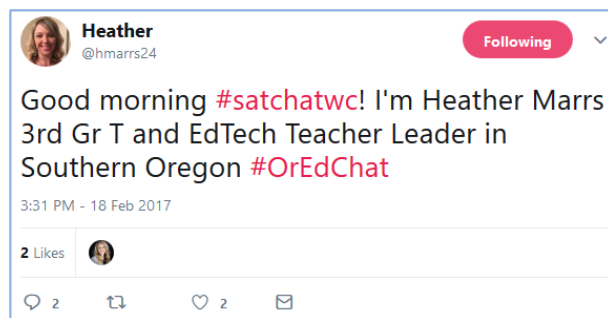
Tweet 13

In either case, this strategy offers potential for forming connections beyond one's immediate area.

The chat then proceeded following the convention where questions are posed at intervals during the course of the hour. In this instance, the opening question was "Q1. As an educator, what motivated you to join Twitter? What kind of content do you normally share on twitter?" The abbreviation 'Q1' indicates this is question one and by convention, those who respond will include both the hashtag and A1 in their tweets. The hashtag and textual indicators help participants find the chat and navigate within what can appear to be an otherwise chaotic, disorienting environment.

In addition to hashtags and textual markers, the response to Q3 ("What motivates you to share something on Twitter? What makes something 'retweet worthy?'") in Tweet 14 shows how participants involve another actor which serves another purpose
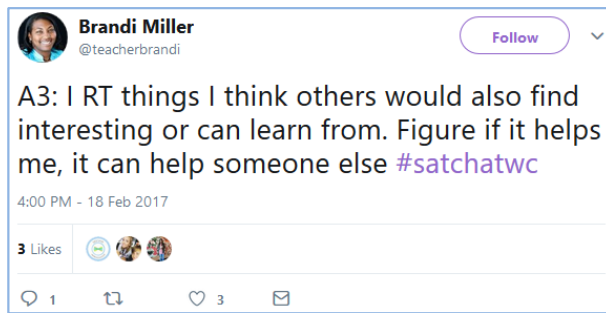
Tweet 14

The retweet (RT) helps share practice and provide support to colleagues by amplifying the original stimulus, and as other responses to Q3 suggest, RTs do so much more, as previously discussed.

Although the presence of a hashtag in a tweet can achieve a number of ends, for the purposes of a chat, it almost demands to be present.
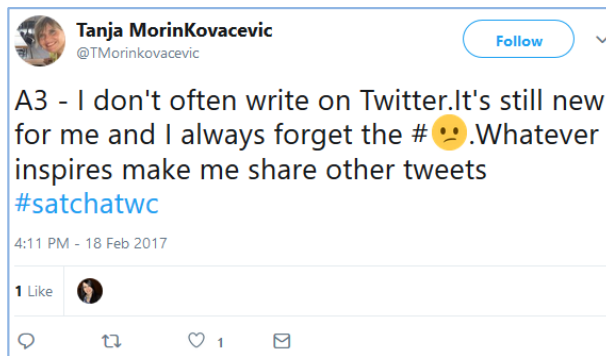
Tweet 15

If it is left out of a tweet in the way the author of Tweet 15 describes, that tweet fails to enter the conversation; people simply will not see it. The same outcome results where the hashtag is not used. In the next section however, I discuss how variation and amendment in fact can be tolerated.

#NAT5HRUAE

#NAT5HRUAE arrived in my twitterstream in one tweet embedded within another and attracted my gaze because the author described it as a "Neat use of a Twitter hashtag[…]." The primary intended audience for the original tweet (and hashtag) was school students, rather than teachers. It might therefore have slipped my attention but I was intrigued by the composition.
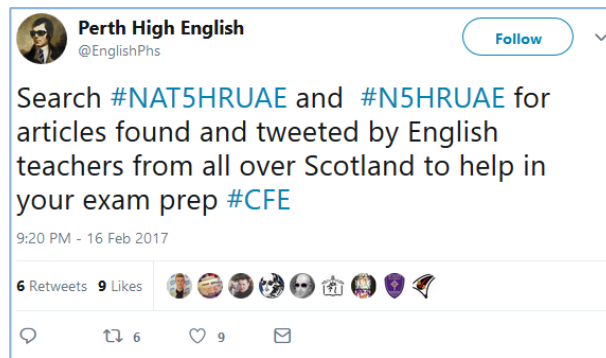
Tweet 16

A hashtag often reduces semiotic load by having an obvious meaning e.g. #socialstudies, but what did the apparent abbreviations in #NAT5HRUAE mean? To satisfy my curiosity I explored this further with the author (a strange experience in itself, the Twitter account being a school English Department). The components of the hashtag indicated the Scottish National 5 Higher (NAT5H) qualification with the remainder referring to the particular strand of that qualification being addressed (Reading for Understanding, Analysis and Evaluation). I was told that the function of the hashtag was to provide quick access to 'interesting and appropriate' articles and thereby encourage students to critically read non-fiction.

Although intended primarily for students, the hashtag also attracted the attention of teachers, at least those for whom the abbreviation was likely to have meaning. The composition of the hashtag therefore attracts some, whilst excluding others. The tweet contained two hashtags rather than one because the originator "started one tag and another school shortened it further." What this reveals is how the original hashtag affected the practice of another teacher, who then, perhaps to work better within the 140 character limit for tweets, shortens the hashtag. Here the hashtag emphasises its fluidity; 'the capacity for shape changing and remaking its context that is the key to its success' (Law, 2004, p.81). This flexibility however creates a dilemma. To exploit the collective work of others *and* contribute to the whole, the two hashtags require each other and become bound together. Anyone tracking either of the hashtags alone might miss resources posted to the other.

Working in concert and separately, the hashtags have appropriated a number of teachers working collectively to source resources for their students, and through the hashtag, inspire each other. This principle is picked up in the final hashtag example.

#12daystwitter

When responding to a topical issue, some hashtags materialise then subsequently decay from view e.g. #OnBoardWithGonski, a movement supporting a landmark report proposing changes in education funding in Australia. Others, like #NAT5HRUAE, are currently ongoing. Some tread a middle path and facilitate communications and connections for intermittent events such as educational conferences like #ISTE. At the time of writing, another annual hashtag was enjoying its 4th birthday and drew together educators in a shared learning experience. #12daystwitter was brought into being by Mickie Mueller[48], an educator offering a Twitter learning opportunity for teachers in her school district. Working on the same principle as an advent calendar, in the days leading up to the Christmas break, the hashtag delivers a daily challenge to those who follow it. Those who participate on a regular basis need some way of following the hashtag in order that it can deliver them their daily challenge. This might be using the Twitter search function or with a Twitter client like Tweetdeck. To be an effective active participant requires assembly of this three-way alliance between themselves, the hashtag and a Twitter client. The hashtag in this instance works in conjunction with the task to help assemble a community engaged in a shared endeavour. Sharing is enhanced by the hashtag providing a focal point through which people can view each other's contributions. Since this is taking place in an open space, tweets drop into the timelines of people who might initially have been unaware of #12daystwitter. The hashtag now serves as a greeting card and ticket to enrol others into the experience.

Kathy Renfrew
@KRScienceLady

Follow

Tell me more #12daystwitter

Jessica FriesGaither @ElemSciTchr
Jumping into #12daystwitter late. I'm Jessica. Elementary science teacher, #NSTAPress author, dog lover.

2:04 PM - 3 Dec 2016 from Vermont, USA

1
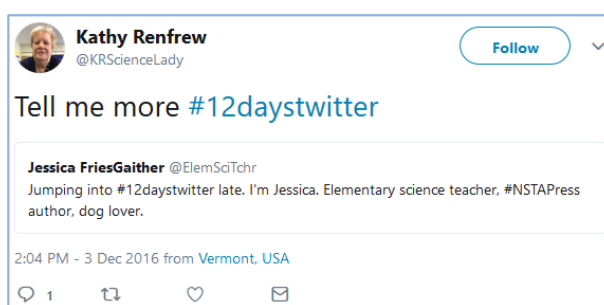
Tweet 17

The author of Tweet 17 references a preceding tweet by quoting it, and asks for further information. The #12daystwitter hashtag delivers that request to all those following it, but a more personal response may be likely as a result of the tweet author being notified when their tweet was quoted in this way.

---

[48] http://edtechnps.blogspot.co.uk/2016/11/12daystwitter-and-power-of-pln.html

Tweet 19 shows an example of how those attracted by the hashtag begin to form connections with one another. The 'Follow' button briefly provides assistance – one click and a new connection is made. As we saw with #satchatwc, by bringing in an additional hashtag (#hurontigers), the audience for #12daystwitter may be swelled yet further. Where additional actors become incorporated into tweets, their potential to affect others, both humans and nonhumans, increases.

Sherri Nelson
@sherrinelson00

Replying to @catlett1

Great idea-now following you! Watch for #12daystwitter tweets from #hurontigers !

2:40 PM - 3 Dec 2016

1 Retweet 1 Like

Tweet 18

Day 4 of the challenge involved sharing a photo of your classroom, which some, like @AmyRoediger, took a stage further and extended to include a teaching activity (Tweet 18)

The main photograph gives a sense of the activity in situ, but in this example, additional illustrative photos are also included <#*ethics*>, together with a hyperlink to a blog post providing more detailed background information. #12daystwitter works with that photo and the blog post link to expand the learning potential for any viewer.

Twitter provides a medium through which to pose questions (Davis, 2015). The Day 10 activity asked participants to pose a question and in Tweet 20, the hashtag can be seen

Amy Roediger
@AmyRoediger

D4: Ss work in groups to predict reaction products w/ assist from paper dolls, use @TheAnswerPad too #12daystwitter aleverandaplacetostand.blogspot.com /2014/12/predic ...

3:21 PM - 6 Dec 2016

1 Retweet 3 Likes

Tweet 19

acting with the @reply and Twitter's algorithms to thread together the responses and contributions of others.

Tweet 20

These are the actors which make dialogue possible, understandable and manageable within Twitter. Of the 6000 tweets which contributed to the #12daystwitter pool, the majority simply added content and involved little further interaction. Knowing what effects these contributions might have on those who view (or contribute) them is largely hidden and much harder to observe.

However, the effect of one particular hashtag is made clear in Tweet 21

Tweet 21

#MTBoS connects the work of a group of educators who self-identify as a 'Global Math Department'[49]

> [...]a community of math teachers on the Internet. We communicate via Twitter and blogs so we use the nickname Math Twitter Blogosphere (MTBoS).

The two hashtags in this tweet now connect together two groups of educators; one an ephemeral, somewhat eclectic group linked through a hashtag in a time-bound activity, the other a group connected by similar interests who 'meet' regularly online, who share

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[49] https://exploremtbos.wordpress.com/orientation/

121

resources, engage in workshops, solve problems together and have co-authored a book. Material collaborators help to produce MTBoS, the hashtag being only one element.

Hashtags may bring people together, but they also make demands. As was illustrated with #NAT5HRUAE, hashtags are also fluid and can change shape. In addition to #12daystwitter, a second parallel, but similar activity was also taking place, conducted by the hashtag #12daysoftwitter. Tweet 22 [*a repeat of Tweet 2*] shows how one participant recognised their mistake:

<div align="center">**Tweet 22**</div>

Others simply doubled up both tags, possibly participating in both challenges or perhaps linking participants in the two together.

Another way in which hashtags may confound their primary collaborators can arise when they become well used. Popular hashtags can become victims of their own success and attract the attentions of spammers – those who use the hashtag to promote their own agenda. Hashtags, unlike usernames, are completely open and available, so may be used incidentally for a completely different purpose as can be seen in the promotion in Tweet 23.

<div align="center">**Tweet 23**</div>

Having introduced hashtag chats through #satchatwc in 'Hashtag chats', and prompted by the sheer number of chats which take place each week around the world, I move on to explore them more deeply in the next section.

Hashtag chats

> **Lena Marie Rockwood**
> @Dr_LMR
>
> A day after starting school acct I saw all the # chats so I started my own acct and I have been engaged since. Sat is my PD day! #satchatwc
>
> 3:41 PM - 18 Feb 2017
>
> 7 Likes
>
> ☐ 2   ↻   ♡ 7   ✉
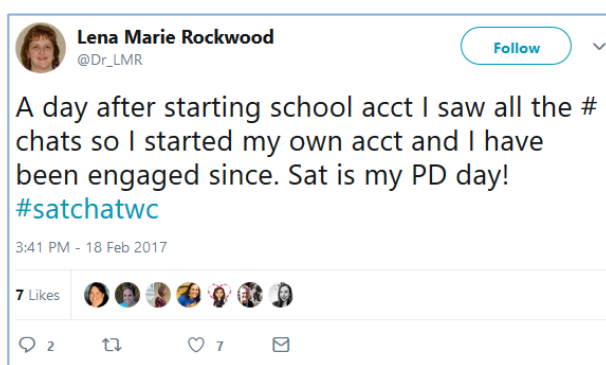
Every day of every week, educators around the world connect with one another, share resources and ideas, and discuss educational issues in Twitter chats. These online exchanges are shepherded by particular hashtags, often containing 'chat' within the hashtag e.g. #ukedchat. Most, though not all, chats are synchronous, that is to say that participants gather on Twitter at an agreed time on a particular day to conduct their discussion. Often the chat will last for an hour and is usually focused on a pre-arranged topic which, for some like #edchat, is established by posting a poll prior to the chat so that the audience can choose the topic. Although chats are open – anyone can view and contribute to the discussion – they are often guided by one or more moderators who encourage participants and support the discussion.

A wide variety of chats have evolved over the years. They occur with different regularity; monthly, bi-monthly, weekly and in some cases daily. The duration also varies from an hour through to half an hour, or down to fifteen minutes; whilst most are held in the evening (chat local time), some are in the morning, and some at the weekend. Of course a 21:00 evening chat like #digitalEDchat in its home of Auckland would be an 08:00 morning chat for someone in London and a late-night chat at 23:00 the day before for someone in Anchorage. On the other hand, the brevity and immediacy of #BFC530 perhaps doesn't travel as well - 'a 15 minute, 1 question Twitter chat every weekday at 5:30am.'[50]

As seen in the educational examples already mentioned, the hashtag often provides a sense of the theme on which the chat is based, the group of educators who might be interested, or the geographical location from where the chat originates. For example, #games4ed

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[50] https://twitter.com/BFC530

might appeal to those interested in how games can be used in education, #edchatie is an edchat located in Ireland, and #apchat is particularly for assistant principals.

Although the majority of chats are synchronous, some take place over a more extended period, allowing participants to contribute when they are able. These are termed 'slow chats;' they are often conducted over the course of a week, and perhaps discuss a different question each day. The #EllChat_BkClub (English Language Learning Chat Book Club[51]) for example, discusses a book over the course of a week. Even synchronous chats borrow from slow chats when their discussions spill out beyond the fixed time slot. Many moderators curate the tweets from each chat using tools like Storify[App], thereby maintaining an archive[52] which people can access into the future.

People in this study became involved in chats in different ways. For some, like Jaimie[53], happenstance brought them to chats:

> *One evening, I stumbled upon a Twitter chat. At first, I couldn't understand why so many responses were using the same odd hashtag: #vided in their conversations? Then I realized that this was a chat – a group of likeminded people from around the world coming together to discuss a topic of interest to all of them.*

Others like Ximena in Tweet 25 are happy to arrive by chance, rather than by design:

Ximena
@Edk8R

Follow

Replying to @_gmdougherty @teacherchalky1 @stuartkellynz

Mine are more random chance chat encounters- like a lucky dip -#digitaledchat

9:32 AM - 24 Oct 2016

Tweet 25

Where people have existing relationships with others they trust, they may follow recommendations or be encouraged to participate, as did Catherine in Tweet 26:

[51] http://larryferlazzo.edublogs.org/2017/01/12/guest-post-new-ell-teacher-online-book-club/
[52] https://ukedchat.com/archive/
[53] https://www.iste.org/explore/articleDetail?articleid=921&category=Professional-development&article=Twitter+is+dumb!+Or+is+it%3f

Catherine Ybarra
@catherinepybar1
Follow

A1 This chat started it all. It's was a new beginning for what was yet to come. @alicekeeler encouraged me 2 join. She's awesome! #satchatwc

3:38 PM - 18 Feb 2017

1 Like

1   1

Tweet 26

For some like Erin (Tweet 27)), knowing someone offline provided the impetus:

Erin The Librarian
@butterfli820
Follow

When I was new to twitter @rpetitto was in my dist &active in a chat. I joined him b/c I had a rl connection. Branched out from there. #nt2t

2:13 PM - 29 Oct 2016

1 Retweet 3 Likes

1   1   3

Tweet 27

…although that needn't be the case:

Lynda R. Williams
@lywilliams132
Follow

A6 #nt2t I like how people I have met on one chat have invited me to other chats. That is powerful tribe building! #twitter

3:10 PM - 29 Oct 2016 from Utah, USA

1 Retweet 2 Likes

1   2

Tweet 28

The comment in Tweet 28 suggests one way networks can quickly grow.

It is common for first-time participants to initially find chats somewhat overwhelming, easing themselves in through a period of familiarisation (lurking) as they become accustomed to the conventions:

125

This acclimatisation soon progresses into more active participation and greater benefits as Mallory describes in Tweet 30:

Tweet 30

And of course some people go on to become moderators, as Deborah described:

> "I've also … *been involved in moderating a chat and that takes a different kind of engagement because it's often quiet fast-paced and as the moderator of a chat, you often have to really engage with the people."*

Some like Matthew[54] are particularly clear about how Twitter chats might make a difference:

> *Twitter Chats, like #sblchat, #dtk12chat, #edchatme, #1to1techat, #ReImaginePD, and #dtk12chat are all intentionally and explicitly focused on improving instruction, designing curriculum and assessment, improving educational systems, providing new and sharing existing resources, collaborative problem-solving, connecting globally, and creating innovative solutions and ideas*

The benefits people have enjoyed are quite wide-ranging and to some extent, reflect the wider benefits they get from Twitter more generally; finding new ideas, connecting with other people and sharing experiences:

Sophie Lennon
@sophieteachernz

A2 Easy to scan for new ideas, great way to connect, and chats provide structured, regular chances to share #digitaledchat

9:17 AM - 24 Oct 2016

2 Likes

Tweet 31

And as Nick[55] observes, this can extend to deeper reflective work:

> *Tweet chatting also provides the opportunity for a Twitterer to examine their own value filter as applicable to students and instruction*

Contacts made through chats can also lead to later face-to-face connections being forged:

Mr M
@athole

Replying to @jonesieboy

real face to face opps too. Because of twitter chats I've visited Manchester via @PrimaryRocks1 and Toulouse via @pedagogies

11:54 PM - 28 Nov 2016

Tweet 32

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[54] https://collaborate.teachersguild.org/challenge/how-might-we-reimagine-professional-learning-so-that-we-continue-to-grow-feel-inspired-and-have-impact-in-the-lives-of-our-students/ideas/twitter-chats-for-recertification

[55] https://medium.com/@nick_schumacher/twitter-for-professional-development-1fc16361542c

There are also less tangible outcomes which are nonetheless equally important for people, as they find inspiration, motivation and support:

Lisa Milstead ⚓
@LisaMilstead

Follow

Agree. Chats help rejuvenate me and my teaching #satchatwc

3:55 PM - 18 Feb 2017

3 Likes

♡ 3

Tweet 33

Or even simply as a distraction or form of relaxation; as Deborah remarked earlier about participating, rather than moderating, "sometimes it feels like downtime from other things." In Danielle's[56] case, it was clearly about kicking off her shoes and it not feeling like work:

> *I accidentally stumbled upon the #digimeet chat just as it was about to start. I had nothing else on, so made myself a massive cuppa and settled in, not quite knowing what to expect [...] I found it incredibly motivational, and was glad I had been involved. It was a worthwhile way to spend an evening, and I didn't think it felt like work [...]*

Participating in chats does not come without its challenges however, and, as a couple of replies to the question posed in Tweet 34 remarked, some of these might be due to the timings mentioned previously:

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[56] https://staffrm.io/@dalynch146/IEvjzEL9LS

128

The fast-paced nature of some chats can make it hard to follow threads, or the message you are seeking to convey can get distorted by the limitations of 140 characters:
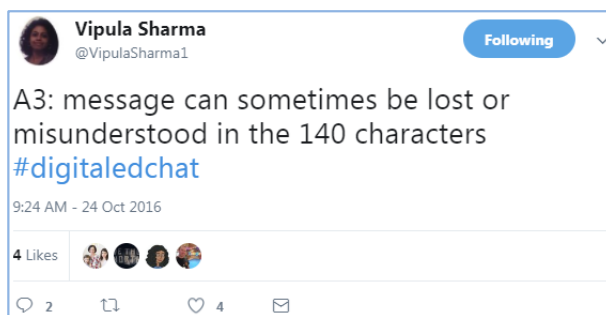
In some instances however, the desire to participate in chats can be a distraction from other activities which might be more pressing:

Georgia Dougherty
@_gmdougherty
Following

Replying to @michaelteacher

Or end up procrastinating other school work because you'd rather be in a chat as it's fun and free PD :P #digitaledchat

9:37 AM - 24 Oct 2016

4 Likes
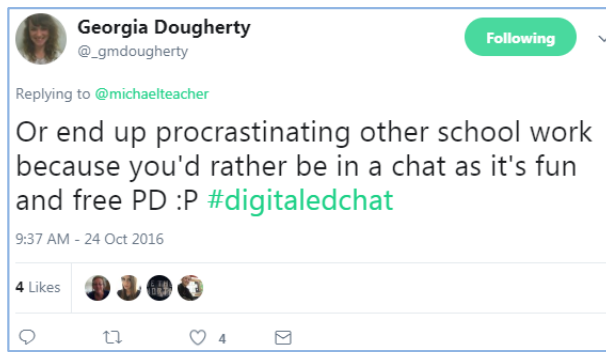
Tweet 36

And this serves as a reminder that other priorities may also be evident:

🐝 MeeShelle 🐝
@macfin76
Follow

@PrimaryRocks1 Sorry I missed tonight, been really poorly and took girl to cricket training! Hope you had a great discussion #PrimaryRocks

8:59 PM - 6 Feb 2017

1 Like

Tweet 37

The opening comment in this tweet, apologising for absence is also curious, given that no-one is noting attendance and that non-presence in online spaces like Twitter chats generally passes unnoticed. Tendering apologies for lateness or lack of active participation is also common in chats. Perhaps people are being polite in the same way they would be offline, or maybe it's another act of ambient intimacy (Reichelt, 2007), a way of checking in and saying 'I'm still around.'

Some of the ways that these challenges can be met are provided by conscripting technical partners like Tweetdeck and Storify to help cut through the cacophony and keep a record for future reference, as Tweet 38 illustrates:
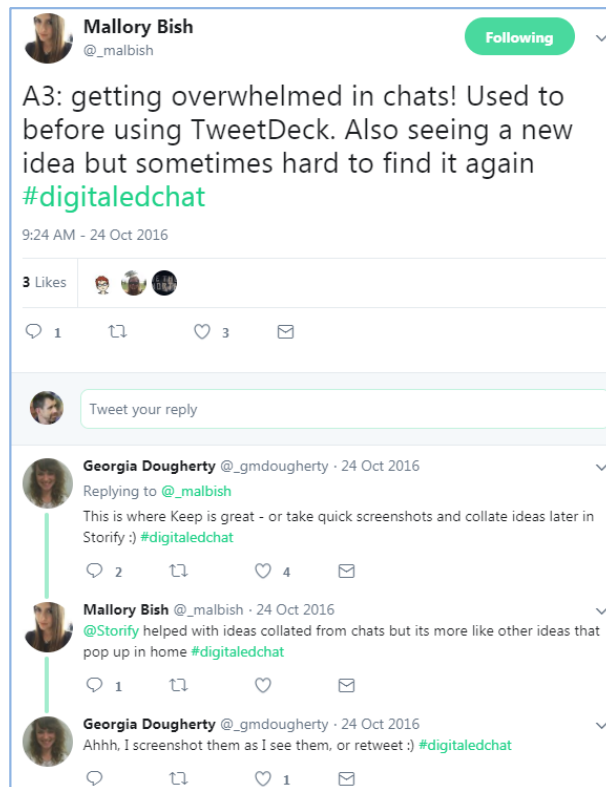
Shortcomings

Hashtag chats do not suit all educators, nor are they appropriate for discussions of all topics. Whilst celebrating the opportunity to converse with like-minded people (fellow 'geeks') who may not be present amongst your colleagues in school, Greg[57] bemoaned the depth and rigour that chats often lack. In responding to Greg, Nick[58] additionally felt that chats can be too fast, too densely populated and make fluent discussion difficult. Ashley[59], agreeing with both sets of views, goes further:

> *What both types of chats can fall prey to are a lack of meaningful connections (with people or ideas), superficial conversations, and a lack of some sort of closure.*

Often in attempting to deal with 'complex concepts' chats can sometimes 'descend into a superficial cacophony of noise where people are talking but not listening, learning or questioning' according to Deborah[60], who longs for 'robust, rather than cursory or jargonistic, discussion.' She shares the concerns of other respondents who almost universally place the cause at the foot of the 140 (280) character limit and how this fails to

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[57] https://gregashman.wordpress.com/2015/10/17/education-hashtag-chats
[58] https://gregashman.wordpress.com/2015/10/17/education-hashtag-chats/#comment-1018
[59] https://ashleytan.wordpress.com/2014/09/12/better-on-twitter-synchronous-discussions-or-slow-chats/
[60] https://theeduflaneuse.com/2015/10/17/education-twitter-chats/

permit nuance. Or indeed how Twitter delivers tweets chronologically, thereby scattering discussion threads throughout the timelines of the participants. All of these observers also point to how one of the attractions of chats, the opportunity to 'geek out' with groups of people sharing similar outlooks, inevitably situates you within an echo chamber which consequently limits the scope and challenge in the discussion.

Despite expressing reservations, each of the observers acknowledged that chats still have some merits, provided your expectations are not too high, or you make adjustments to ensure you get more from them. As Deborah noted:

> *"[...] we can be reflective and critical about how we run these chats, how we participate in them and how we use other media such as blogs, podcasts, Periscope and Voxer to take our conversations further, deeper and towards rigorous and elegant debate."*

#NZBTchat

Having explored #satchatwc on pages 115-117, I close this section with a rather different example; #NZBTchat (New Zealand Beginning Teachers) by comparison, is relatively new. It was started by two early-career teachers (Georgia Dougherty and Mallory Bish), who had participated in other chats, found them useful, but felt that their educational sector was not adequately catered for. In describing her early experiences, Mallory[61] expressed initial reticence:

> *In the past I had watched and read chats while they were happening but almost felt reluctant to join in. I think this came from the small fear that what if my ideas and answers conflicted with others? I bit the bullet and joined this first chat although I still felt hesitant to answer all questions.*

Moving from there to founding and moderating their own chat in late 2016 exemplifies the progression and development that educators often make as they become more proficient and more enthusiastic participants. That next step shifts their learning, as Georgia[62] outlines:

> *By moderating I feel I am learning so much by interacting with others and providing challenges questions in response to those engaging in the chat, so my critical thinking skills are increasing. I also feel proud that we are giving back to the community[...]*

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[61] https://mallorybishptcs.blogspot.co.uk/2016/10/1810-reflection-use-of-twitter-chats.html
[62] http://beyounooneelsecan.blogspot.co.uk/2017/02/moderating-twitter-chat.html

This also illustrates the way in which many educators on Twitter feel it important for the greater good to be a contributor, as well as a consumer of the resources and experiences from which they benefit. This is not a journey the two founders took alone however, as Georgia[63] recounts:

> *Other people who have been incredibly supportive of Mal and I, and the development of the chat are Rachael, Carl, Susie, Alex, Hayden, Myles, Hanchen, Stuart, Andrew and Paul. These people have been there every step of the way, and without their help, challenges and critiques we would not have continued to moderate our chat, nor would we have presented at conference! All but one of these people we 'met' through Twitter!*

One might argue that Twitter provided the initial experience and inspiration which set Georgia and Mallory on this path; it was sufficiently open to allow them to implement their ideas and proved supportive in guiding their path forward. It is difficult to conceive how colleagues so early in their career could have undertaken such a learning project without the capabilities that Twitter offers.

In the next section of this chapter, I briefly revisit the opening section and attempt to exemplify what subsequently unfolded, through the use of a specific vignette, EduTweetOz.

EduTweetOz

A quick reminder of Tweet 4:

Tweet 4

When I first read this tweet I had no idea what #RoCur was, so obviously clicked the link to learn more. Aaron's post reflected on his own recent experiences of participating in

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[63] http://beyounooneelsecan.blogspot.co.uk/2017/07/giving-back-to-penz-whanau.html

@EduTweetOz[64], but also gave me a sense of what RoCur (Rotation Curation[65]) is – a different person each week takes the helm of social media account – most often on Twitter. For @EduTweetOz[66]:

> *"Each week a different educator will take responsibility for tweeting. We hope that people will use the space to share their experiences, pose questions, engage in dialogue about current educational issues and help each other out.*
>
> *Guest tweeters and other educators will be showcased on this blog to share their passion for education with the wider community."*

I was curious what the account did for, and to, both those who assumed the mantle of host, and those who followed the account's tweets. Why did people volunteer, both to curate the account and to become hosts, and what did people learn from that experience? As different people with different views and from different sectors transition through the 'chair,' what does that do to the account?

Background

At this point I wasn't sure whether the notion of RoCur began with EduTweetOz or whether origins came from earlier. The idea appears to have originated within the tourism industry in Sweden with @Sweden[67] 'Every week, the country's official Twitter account, @sweden, is handed over to a new curator as a means to promote and celebrate the country and what it offers. Other countries like New Zealand[68] now have similar accounts and cities in India appear to have embraced the principle wholeheartedly[69]. A search on Twitter initiated by clicking the hashtag #RoCur in Aaron's tweet revealed that rotation curation has broadened and now includes, amongst others:

- scientists sharing their research ('I Am SciComm' https://twitter.com/iamscicomm)

- speech language therapists discussing practice (@WeSpeechies - https://twitter.com/wespeechies)

- LGBTQI people sharing their experiences ('TwkLGBTQI - https://twitter.com/TWkLGBTQ).

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[64] https://twitter.com/edutweetoz
[65] https://en.wikipedia.org/wiki/Rotation_Curation
[66] https://edutweetoz.org/about/
[67] https://twitter.com/sweden
[68] https://twitter.com/peopleofnz
[69] https://www.socialsamosa.com/2013/12/5-rotational-curation-accounts-india/

As my attention returned to @EduTweetOz, I began first at the website edutweetoz.org, which supports and complements the Twitter account. Organisational, institutional, community and group accounts set up on Twitter often have a similar supplementary space to provide for longer form information sharing and as an alternative home base. Unusually for an 'open' learning and sharing community, EduTweetOz has a mission statement:

- *"to celebrate and share the real work of educators from all sectors and provide an alternative to the negative perceptions of teachers popularised in mainstream media*
- *to build a community of educators from all sectors and states of Australia. We want to bring together teachers from pre-schools to universities, from private and public sectors, as well as those who support us in fields such as educational research*
- *to facilitate dialogue and share our journeys and promote excellence."*

This perhaps serves as a reference point for hosts from a range of backgrounds; a place to which they can turn for guidance whilst cultivating their EduTweetOz voice.

The EduTweetOz site also provides a kind of billboard through which its audience can discover more about forthcoming hosts. Each week, prior to taking the helm of the account, the temporary host answers five set questions. Their responses form a blog post which provides a little about their background, experiences in education, and what they hope to cover during their week as @EduTweetOz host.

People who volunteer to assume the role of host on EduTweetOz come from a broad mix of backgrounds and present an eclectic range of topics. Previous hosts include ITT students and experienced teachers, people from different sectors in education (HE as well as K-12), with different roles (headteacher, librarian, subject teacher) and some non-teachers. It is no surprise that some people bring their subject specialism with them (Chemistry, French, Art), but often that's in the context of a particular issue, like the need to encourage greater female participation in traditionally male-dominated subjects like ICT[70]. Some people tap into topical issues like Children's Book Week[71] or NAIDOC (National Aborigines and Islanders Day Observance Committee) Week, discuss the implications for schools and encourage people to share experiences with one another. Different areas of education also prove popular such as NAPLAN (National Assessment Program – Literacy and Numeracy)[72], education policy or teacher accreditation. Digital

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[70] https://edutweetoz.org/2017/07/16/edutweetoz-blog-elke-schneider/
[71] https://cbca.org.au/cbca-childrens-book-week

[72] https://www.nap.edu.au/about

technologies or literacies regularly emerge as themes to be explored, often in association with technology implementation in schools.

Whilst some hosts note that participating in EduTweetOz might be aligned with generally accepted outcomes from professional learning, there are other aspirations which might be less easy to achieve through conventional means. Hosts often propose EduTweetOz as a way to share and showcase ideas and educational issues; to 'build a shared repository of knowledge throughout the country,' as one host put it. The nature of the platform of course enables hosts to establish a forum through which the shared artefacts and experiences may be discussed; by 'creating a professional network and providing a platform for discussion.' The sense of providing the means through which people might connect seems to have particular significance in a country which suffers, by its own admission, from the 'tyranny of distance' (Blainey, 1966).

EduTweetOz - Michael Walker
@EduTweetOz

Following

Replying to @foxguest @dickfaber

Even if the cost is covered, the time taken to go to a "nearby" town can be a huge cost. I once drove from Wentworth to Broken Hill - 3 hours. Enjoyable drive but a long way for a PD.

5:50 AM - 2 Aug 2018

1 Retweet 2 Likes

1   1   2
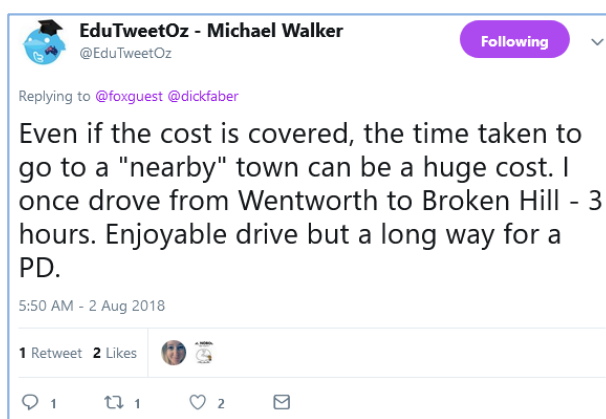
Tweet 39

For some, the opportunities to provide spaces for a wider range of voices or to forefront issues important to indigeneity are significant features. Perhaps it is the range of opinions and ideas enabled by cycling through different hosts that help to make EduTweetOz an attractive venture to many.

In the sections which follow I first provide, in 'Activity on EduTweetOz,' some general observations from across the whole corpus, then follow that with four sections, each illustrating a different category of host activity.

Activity on EduTweetOz

Examining @EduTweetOz tweets collected between 16th August 2017 and 3rd October 2017 revealed differences in the way hosts approach their tenure. Many of the activities appear similar to those found when observing educational Twitter users in general and confirm what has been revealed by previous research. This is to be expected of course; the

people who assume the mantle of host are educational Twitter users. People can be seen sharing (links, documents, opinions), discussing (topical issues, pedagogical approaches, school policies and practices), and recommending or recapping literature (books, articles, research). Although *seeing* people making connections is less likely to be manifest in tweets, in the blog posts discussed later, this is nevertheless an activity people do mention. Once again, these observations confirm the findings of other research in the context of more general, as opposed to RoCur, behaviour on Twitter.

The aforementioned period was covered by around a dozen hosts. There is a noticeable difference in their approaches as can be seen in the following visualisation. During their weeks in office, Figure 21 shows that the most prolific of the hosts generated 869 tweets, whilst the least produced 134.
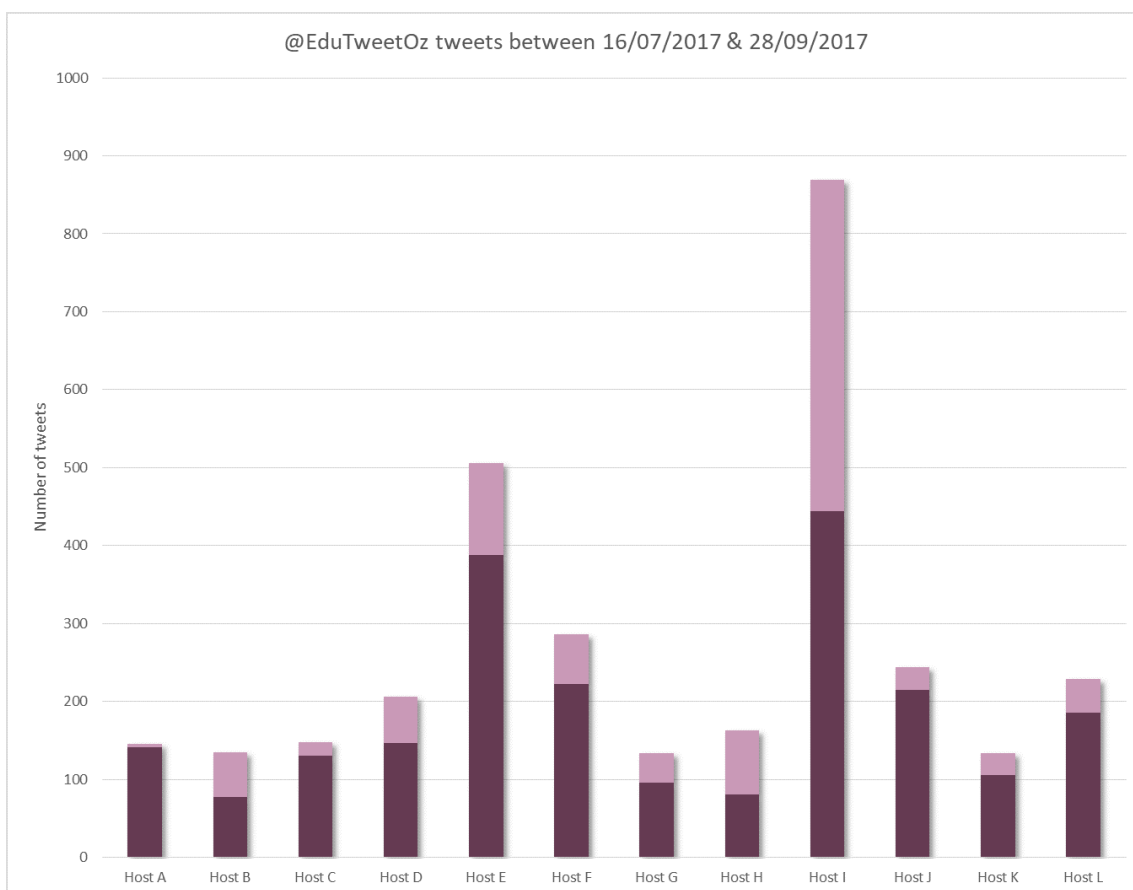
Figure 21: Number of EduTweetOz tweets

The lighter coloured section which tops these bars shows the number of tweets which contained hashtags. As discussed in 'The Hashtag' (pp.112-122), including hashtags can expose a tweet to a wider potential audience or indicate a particular viewpoint. That subtlety is difficult to establish however, without manually examining each tweet and reading each hashtag individually. Furthermore, as will be shown in Figure 22, many of the

tweets the hosts produced were retweets, so incorporating a hashtag may not necessarily have been their choice.
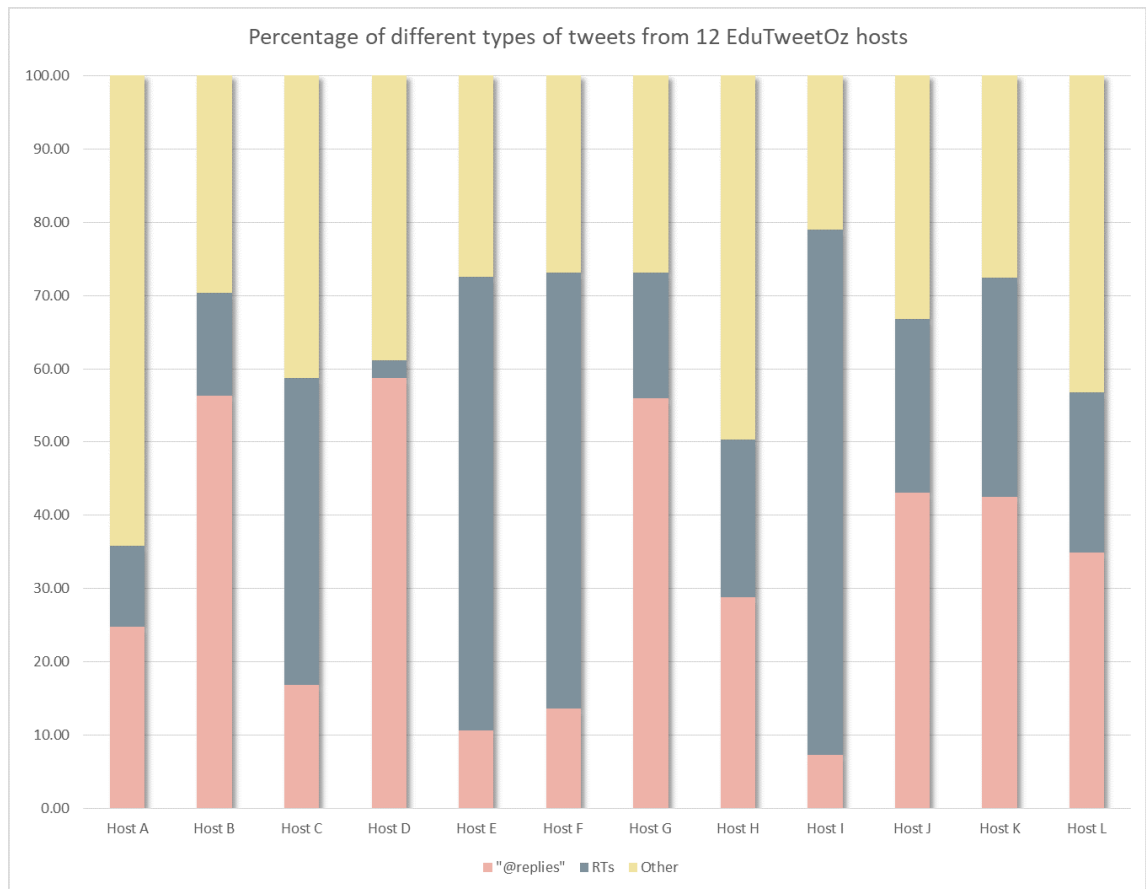
Figure 22: Different tweet types from different EduTweetOz hosts

Figure 22 shows how tweets for all the hosts were broken down by retweets, @replies and undirected tweets.

Over half the tweets of hosts I, E and F were retweets, which suggests their strategy was predominantly to *amplify* the voices of others. Retweeting can serve a number of functions including prolonging the lifetime of a tweet and the message it carries, and shifting a tweet into the timelines of those who might not otherwise see it; both of these increase the potential audience for a particular tweet. Retweeting also provides feedback to a tweet author, perhaps suggesting that their tweet was of particular interest or had resonance with the retweeter. Hosts B, D and G showed high levels of responsiveness to others, as indicated by over half their tweets opening with @replies. One might assume therefore, that these hosts are keen to promote conversation and discussions and anecdotally, by inspecting their tweets, more threaded conversations do appear to develop from their actions. Host A is quite interesting in that over half of their tweets are neither retweets nor @replies; in other words they are mainly initiating tweets, rather than responding to others.

The figures above and my subsequent comments assume tweets occur largely in isolation. Many tweets do in fact attract no (visible) response, but where replies are provoked, conversation threads may form and discussions develop. Rather than attempt to attend to the many singleton tweets from ETO which attracted little response, my flâneur's curiosity propelled me instead to follow a few of the threads to explore the nature of the emerging interactions. The following visualisations, produced using Treeverse, offer illustrative threads from the EduTweetOz corpus. In each case, the initiating tweet is viewed as a node at the top of the tree, with replies, and replies to the replies, unfolding in the branches beneath. The different node images indicate different contributors. Although Treeverse allows the content of each tweet to be viewed, or to follow single lines of argument from tweet to tweet, I use it here to explore the different forms of exchange (as indicated by their shape) which particular tweets from the host(s) provoked.

Asking for tips
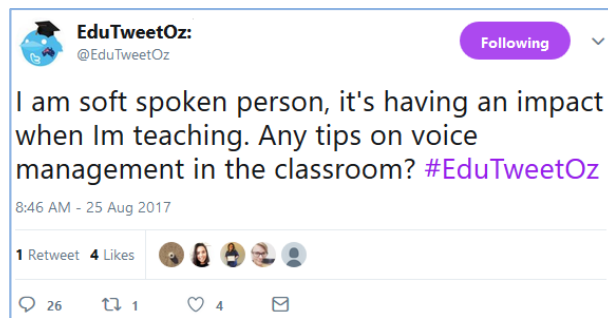
Tweet 40
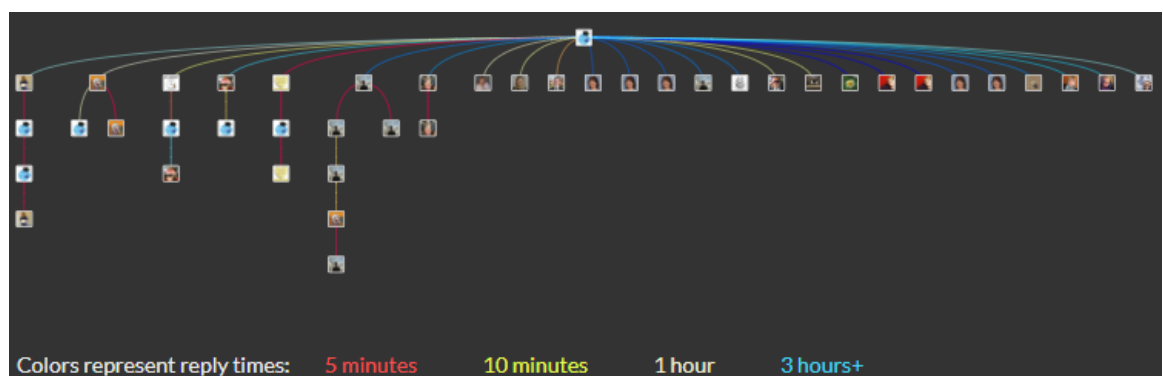
Figure 23: ETO Treeverse - Asking for tips

Since the tweet was essentially asking for a simple response, the visualisation in Figure 23 shows little depth; people reply with their tips, but there's little to discuss. The breadth of the exchange shows that several people responded and some of them provided slightly longer answers as can be seen where the same node image crops up multiple times in that 2nd level branch. One might speculate that not only does the host who posed the question

139

learn here, but so too the participants who contributed to the discussion, and possibly others following the thread.

Sharing expert knowledge

The extended thread shown in Figure 24 and arising from Tweet 42, is mostly a stream of tweets from the host, sharing her/his knowledge on a particular point. In this case the host was using the chair to disseminate some of their research findings; a rather different approach than through a conference paper, perhaps hoping for peer, or participant feedback. Towards the foot of the thread, we can see that others did join in and it then developed into a discussion on the challenges schools face related to technology adoption by young people.

Tweet 41

Figure 24: ETO Treeverse - Sharing knowledge

140

Opening a discussion

Tweet 42

Although Tweet 43 appears to be posing a rather closed question requiring a yes/no answer, including the tweet it is quoting reveals that an attempt to broaden the topic to ask whether other issues might also be relevant.
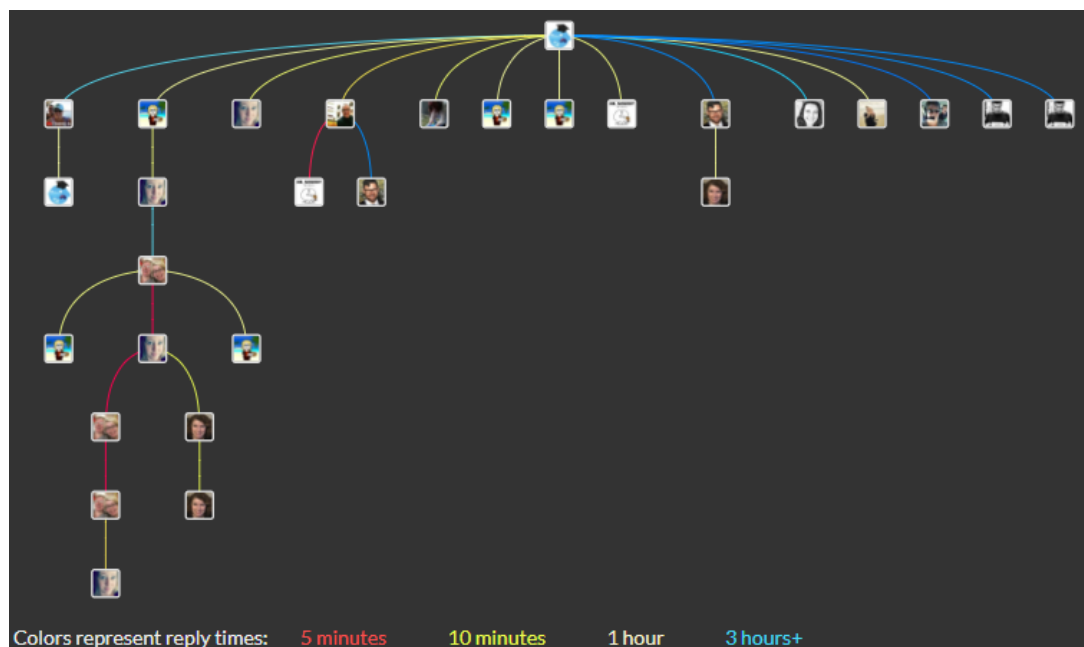
Figure 25: ETO Treeverse - Opening a discussion

Of the dozen or so responses shown in Figure 25, a couple did refer to bandwidth (a serious issue for many communities in more rural parts of Australia), however a range of other topics were also mentioned including funding, Bring Your Own Device (BYOD) and teacher training. The slightly more extended discussion was on the topic of BYOD, but no conclusions were reached, nor successful strategies offered for addressing some of the concerns. Perhaps having posed the question in the first place, this is where the host might have stepped in to tease out ways in which schools have begun to seek solutions. But then, the host might have simultaneously been involved in multiple other conversations and threads, let alone the other aspects of their life.

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What Tweet 42 did do however, was to bring the topic discussed in the thread associated with the embedded tweet, within the purview of the EduTweetOz followers. It provided a bridge between two separate, but related discussion threads.

Eliciting opinion

Tweet 43

The question in Tweet 43 speaks to the '21st century learning' discourse which some find rather provocative. Although it only attracted a few respondees, the extended discussion between EduTweetOz and one particular respondent arises from their differing views. Perhaps conflicting opinions generate longer discussions? Another informative

Figure 26: ETO Treeverse - Eliciting opinion

aspect of Treeverses is the coloured connectors. Red connectors indicate responses which follow one another in rapid succession. The prevalence of these in this exchange might be an indicator of the passion of those involved in the discussion.

Establishing the outcome of exchanges like these is difficult without follow-up involving the active parties. Did either of the participants have any influence on the other? Was it even their intention to do so? Can frank exchanges of views like this be described as a learning episode? One might be tempted to say 'no' because at the close, both participants still appeared to hold the same

views. If seen as an assemblage however, then it might continue to inform future considerations and ruminations of this topic and may have a delayed influence.

Post host posts

Following their week at the helm, some hosts authored reflective blog posts looking back on their experiences. Some of these are reposted on the ETO site, whereas I found others using a search engine. The following observations come from reading seven such posts.

Some hosts volunteered to participate through the online submission process, but many were either invited by the EduTweetOz moderators, or were encouraged to participate by people they knew. Being invited or encouraged was often seen as a sort of affirmation of worth; someone thinks that what I have to contribute might be of value to others. Somewhat surprisingly, this often set up tensions in the potential host. Delight at having the opportunity to interact with a larger audience, but fear for some that they lacked the background and experience, for example in trainee or newly qualified teachers like Madeleine[73]:

> *When Michelle and Corrine first contacted me about hosting my initial reaction was utter terror. With just three years teaching experience under my belt I was dubious as to whether I had the knowledge, skill, or expertise to host a Twitter account that has 3,500 followers. With so many experienced and well-respected educators previously curating EduTweetOz (and doing amazing jobs) I was concerned I would be woefully inadequate. … However, after further reflection I decided that his opportunity was too good to let pass me by. I love a good discussion on education, I love talking about my research in mathematics education, and I love improving my knowledge of education.*

Being the EduTweetOz host was almost universally described as an enjoyable, energising experience, even after weighing up the costs. Drawbacks included the difficulty of maintaining a work-life balance during the week and feeling drained at the close. Finding the right tone and appropriate responses whilst experiencing a much higher rate of tweets than that encountered through one's own account generated considerable mental demands, as Brendan[74] observed:

> *One thing which I had not anticipated was the speed at which the EduTweetOz feed would move. … I will admit that I was mentally drained by the end of the week, and achieved very little that weekend that was on my to-do list, That said, I thoroughly enjoyed the week and*

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[73] https://matthitude.wordpress.com/2014/02/03/reflections-on-my-time-curating-edutweetoz/
[74] https://c21teaching.com/2015/09/16/reflection-on-a-week-as-edutweetoz-host/

> *feel that the benefits of connecting with such a wide array of educators, engaging with a variety of conversations topics, and growing my own PLN far outweigh the minor inconveniences.*

This was especially the case when the weight of responsibility of doing this under the EduTweetOz account. Nevertheless one might also spin these drawbacks in positive terms if they're viewed as developing your skills at coping with challenging circumstances, whether that's creating an appropriate response, dealing with multiple information streams or managing workload effectively. It's an opportunity to practice those skills, supported by the moderators, over a fixed period of time.

Despite some of the drawbacks mentioned and the time some hosts spent in preparing and planning their forthcoming week, the number who said they would recommend it to others is perhaps telling. Hosts reported that their time at the helm provided an opportunity to expand their personal learning network and develop their own Twitter account as a result of some of the connections made through being EduTweetOz. They also felt exposed to views they might not otherwise have experienced; an opportunity to ameliorate the oft-quoted problem of the echo chamber. These outcomes were also felt by the hosts when they were followers of EduTweetOz, rather than being in the chair.

In addition to both EduTweetOz host and audience being affected by their online exchanges, the host in particular was in a position to influence EduTweetOz itself. As people interacted and responded to tweets, often they would not be people already being followed. Whether the 'Follow' button was pressed depended on each host; she or he had the opportunity to reshape EduTweetOz in this small way. Not only through those the account followed, but the tweets, retweets, Likes and mentions during their tenure might also attract the attentions of others who might choose to follow EduTweetOz as a consequence. For Deborah[75], that generated a certain burden of responsibility:

> *While I was absolutely comfortable with being myself during my @EduTweetOz week, I also felt a different sense of obligation to the account administrators. Is my authentic social media voice appropriate in an account administrated by others and on which I am a guest? Can I say exactly what I want in precisely the way I want? To what extent do I need to be tactful or restrained?*

Although hosts may (or may not) fully subscribe to the EduTweetOz mission, their particular proclivities and actions subtly shift the nature of the account as they pass through, so that it evolves, becoming the sum of all those actions.

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[75] https://theeduflaneuse.com/2016/11/18/rotation-curation/

Discussing 'Meeting the Locals'

In this discussion I attempt to tease out how the different elements within the Twitter architecture begin to play their part. The basic activities with which they're associated begin to form the building blocks from which increasingly complex activity becomes possible. EduTweetOz is offered as one example of a rich and complex learning practice enacted by human and nonhuman participants. In the sub-section which follows, I explore how this Gathering begins to answer the study's research questions.

Whilst it is possible for anyone to find information on Twitter, even without an account, that would render it no more a means of undertaking professional learning practice than say, using Wikipedia. *With* an account however, connections become possible and connecting is facilitated and encouraged through profiles and tweets. The bio and follow button help to begin the process, whilst retweets and likes help to sustain the relationships which form. Connecting is more than merely a one-time click when viewed as assemblage. Every tweet sent, retweeted or liked; every hashtag, mention or emoticon included; every link to a site, post or image, offers potential. It might be an act of renewal – touching base with those with whom you're already connected – or growth, and be perceived as an invitation to make a connection. A broad palette of possibilities is available ranging from a tight focus on those with similar experience, from similar educational contexts and with similar interests, to those from different educational phases, in different countries, who might espouse different pedagogical views. Each mix assembled by each individual will do different things.

A tweet is far from the simple limited character message it might initially present. Much better to think of it as an assemblage in which a variety of actors are working together, and from which associations emerge. Once authored and cast into the Twitterstream, a tweet continues to do work as it appears in various timelines. Aaron's tweet (Tweet 4) appeared in my timeline, although I first saw it as a result of a notification. It will also have appeared in the timelines of anyone else following Aaron, and in the timeline of anyone following the RoCur hashtag. As the tweet stats in Tweet 4 show, it was also retweeted, so will also have appeared in the timelines of all those following the retweeter. A tweet is a busy actor, and is often the point from which further activity begins.

Connecting with others has become part of the professional practice of teachers on Twitter. It is common for people to associate connecting with learning, if not in the same breath, then definitely in the same tweet. Connecting has become almost synonymous with

learning for many. So when Fenwick (2015, p.87) observes that 'A sociomaterial perspective tends to view all things – human and nonhuman, hybrids and parts, knowledge and systems – as effects of connections and activity', connecting becomes more than merely making links, it is a constitutive activity within a learning assemblage.

Through Twitter, teachers can connect with like-minded peers to enhance and extend their repertoire – the resources they use, the beliefs they hold. Through those connections, they also expose themselves to other perspectives and different ways of doing things, and as a result, may change their views. Twitter's role in this is to enable and encourage those connections, acting as a social glue, and facilitating the regular exchanges which constitute 'ambient intimacy' (Reichelt, 2007) and which maintain ongoing relationships. The Follow button might initiate a relationship, but the Like and Retweet buttons can help sustain it. Tweet and profile constituents become integral in forming and sustaining relationships. The Retweet is a repeater and amplifier, causing the original message to appear and then reappear in Twitter timelines; a nudge here, a prod there. This is more than creating or extending a network of practice or personal learning network, it is network*ing*.

Hashtags cooperate with other actors, repeat themselves and become more insistent. In collaborating with other human and nonhuman actors they do work by forging connections and facilitating communication exchanges. Hashtags don't simply work for teachers in this regard, but work with them, sometimes coaxing, sometimes cajoling and sometimes compelling. Hashtags, usernames and hyperlinks are distinctively coloured and are interactive, inviting readers to click, and provide an easy route to make further connections and extend the learning potential. When aggregated together in a single tweet, their effect increases; a hashtag working together with a hyperlink is more insistent.

The flexibility and adaptability of hashtags help to bring forth activities like hashtag chats, and to extend into so many different educational spheres. Hashtag chats begin from a single premise; a Twitter conversation enabled by a hashtag filtering tweets from the general twitterstream. Chats have become prolific, enduring, and offer different formats at different times to suit different needs and interests. Offering structure and regularity, balanced with informality and openness, chats have become multiple, depending on how they are done. Although not universally celebrated, those who choose to become involved are able to progress through different stages of experience. A novice can choose to lurk, but with more experience become an active participant, a moderator or even establish a new chat.

Hashtag chats present a different form of professional practice which may have at its heart, the simple premise of a professional discussion. What Twitter adds is the scope to transcend time and space by allowing access to synchronous or asynchronous participants who may be in school, on the bus or at home, from Iceland to Ireland to Indonesia. The agenda of chats may be influenced by, but is not driven by, wider educational issues or initiatives. Participants themselves are at liberty to decide the content, duration and depth of exchanges. Those who participate can seek affirmation from, or award it to others; they can challenge views or offer their own for scrutiny.

When embarking on any new experience, a period of acclimatisation allows a new participant to become familiar with the conventions and expectations. This is one instance of how 'lurking' might be perceived a more legitimate endeavour and even a necessary part of the learning process. Progression is then possible as participants' capabilities and confidence increase, but especially when other actors like Tweetdeck are enrolled in the sense-making process. Perhaps arising from the goals participants bring to chats, or from unexpected outcomes, or both, those involved in chats experience consequences. They may expand their number of connections with new followers or by following others; they may increase their knowledge about a particular issue; they may try out a new pedagogical strategy in class; or their well-being may have been enhanced.

EduTweetOz (ETO) has parallels with hashtag chats and is often, though not solely discursive. It introduces an added dimension with participants having the opportunity to take on different roles, as host or as a follower-participant. The view from, and demands of, each role are different, each offering its own learning opportunities. Rather than activity being marshalled by a hashtag, EduTweetOz is driven by a single account with its associated activity reliant on its handle – @EduTweetOz. Those who wish to participate with ETO rely on the handle, either to follow the account it fronts, or to monitor tweets which include it. The principal activity takes place on Twitter however, this is bolstered by the EduTweetOz blog which provides a further point of reference for hosts and participants alike. The connective tissue between Twitter and the blog consists of the permanent link presented in the full bio, supplemented by occasional tweets pointing to individual posts.

The activity associated with ETO is rich and varied. As each host passes through, a different range of strategies and techniques is presented to participants. Some make extensive use of hashtags, whilst others are more sparing. Some retweet a lot, some hardly at all. Some hosts reply to many tweets, others to only a few. At times therefore, ETO

becomes a stream of useful information, a provocation for one's thinking, or an amplifier of the knowledge that others are sharing. The overarching sense is one of variety and change.

EduTweetOz affords opportunities for both hosts and participants. The audience for ETO is exposed to a variety of hosts employing a range of techniques to cover a wealth of topics. As a consequence, and as I discuss further on pages 214-215, following ETO is one way to help ameliorate the effects of the echo chamber. Those who take up the challenge of its hot seat have the opportunity to try on a second skin, or stretch themselves beyond where their usual educational Twitter account allows. As Condie, Ayodele, Chowdhury, Powe & Cooper (2018, p.14) found from their university student hosts, hosting provides an opportunity '[…] to build confidence and an authoritative voice within their discipline by posting original content … and by participating in two-way interactions within and beyond their immediate learning communities.' The different, often bigger, audience with differing expectations requires hosts to think differently and adapt accordingly. Many described the experience as both demanding, but rewarding. Moving beyond one's comfort zone in this way can be one strategy for developing capability.

Addressing my research questions

The architecture Twitter provides as part of tweets and profiles help to make connections, and establish and maintain relationships. They present and filter information, bring people together around a rallying point and do so across spaces and time. Activity directed by and through @EduTweetOz overcomes the distance separating geographically distant people. Different components help in different ways, but have an invitational quality where involvement can begin with little more than a simple click. Participation at that level can be criticised as tokenistic however, the ripples which spread can have much larger cumulative effects.

Burnett (2017) suggested that iPads can be considered as having a 'layered architecture' comprising physical presence, interactive features, apps and digital artefacts. One could conceive of Twitter in a similar way, with an architecture including layers which address:

- Appearance – what is presented to the user. This is fluid and depends on the device through which Twitter is being viewed
- Content – the information being passed between users. This includes text, images, links which are presented through tweets, profiles and Twitter-generated content (e.g. 'Trends for you,' 'Who to follow' etc)

- Interactivity – Twitter underlying coding transforms some user provided content into interactive resources. When a hashtag, @mention or url are included in a tweet for example, Twitter turns them into clickable links

- Connectivity – through the links which are included or generated, other internal and external locations are connected together, enabling users to easily move between them.

Different Twitter components span different layers and support TPD in different ways. A link from a Twitter profile to a blog is more than a single-use ticket from one place to another, but expands the available information space of each. When the character limitations of the Twitter bio prove too constraining, this can be augmented with the 'About Me' page of a linked blog. Hashtag chats may take place within Twitter, but other platforms like Tweetdeck spread the participative space and reduce the load for some. The knowledge generated during chats remains distributed, though not necessarily accessible, on Twitter. By curating and condensing the tweets into an archive elsewhere, those unable to access a chat synchronously are granted a second chance.

The professional practices in which teachers participate vary in scale and scope. This Gathering confirms what Carpenter and Krutka (2015) found, that teachers share and acquire resources and ideas. Sharing a document or idea is as simple as including it in a tweet however, finding *specific* resources can be more demanding. When hashtags become involved, resources on a particular theme are held together, become searchable and more easily located. As was shown with #12daystwitter, hashtags can also generate an affinity space (Gee, 2005; Greenhalgh & Koehler, 2016) enabling teachers to assemble and participate in a time-limited activity. Although there are some elements of structure, #12days had a planned sequence of tasks, completion is not obligatory and participation is on an informal basis. Hashtag chats offer similar opportunities, although generally on a more regular basis and are typically arenas geared towards discussion. As Carpenter (2015) noted, different degrees of participation are possible, from lurking to moderating. As discussed earlier in this Chapter, in #NZBTchat, those levels of participation might be extended to include founding, establishing and promoting the chat. In other cases, individuals might curate and archive tweets, or blog their chat reflections. Different intensities of participation are available to suit different needs and interests. EduTweetOz similarly offers different levels of involvement, although through a wider range of tasks. In isolation, these might be considered mundane; after all, teachers are involved in discussions daily. What makes EduTweetOz arguably unique, is how the topics, the participants, the

roles, and the level of formality (or informality), are continually shifting. I pick this up later in Chapter 8.

In the next Gathering, a hashtag once more provides a point of departure in order to travel to other activities, visit different groups, and follow the path of one of those resources that are regularly 'shared' or sought.

6 GATHERING: ASSEMBLING ACTORS, MAINTAINING RELATIONSHIPS

Educators come together through Twitter in different ways and for different purposes. The tweet below unfolded this Gathering which explores how:
- a simple question posed through a tweet connects people and can develop into a rich exchange. One way this might be conceived is as 'pop-up' mentoring;
- sharing a single resource (the 'crib sheet') can develop into a complex, rich, extended exchange in which that resource is trialled in the classroom, remixed, then multiply re-shared;
- the constituents of Twitter discussed in the previous Gathering enable groups to assemble, collaborate, sustain, and extend in different ways.

Laur HD
@lauranteaches
Following

Really curious about how often Eng T's mark. 2nd placement has a v.diff policy to my main school and T's are a LOT happier.
#teamenglish

6:58 PM - 18 Jan 2017

2 Retweets

6   2

Tweet 44

A single tweet and the hashtag with which it participates provide a point of departure in this Gathering. I first explore the exchange which unfolded from the tweet and the interrelations between the human participants. This exchange and the #teamenglish hashtag which helped to bring it together, brought me to a second, longer series of interactions assembled by and around a nonhuman actor, the 'crib sheet.' Finally I follow the hashtag to the #teamenglish 'community' it assembles, then compare and contrast that with a similarly enacted sister community, #mfltwitterati.

Lauran, the author of Tweet 44, was a trainee teacher on placement in a school at the time of the tweet. She appeared to be exploring why different schools appear to approach marking in different ways. Lauran's remark is the kind of comment someone might make to a colleague at break time in a staffroom; any response might depend on the experience of the person to whom the question was posed. Casting the same query out through Twitter however, offers the question up to a wider audience.

Although the Tweet 24 is undirected in the sense that there is no @mention to pose the question to a specific person, it *does* include the #teamenglish hashtag. This hashtag provides a rallying point for teachers who specialise in or have responsibility for English teaching. To see Lauran's tweet in their timeline, a recipient would need to be following the @lauranteaches Twitter account *and* have to be viewing during a particular window of time. Those who follow the hashtag are arguably more likely to see Lauran's tweet because: a) it is more likely to persist longer in the hashtag timeline; and b) it is more likely to attract the attention of someone who is invested in the topic area and who is positioned to be able to respond.

Seven people responded to Lauran's tweet and the whole exchange took place over approximately four hours. The visualisation in Figure 27 that Treeverse and I jointly produced, shows each tweet represented as a node containing the profile pic of the author. Tweets which respond to others are presented as sequences of interconnected points with each reply positioned under, and connected to the tweet to which it responded. Topographically, the tweet exchange in this visualisation is deeper than it is wide. This indicates that although

Figure 27: Treeverse - requesting information

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there were few responses to the initial tweet, there was an extended, ongoing exchange between some of those involved, a dialogue in fact.

Some of the responses got straight to the heart of Lauran's query and were very clear cut, as with Caroline's:
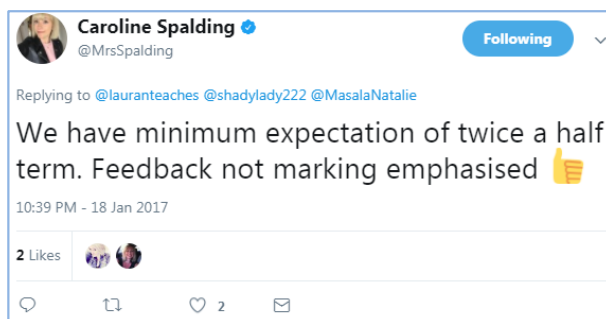
<div align="center">Tweet 45</div>

Others, like Becky, indicate what appears to be a more open, flexible approach:
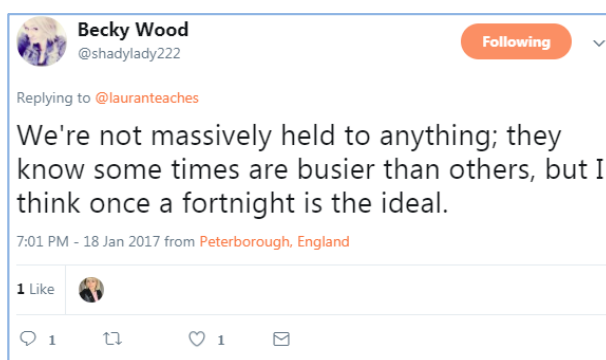
<div align="center">Tweet 46</div>

Becky was also the most engaged participant in the exchange and generously contributed around a third of all tweets, slightly more than Lauran. Lauran's follow-up questions prompted Becky to provide more specifics and outline the consequences of their departmental approach. Becky provided a specific example of a resource she and her colleagues use called a 'crib sheet.' Tweet 47 contained embedded photos showing what crib sheets look like in use:
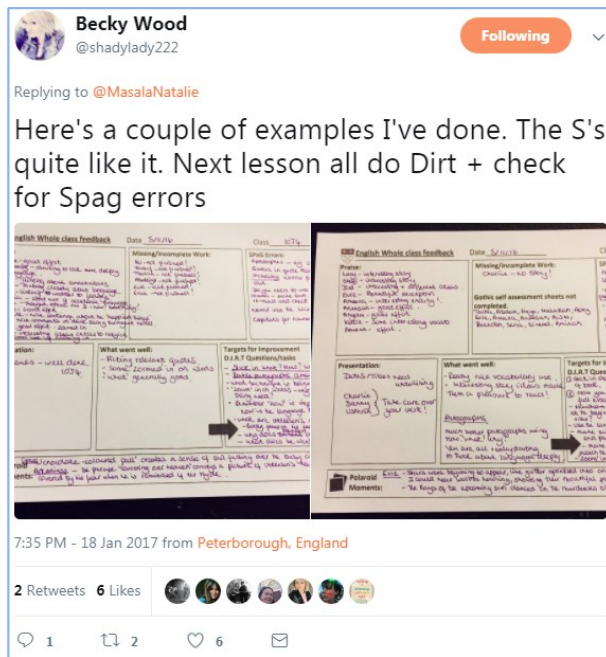
It is likely that Lauran now had an idea of the way one school English department approached marking, together with concrete examples. At this point Rebecca joined the conversation saying how useful she too found crib sheets and provided photo examples of the ones she uses.
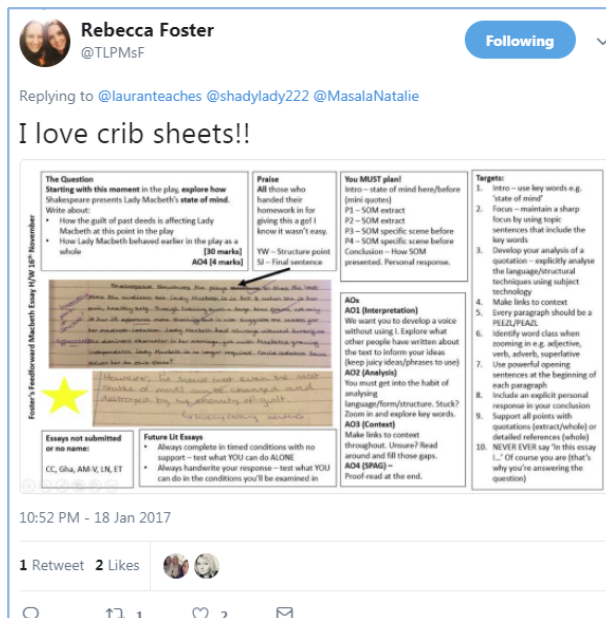
This is a slightly different version of crib sheets, giving Lauran different options to consider. Moving on, rather than simply share a blank example of her own, Becky used a quote tweet which pointed to the crib sheet's origins:

By including Greg's original tweet, Becky credits him as originator of crib sheets. Twitter also sent a notification to Greg that one of his tweets had been quoted, so as a consequence he also joined the exchange briefly to express his gratitude for the mention. Twitter also assisted when displaying the photo previews mentioned earlier; it was the photos which initially brought the crib sheet into the exchange and thereby provided the concrete example which began to make a difference, as indicated by the following responses to Tweet 49:
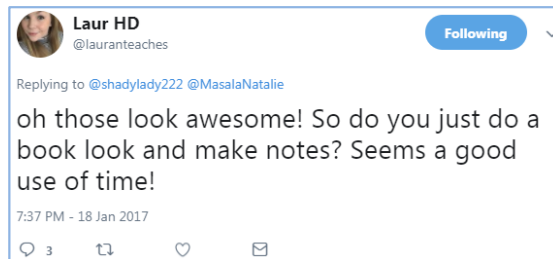
Tweet 50
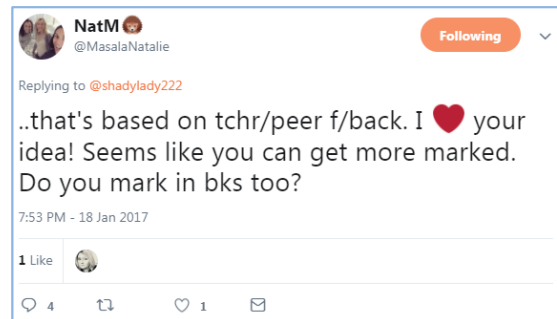
Tweet 51

Being able to *see* the examples offered by Becky and Rebecca, Lauran and Natalie appear to gain a much better sense of what the crib sheet involves.

At its most basic, Lauran posed a question to which she received a range of responses; all were from more experienced colleagues, some of whom had posts of responsibility. One might argue that Lauran would have been less likely to benefit from such diversity had her question been posed to colleagues in her staffroom. Furthermore, the medium through which the conversation took place meant that contributors could easily share concrete examples of their resources they used, whether as photos or links to templates. Since the

environment within which the query was posed is ostensibly open, Lauran was not the only beneficiary of the responses; Natalie too expressed her gratitude, as shown in Tweet 51. One might view this as a simple give-and-take exchange, or alternatively that it is more complex and there are learning opportunities for all concerned, including those who are sharing/responding.

Mentoring?

I was struck by the interactions in this exchange between Lauran and Becky particularly, one a trainee teacher and the other experienced, and wondered whether this could be framed as a mentoring or coaching episode.

> *Mentoring is a structured, sustained process for supporting professional learners through significant career transitions.*
>
> *Specialist Coaching is a structured, sustained process for enabling the development of a specific aspect of a professional learner's practice.*

(DfES, 2005)

Since that document was published, the 'National Standards for school-based initial teacher training (ITT) mentors' (2016)[76] have been produced and are built around four standards. In the exchange, it could be argued that Becky is 'modelling high standards of practice' (*Standard 1 - Personal qualities*) and is supporting a trainee 'to develop their teaching practice in order to set high expectations of all pupils' (*Standard 2 – Teaching*).

Mentoring will usually be sustained over a period of time through a trusting relationship. A Twitter exchange on the other hand is ad hoc, assembled at the time of need and may or may not be between two (or more) individuals who have a pre-existing relationship. Perhaps then Twitter offers something else; a different form of mentorship? To explore that further, imagine abstracting the enabling actor, Twitter. Had Lauran not been involved with Twitter, she could of course posed her question to her ITT mentor (assuming she had one), or to another colleague in school. The added benefits Twitter appeared to contribute were, firstly a timely answer (although there is a discussion to be had about teachers' working days stretching across 7:00pm), and secondly a range of responses, though of course there is no guarantee that any will necessarily be helpful.

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[76] https://www.gov.uk/government/publications/initial-teacher-training-government-response-to-carter-review

Originally, I had no idea whether Becky is a trained ITT mentor, but having subsequently visited her profile <#*ethics*>, it indicated that she is. Her responses certainly appeared to 'support [*a*] trainee in developing effective approaches to planning, teaching and assessment,' 'support [*a*] trainee with marking and assessment of pupil work' and 'offer[*ed*] support with integrity, honesty and respect' (DfE, 2016).

Another difference between conventional mentoring and what I observed on Twitter is that it took place in a public arena and wasn't exclusively a dialogue between two people. Others were able to join the conversation, as either mentor or mentee, or to ratify or confirm a point which had been made, in the way that Emma did here:
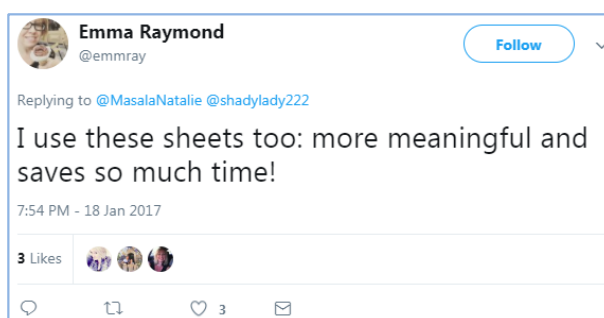
Tweet 52

A potential mentee on Twitter clearly forgoes privacy for increased reach, sustainment for speed of response, closeness of relationship for richness and variety. Arguably, one also forgoes trust, but perhaps that still exists within Twitter, albeit in a different form.

As Figure 2 in Chapter 1 showed, people often describe their activity on Twitter as professional learning, professional development or CPD. However I have yet to encounter anyone who calls what they do *on Twitter* as mentoring or being mentored. This episode struck me as illustrating some aspects of mentoring, but reshaped by the medium through which exchanges are conducted. Although mentoring was the way *I* framed this, when seeking permission from Becky to use the tweets above, she replied:

> *When you start these conversations, you don't really think about it, but actually I am a Scitt mentor for two different ITT providers and have been for several years, so that probably influences the way that I interact, particularly with trainees or new teachers.*

Her experiences, her role and previous actions became entangled as part of this assemblage, without her having given it much thought. If the outcome of this episode was that Lauran is now better informed about marking more generally, is better placed to be able to discuss these issues with her immediate and future colleagues and is more likely to

be able to make an informed decision, then the assemblage which was enacted was indeed one of mentoring. It might have similarities with what is more conventionally conceived as mentoring, or it might not, but if the outcome is the same, then it could be argued that the description is valid.

As a flâneur, I felt drawn down one 'street' by Lauran's tweet, but in so doing, two further avenues appeared. In the next sections I shall exercise my ANT sensibility further by following both the 'crib sheet' and the #teamenglish hashtag.

Crib sheet

During the exchange I discussed in the preceding section, Becky shared an example of one of the resources she had been using to provide whole class feedback. Later, in a quote tweet, she went on to reference and credit Greg, the creator of the original resource she adapted for her classes and setting. The quote tweet not only acknowledges the author, but via a notification, let's them know that one of their tweets has been acknowledged in some way. The tweet Becky quoted, links back to a blog post[77] where the 'Marking Crib Sheet' by Greg was first(?) released. Before I move on to discuss this further, as I mentioned previously, Greg popped into the original exchange, just to express his gratitude for being acknowledged.

Greg Thornton
@MrThorntonTeach
[Following]

Replying to @shadylady222 @MasalaNatalie

Thanks for sharing blog - it really does work, no harm in giving it a go :)

8:14 PM - 18 Jan 2017

2 Likes

1   2

Tweet 53

People on Twitter regularly express thanks in this way and are appreciative that others find value in the resources they produce and share.

Taking a closer look at Greg's tweet that Becky quoted:

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[77] https://mrthorntonteach.com/2016/04/08/marking-crib-sheet/

Similar to Tweet 4 which opened the previous chapter, this tweet is also rich and complex and has a number of actors working together. Intentionally or not, Greg's opening phrase of 'Reduce time' will immediately catch a teacher's eye, as will the word 'free.' The large photo preview of the crib sheet instantly draws attention and enables the viewer to quickly assess whether this resource might be useful to them. The three hashtags help to locate the theme of the tweet, but also potentially pull in other constituencies, like those following the #edchat hashtag. #markingcribsheet might be a hashtag Greg created, but given how others have adapted the crib sheet for their own contexts, this hashtag could provide a helpful mechanism to aggregate examples. Being able to quickly jump to more detail using the hyperlink is a useful feature; even the url has been automatically shortened so it occupies fewer precious characters.

Some sense of how effective this tweet was, and of the value that people ascribed to the Crib Sheet can be gleaned via the number of times the tweet has been retweeted and Liked. This assumes of course that those figures are indeed indicators of value. By scanning the Replies to Greg's tweet, people's opinions become clearer as illustrated in these responses:

Kerry Madrick
@misstait_85   Follow

Replying to @MrThorntonTeach

Love this! Just used it to plan feedback for class set of exam questions. The blog post is really useful in explaining how it all works!

5:25 PM - 16 Sep 2017

1 Like

Damian Benney
@Benneypenyrheol   Following

Replying to @MrThorntonTeach

I'm sharing with Primary cluster on Wednesday. I'm tweaking to use with my Year 10 classes. My boss thinks it's great too.👍

10:02 PM - 3 Oct 2016

3 Likes

Tweet 55

Tweet 56

Although these constitute a small sample of the many replies Greg's tweet received, the first nevertheless shows how important the link to the blog post was, let alone the post itself. Both tweets also hint at the impact that tweet and the resource it shared actually had and in the case of Tweet 56, beyond Damian's classroom and even into another educational phase.

Together with positive comments like these, throughout the thread, people often ask questions of Greg which he either answers directly, or guides them back to his blog post. The post itself is detailed and clear, explaining why and how the crib sheet was produced, and providing examples of the ways in which it had been used. Greg also provides links to a 'How to' guide and a blank template of the crib sheet. The post itself is a rich, multimodal ensemble worthy of further discussion, but that would perhaps move beyond where this study can go within the time frame available. The 'Comments' thread of Greg's post, like Twitter, also features a number of questions and people expressing their gratitude:

> *I really like this, as a Primary Teacher who covers PPA, I can see this would be a good way of feeding back to the class teachers also. Great for Computing and other subjects where no written work to mark e.g. computing and music. I am going to start using this straightaway and will share with colleagues. Thanks for sharing it.[78]*

This is typical of the 48 comments the blog post attracted (as of 19/09/2017). There are also 9 pingbacks from other blog posts which outlined ways in which their authors used and/or adapted the crib sheet, many sharing their variations. [*Pingbacks are reciprocal links automatically generated between blog posts by the respective blog platforms*]. Several of these posts also discussed the political climate within which the crib sheet sits and consequently help to explain why people find resources like this so potent, citing assessment, workload, school inspections, and accountability.

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[78] https://mrthorntonteach.com/2016/04/08/marking-crib-sheet/#comment-38

Whilst the majority of tweet replies or blog comments were positively inclined towards the crib sheet, a few, whilst not entirely critical, expressed concern at pupils being named on the sheet <#*ethics*>. Although some pupils were praised on the sheet, which is presumably acceptable since no-one drew attention to that, some respondents were worried that names of pupils who had work still to complete were shared amongst the class. Greg responded to each of the people who mentioned this, but this appeared to be an area of contention which remained unresolved.

Many of the tweets and blog comments described the ways in which the original crib sheet was adapted, as can be seen in the three examples in Figure 28.
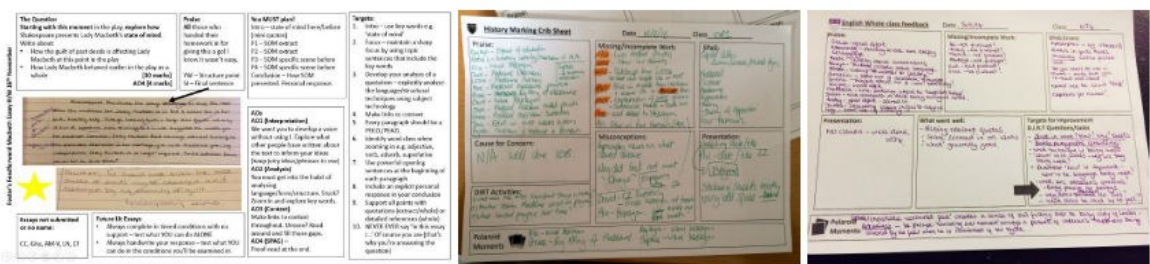
Figure 28: Crib sheet examples

Beginning life in a history departmental context, it found its way into other subject areas and has crossed phases from secondary to primary. From a digital file downloaded from Greg's blog post, it is then adapted digitally, before finding itself passing through a printer, being displayed on a noticeboard, stuck in a pupil's book, scanned, viewed through a visualiser or displayed on an interactive whiteboard. For one teacher it might follow a Y11 science investigation, identify skills that need practising, be displayed through a projector and discussed with the whole class to help prepare them for a GCSE exam. For another teacher, it might follow a Y7 English homework set to three different groups and thereby comparatively highlight strengths and weaknesses in poetic style across the groups. The crib sheet is still the crib sheet, but is enacted differently in each case.

Having followed one of those leads arising in the 'Mentoring' section, I now want to pick up the second. Tweet 44 pointed to #teamenglish and it was individuals associated with this group that were involved in the exchange about the crib sheet. In the next section, I will explore who or what is #teamenglish.

Hashtag 'communities'
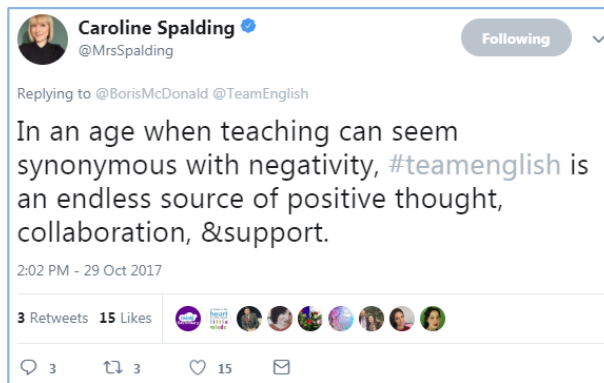
Caroline's tweet above provides a brief introduction to #teamenglish, although the tweet which opened this chapter could easily have appeared here, albeit for a different reason. Earlier, I noted how the hashtag #teamenglish might help Lauran's tweet reach a wider audience. When #teamenglish began to appear at other points during my observation-participation, its insistence appropriated my attention. There are many school subject oriented hashtags like #MTBoS, #geographyteacher and #artseducation, some of which,

like #teamenglish and #mfltwitterati, consider themselves to be communities. In the previous Gathering, I showed how hashtags could enable a chat, filter resources and manage a time-limited event. Here I follow two hashtags and explore the ways in which they manifest as 'communities,' how they are similar and how they differ.

Unlike #teamenglish, which brought itself to my attention through a tweet which appeared during my observation (Tweet 44), I was aware of the #mfltwitterati prior to my research. It became
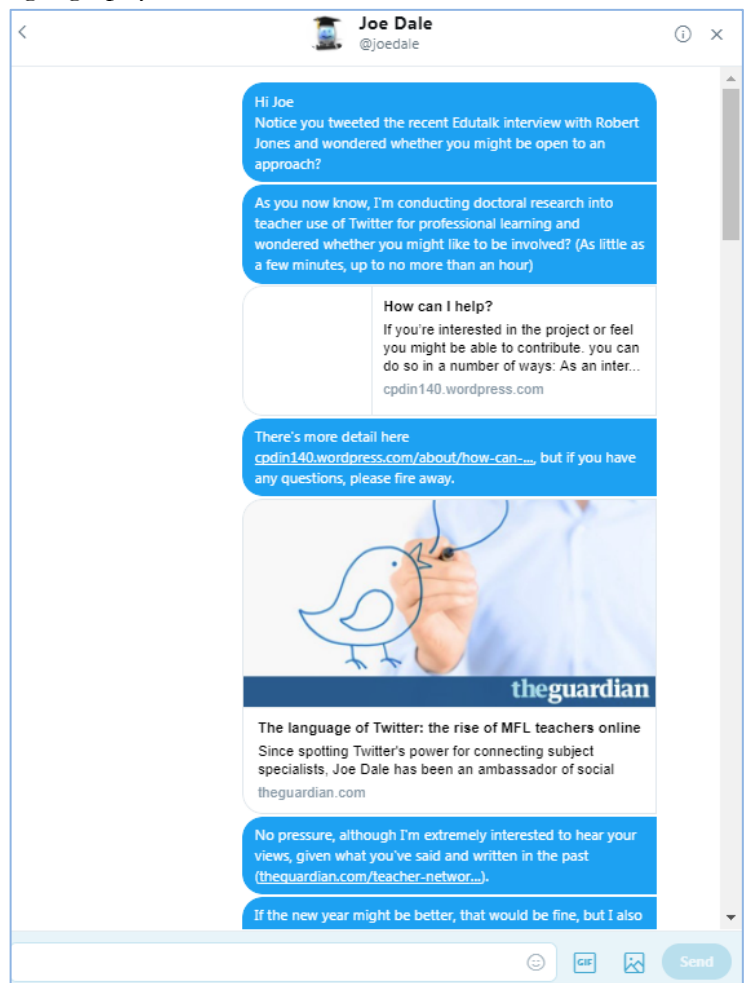
Figure 29: Invitation to interview exchange

a topic for closer scrutiny as a result of a somewhat unexpected, but nonetheless rewarding route. Having posted the first few semi-structured interviews online, as described on p.72, a tweet from Joe (@joedale) appeared in my timeline, mentioning how interesting he had found listening to one of the recorded interviews. Interested to see how far his interest' might extend, I contacted him to explore whether he too might consider being involved. Figure 29 shows how I made initial contact with Joe using Twitter's direct message feature; the same opening remarks were used when approaching other people to solicit their involvement <#*ethics*>. Joe replied 'Would love to. How about tomorrow morning?' which then unfolded into a longer exchange as we fleshed out the details and arranged to experiment with a new application for recording Skype calls – Zencastr. This was prompted by Joe and perhaps helps to illustrate how educators on Twitter are often keen to explore new avenues and try new things.

During the course of our interview, Joe mentioned 'the MFLTwitterati' a number of times and referred to it as 'a community.' In sociological terms, community can be described in different ways; through reference to place, interest or attachment for example. As listed in Appendix C, a number of studies have explored teachers' activity on Twitter as communities of practice. In this vignette, and in keeping with the broader stance I'm adopting throughout this study, I will seek to explore what both MFLTwitterati and Team English communities are *on their own terms*.

When #mfltwitterati and #teamenglish are described by some *as* communities of teachers, community is probably used in a loose sense. The focus of attention in both cases is a discipline or curriculum area; modern foreign languages (in UK parlance) for the former and English the latter. Though each is internally connected by its disciplinary interests, the actors which come together to achieve that are somewhat different. For #teamenglish, the hashtag filters information and provides a similar connective thread in the same way that #mfltwitterati does, but it doesn't work alone. It is partnered by the @Team_English1 Twitter account[79], curated by two people, English teachers, as indicated within the account bio:

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[79] https://twitter.com/Team_English1

Figure 30: Team English profile

The profile associated with this bio suggests a number of things. The hashtag, the curators'
Twitter handles and the Team English blog[80] are all immediately visible and accessible. As
mentioned earlier, a hashtag can bring things together however, it tends to be mobile and
not associated with a particular place; there's nowhere to '*go*' to encounter MFLTwitterati,
other than a rather underused wiki. #teamenglish provides a greater sense of spatial fixity
here; the blog and the Twitter account provide clearly articulated locations to visit. This
might serve to make it easier for interested newcomers to quickly get on board. The
Twitter account bio provides a sense of what #teamenglish is about. The blog supplements
this with greater detail available through the various posts, although the 'About' page has
yet to be mobilised, showing only the default Wordpress text (as of March 2018). A quick
scan of the @Team_English1 timeline alongside its bio provides a snapshot of the
account's recent activity. Proximity and ease of access (through hyperlinks) to these
different strands might well be significant actors in enrolling new participants. A sticky
'Pinned tweet' which remains at the top of the timeline enables timely or significant
message to remain visible:

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[80] https://teamenglish1.wordpress.com/

The example from March 2018 in Figure 31 illustrates another actor, an email address, becoming appropriated. Without a blog post explaining the rationale behind the need for an email address, one can only speculate how the 'closed' space of email exchanges sits alongside the otherwise open platforms across which #teamenglish activity can be found.

The MFLTwitterati is described by Joe in a document entitled 'How to join or follow the MFLTwitterati[81]' as:

> *[…] a dynamic and supportive community of language teachers, departments, consultants and organisations from the UK and Ireland who like to regularly share updates, links to resources and advice on anything and everything to do with languages and language learning. Anyone can follow the MFLtwitterati by subscribing to my list MFL Twitterers or by following the hashtag #mfltwitterati.*

It appears from this that the MFLTwitterati is not a single entity but comes together in different ways. I shall explore how the two communities come together in more detail in the forthcoming sections, but I begin with a visual overview of their activity. This will be followed by a closer examination of how each 'community' is constituted, and the practices in which they are engaged.

Connecting together

Since both #teamenglish and #mfltwitterati share interests in their respective subject disciplines, perhaps the activities in which they're engaged are similar? Activity appears to be co-ordinated by and through the respective hashtags, so they were the actors I initially chose to follow. An initial Twitter search using Twitter's search tool revealed #mfltwitterati and #teamenglish tweets covered a range of topics and themes. To gain a better sense of how that unfolded over a period of time, I separately collected tweets which contained each hashtag using TAGS[App] over a ten day period

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[81] https://docs.google.com/file/d/0B-8ru4WYXDhTTDhSOThVVXgyaFk/edit

Unlike in other areas of this thesis, here I elected to pixelate tweeter's names, apart from @Team_English1 and Joe *<#ethics>*. Since these visualisations are generated from broader participation figures and do not constitute 'authored texts,' seeking authorial permission to publish did not seem appropriate, especially given that the focus of attention is on overall, rather than individual activity. In both cases, around 1400 tweets were produced from several hundred separate Twitter accounts. The ten most prolific tweeters are shown in each visualisation.

Figure 32 shows a summary of Twitter activity for Team English:
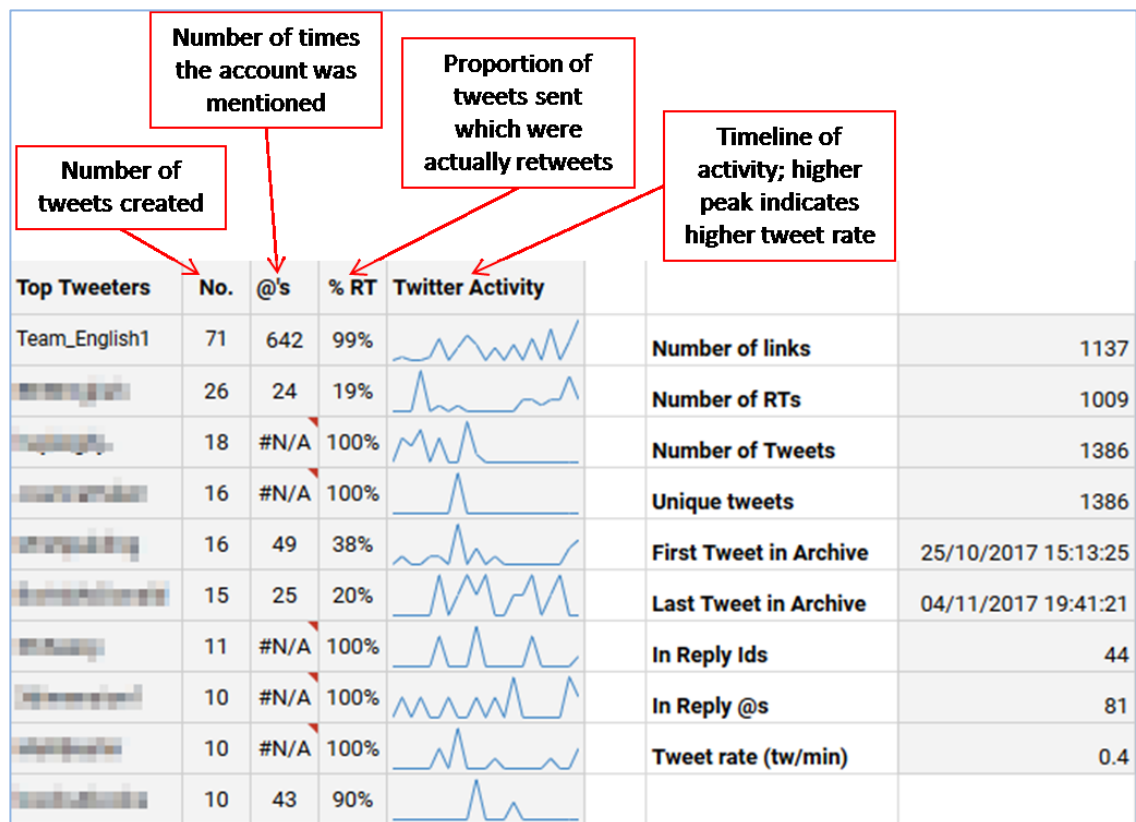
Figure 32: Twitter activity for Team English

During this time, 1386 tweets containing the #teamenglish hashtag were launched. Around two thirds of these (1009) were retweets and 81 were replies to other tweeters.

Perhaps unsurprisingly, @Team_English1 is the most prolific tweeter, and the one who retweets or is mentioned by others the most. Almost all of the account's activity is retweeting (99%), suggesting it acts as an amplifier or repeater, thereby prolonging the lifetime and reach of information being circulated. Perhaps surprisingly, the most prolific participant in #mfltwitterati is not Joe, as Figure 33 shows:

Top Tweeters	No.	@'s	% RT	Twitter Activity			
Business 1	122	44	#N/A		Number of links	1218	
joedale	66	46	80%		Number of RTs	763	
▓▓▓▓▓	42	33	14%		Number of Tweets	1410	
Business 2	34	6	#N/A		Unique tweets	1409	
Business 3	33	8	#N/A		First Tweet in Archive	13/10/2017 13:59:32	
▓▓▓▓▓▓	25	17	32%		Last Tweet in Archive	23/10/2017 13:06:03	
Business 4	22	6	55%		In Reply Ids	18	
Business 5	22	50	5%		In Reply @s	30	
▓▓▓▓	20	7	25%		Tweet rate (tw/min)	0.1	
School 1	17	#N/A	100%				

Figure 33: Twitter activity for mfltwitterati

Mixed in with the activity of educators are several businesses – as indicated in their Twitter bio statements – for which I've provided pseudonyms rather than pixelating. These businesses included travel companies which arrange overseas visits, language-related app vendors, and producers of language-related educational videos. The number of businesses which appear in the top tier of #mfltwitterati participants might be surprising in what is articulated as a 'community' of language teachers. This is very different from #teamenglish where there were no business accounts amongst the most prolific tweeters. Of course Twitter is largely an open environment and the hashtag #mfltwitterati is not discriminating in how it appears, so anyone is free to work with it. For some, #mfltwitterati tweets from businesses may be considered 'spam,' with the attendant negative connotations.

Seven rows below the lowermost in Figure 33, although not visible in the figure, one particular business has a very regular sawtooth pattern of Twitter activity; this suggests they tweet on a regular cycle. Inspecting their tweets more closely shows they produced a daily tweet which always had the same format:

The latest The LanguagePoint MFL News! paper.li/▓▓▓▓▓▓▓▓... Thanks to @bfrench329 @frausullivan @cforchini #mfltwitterati #education

3:43 AM - 21 Oct 2017

Tweet 58

167
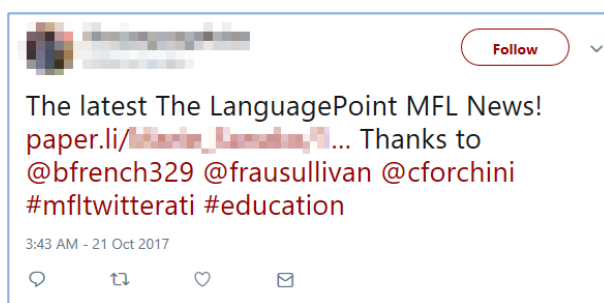
Tweets like this are automatically generated from automatically curated content using an application called Paper.li[82] which uses "natural language processing, machine learning and social signals to analyse and extract the most relevant and engaging stories from social media and the web." Whilst information about language learning might be useful to the MFLTwitterati community, the lack of engagement with these tweets (none were Liked, retweeted or received replies), and since the account did not reply to or retweet other community members might indeed position this as spam, rather than participation by a member of the community. Even 'mentioning' language teachers didn't attract responses from those involved, even though they will have received notifications. The recipients will be aware that their handles were automatically pulled into the tweet, rather than the tweet actually reaching out to make a personal connection. On the other hand, Business 1, the most prolific tweeter, produces tweets which are regularly retweeted by other community members, perhaps indicating a higher degree of involvement in, acceptance by, and value for MFLTwitterati.

The following visualisations from TAGS allow us to explore the activities more closely, providing a sense of the distribution and proximity of activity more generally, rather than being able to see individual account details <#*ethics - zooming in more closely might make individual users' names more easily recognised, but it is the patterns of connections to which I wish to draw attention, rather than individual accounts*>. Figures 34 and 35 show the breadth of involvement across several hundred participants. In each case, a central principal account is prominent; @Team_English1 and @joedale, as revealed more closely when zooming in (Figures 36 and 37).

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[82] https://paper.li/
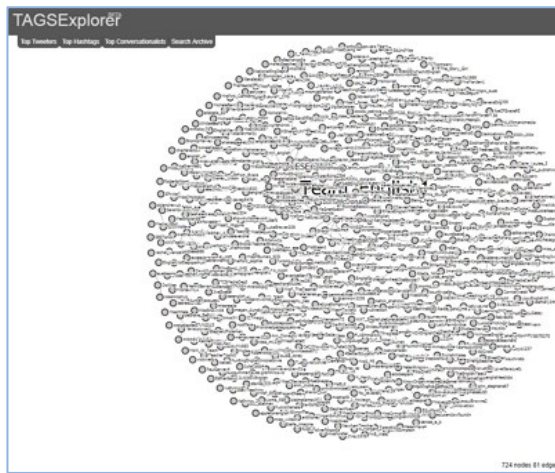
Figure 34: TAGS visualisation for Team English
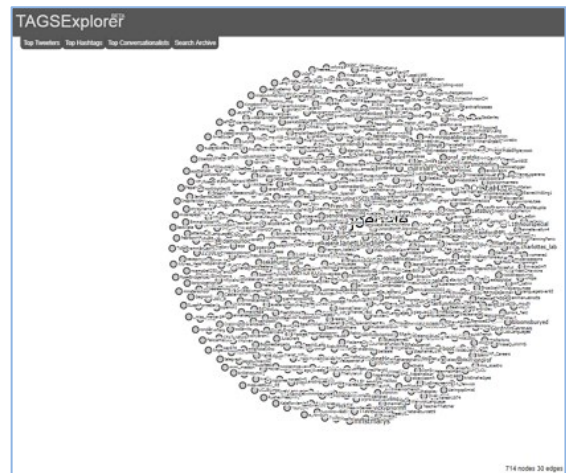
Figure 35: TAGS visualisation for mfltwitterati
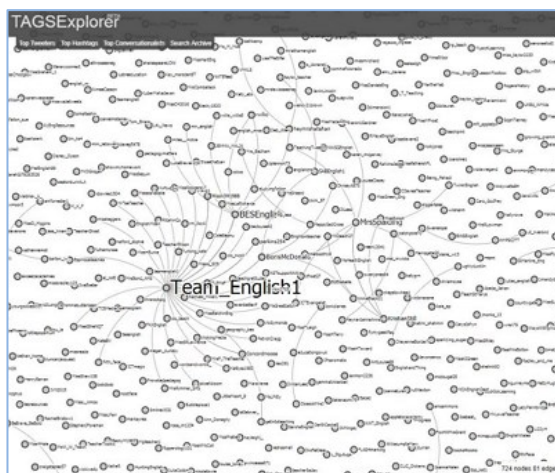
Figure 36: Magnified TAGS visualisation for Team English
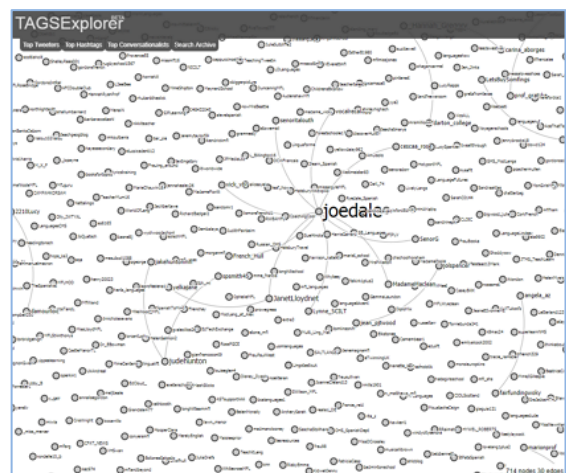
Figure 37: Magnified TAGS visualisation for mfltwitterati

Each node in the visualisations represents a Twitter account which produced a tweet with the hashtag being followed. The number of nodes provides one sense of the extent of the community, as rendered by those who produced tweets during the given time period. Nodes which are connected by solid lines show tweets in which one tweeter replied to another. At the lower magnification in the upper pair, those connections are difficult to see, but zoomed in, some of those replies become visible in Figures 36 and 37.

In the following visualisations 'mentions' are added as indicated by dotted rather than solid lines. @Team_English1 remains at the centre of activity in Figure 38:
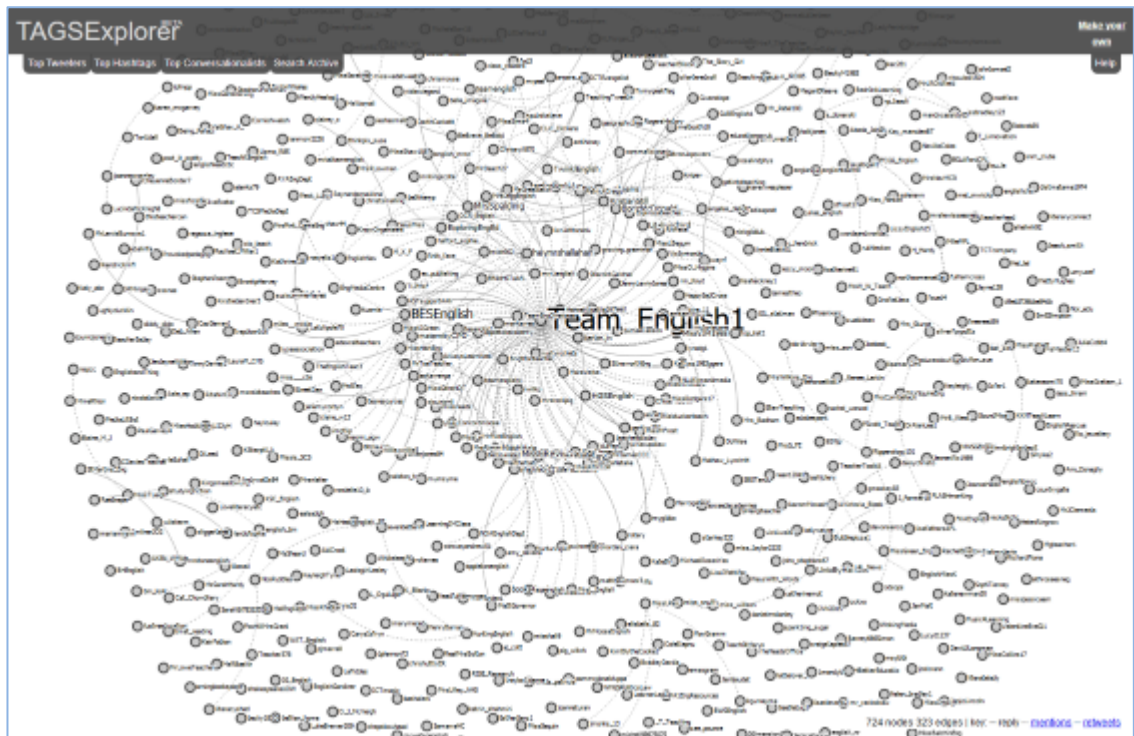
Figure 38: TAGS visualisation for Team English with 'mentions'

Unlike with #teamenglish, where @Team_English1 continued to dominate activity, the visualisation for #mfltwitterati in Figure 39 now shows more clustering:
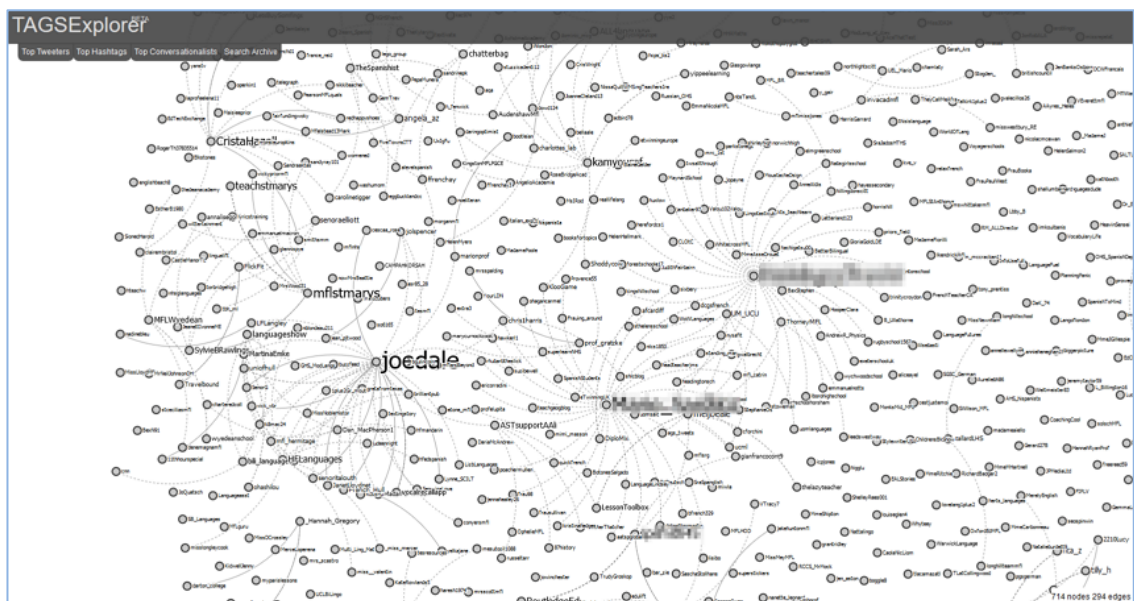
Figure 39: TAGS visualisation for mfltwitterati with 'mentions'

Those nodes at the centre of clusters indicate accounts which often mention, or are mentioned by others. Apart from @joedale, the other cluster centres are businesses, who are mentioning other accounts, but are rarely being mentioned themselves, nor are receiving replies; they're attempting to interact with others, but that's not being reciprocated. They're within the community, as defined by the hashtag, but are largely ignored by the other members who perhaps find little of value in their contributions. The one exception is Business 1, a company which, from their profile, produces vocabulary quiz apps. Some of their tweets promote their products, but they regularly also release snippets of useful content. As Tweet 60 shows, this

TRICOT DE CORPS: the gender of the French word for vest is masculine..le tricot de corps #learnfrench #mfltwitterati #mflire

7:50 PM - 13 Oct 2017

1 Retweet 2 Likes

Tweet 59

sometimes get retweeted or Liked, indicating a degree of usefulness to other members.

In the final pair of visualisations, blue lines indicating retweets are added. The visualisation suddenly becomes much busier suggesting retweeting is the dominant behaviour for #teamenglish. The intention seems to be to ensure that tweets reach as wide an audience as possible. As mentioned, of the 1386 tweets, 1003 were in fact retweets. Unlike the hashtag which allows those following #teamenglish to filter these specific tweets from others in their timelines, the retweet multiplies the likelihood of fellow members of #teamenglish becoming aware of any particular tweet. Furthermore, it also increases the visibility of the tweet to others who may not yet be participants in #teamenglish.
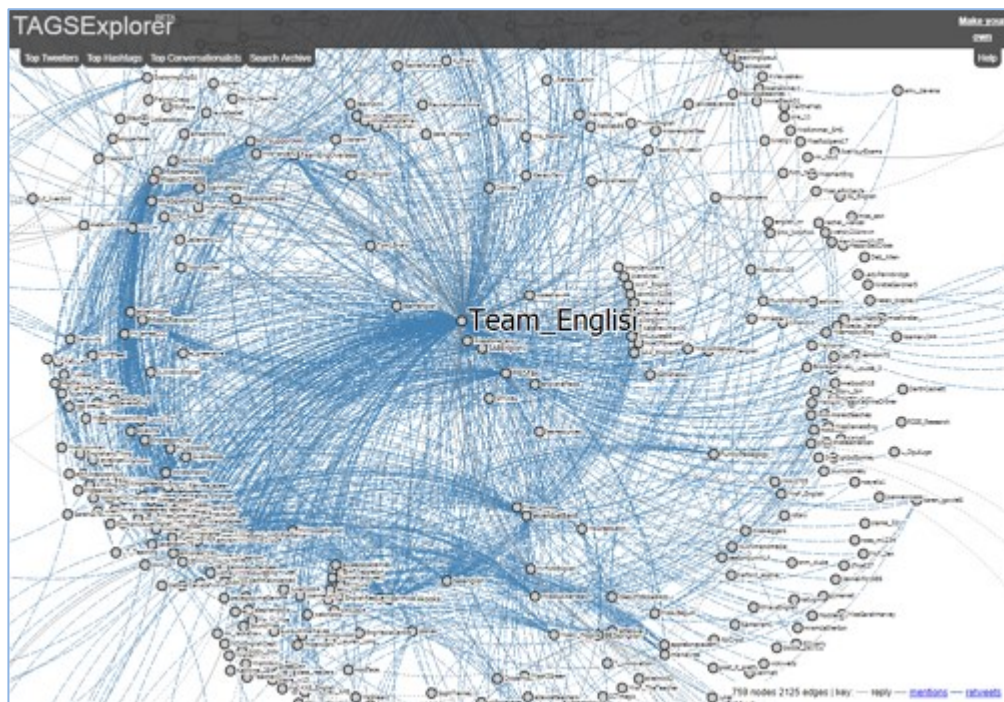
Figure 40: TAGS visualisation for Team English with 'retweets'

As Figure 40 also shows, @Team_English1 is once more highly active, but with more nodes appearing as centres of activity, it is possible to see that the retweeting load is shared around more widely.

In addition to filtering tweets and acting as a contact point, #teamenglish has had a profound effect on some people:

> *"I'm not sure how I found it, or when exactly I found it, but the hashtag #teamenglish has been a revelation. I could not quantify the amount of time it has saved me."*[83]

Note that it is *the hashtag* which is specifically referenced here; a possible indicator of the important role the nonhumans play.

The visualisation for #mfltwitterati also becomes busier, as can be seen in Figure 41:

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[83] http://www.labourteachers.org.uk/sharing-resources-online-for-free/
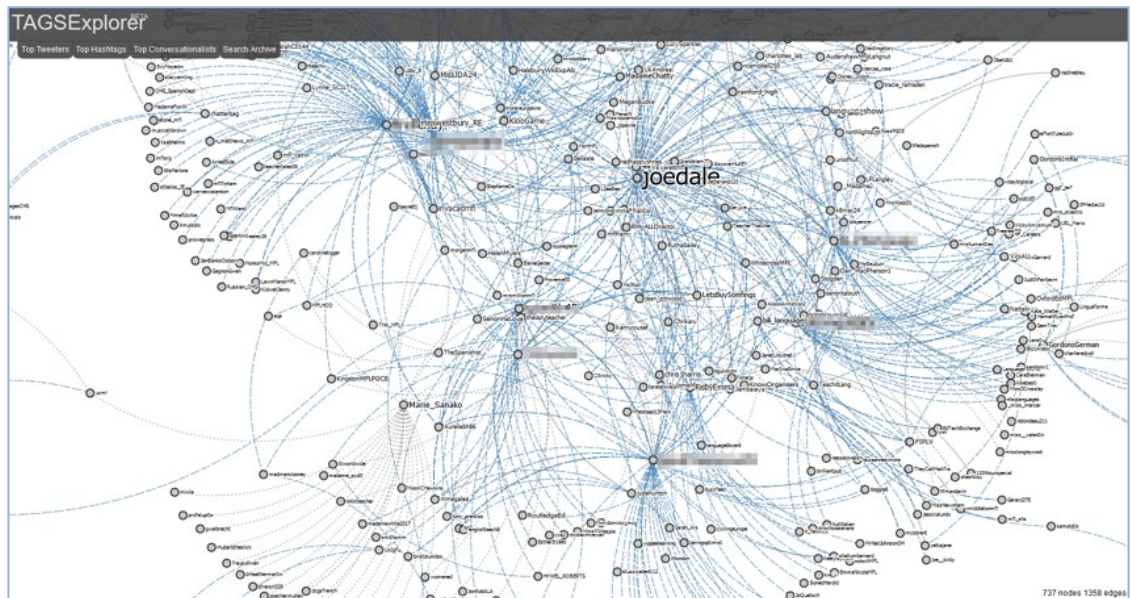
Like #teamenglish, retweeting is also an important activity within the #mfltwitterati, especially amongst the educators. Although Joe is still prominent, other accounts now appear more active as they re-share the information they encounter, perhaps bringing it to those who might have missed it the first time around.

In both hashtag communities, there is a central principal actor around which Twitter activity revolves; @JoeDale for #mfltwitterati, and @Team_English1 for #teamenglish. In the former case, it is a single person who takes responsibility for pushing Twitter activity, although as Figure 40 shows in the retweeting behaviours, a much wider range of people become involved in the resharing load. Behind @Team_English1 are two people, which could mean that the principal actor's workload is shared. Perhaps however, it is that @Team_English1, through its very name, represents the #teamenglish community, so members naturally place it at the centre of their English teaching related Twitter activity and as a consequence maintain its prominence in the #teamenglish visualisations. The above visualisations serve as reminders however, that both communities have prominent nonhuman actors, for example, the retweet. The likelihood of a human actor forming part of both communities is quite small, yet the RT works in both these and many others.

Resource exchange

Given the clearly stated purpose of @Team_English1, as articulated in the bio shown in Figure 30, it is not surprising to find that sharing resources and ideas dominates the types of activities conducted through tweets. This is a bi-directional exchange; some tweets seek

resources, whilst others provide them. Tweet 60 is an example of a tweet in which a very specific request is made:
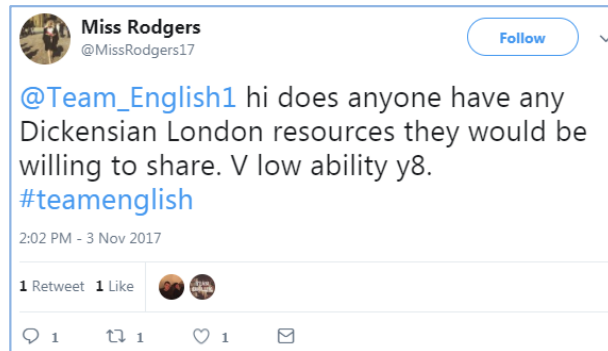
Tweet 60

Although requests may also be more general in nature:
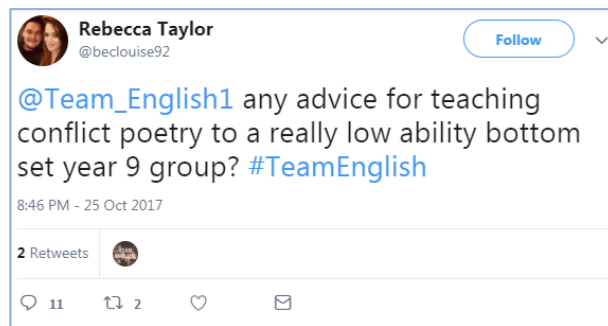
Tweet 61

Tweet 61 attracted eleven replies; a rich source of options for the newly qualified teacher making the request. Posing questions about English teaching, assessment or working practices, rather than making requests for resources, is also common:
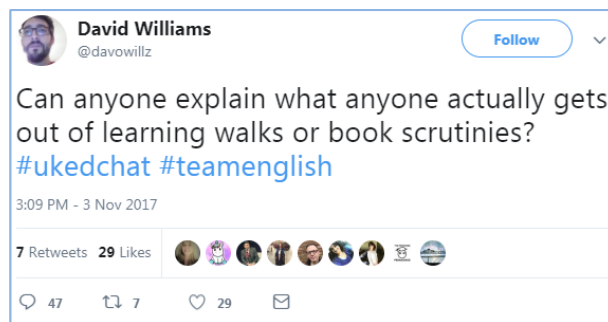
Tweet 62

Tweet 62 provided a topic on which people were keen to share opinions and experiences, as the 47 replies suggested. The Treeverse generated from those replies is shown in Figure 42 and provides a visualisation of the involvement. Not only is there a wide range of

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responses, but the depth of some of the paths illustrate the back and forth discussions which took place.

In addition to *requesting* resources and ideas, people sometimes *provide* them. Sometimes this is in response to specific requests, like the reply to Tweet 60 however, people also share out the resources they have been developing (Tweet 63) as they complete them, rather than responding to solicited requests:
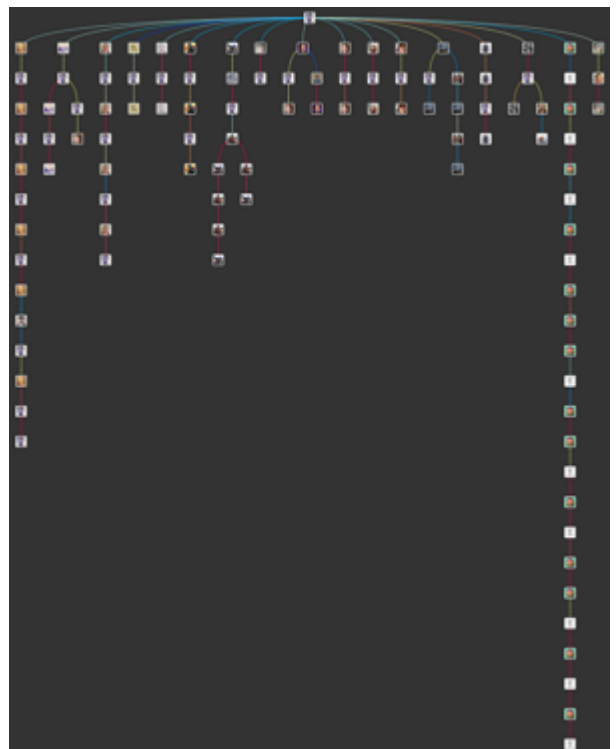
Figure 42: Treeverse of 'learning walks' discussion

Tweet 63

Tweet 63 is another rich tweet in which multiple actors work together to perform a variety of activities. Adding #engchatuk drops the tweet into the timelines of both those following that hashtag, and those following #teamenglish. Mentioning @Team_English1 might be viewed as an implicit request for a retweet. These simple actions increase the audience for the tweet and make it more likely that the resource it is sharing might be taken up. Tweet 64 also shows the importance of Dropbox[App] (an online file storage and sharing utility) for #teamenglish as a central repository for their resources. The

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#teamenglish Dropbox account requires maintenance and management, whether related to the structure, or granting access to newcomers:
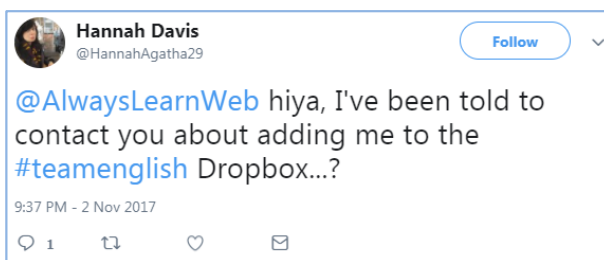
Tweet 64

In the brief period I followed #teamenglish, I wasn't able to establish precisely who took on the responsibility of organising the Dropbox, but the load appeared to be shared between a small handful of members. Of course when many people are granted access to the same electronic resource, without safety measures in place, problems can and do occur, as Tweet 65 shows.
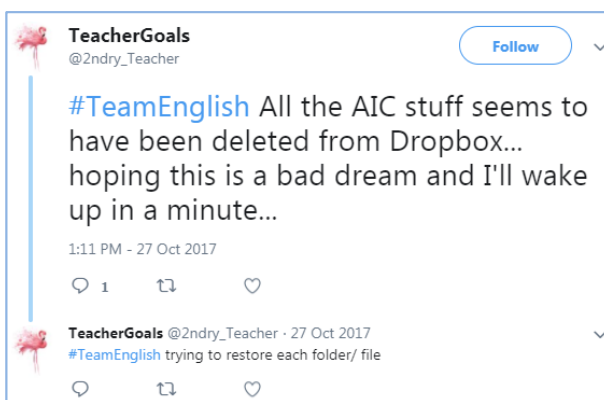
Tweet 65

In general though, the Dropbox provides a location to find or deposit the more tangible outputs of teacher and group effort: long term plans, schemes of work, assessment strategies, lesson plans, and individual resources.[84]

It's important to note that whilst Dropbox folders may be organised into a structure, tweets offering resources scattered across timelines lack this ordering. People tend to post resources when they complete them, which *might* coincide with someone else's need at that time, but more often won't. A market stall holder yelling about a bargain bundle of apples is unlikely to attract the attention of someone out shopping for boots! Although offers of resources may not be coherently organised, one resourceful individual created a

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[84] https://staffrm.io/@fod3/w9qgfx0GwJ

workaround and strung together several resources on a single theme. By authoring a single tweet then replying to it with multiple tweets, each containing a link to a different resource, @MissHBurke was able to keep those resources together within the tweet thread generated by the replies. In a further innovative stroke, she then 'pinned' the initial tweet; this fixes it as the top tweet visible on their timeline when someone views their profile page. By prolonging the exposure of those particular resources, it becomes more likely that people will find them. Being pinned, the thread also becomes a further
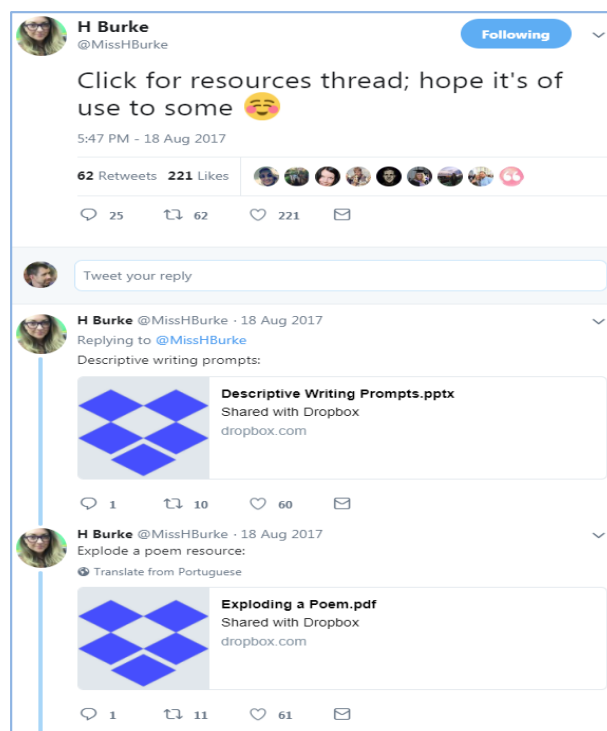
Tweet 66

extension of the profile, providing visitors with another piece of information to help them decide whether to follow, and thereby extend #teamenglish.

In the #teamenglish corpus of tweets, of the 383 original (rather than retweeted) tweets, 103 were offering an unsolicited resource or idea. With slightly fewer specific requests or general questions (93 tweets in total), this made the balance appear to be slightly tipped in favour of net contribution.

The balance of resource sharing appears to be tipped towards contribution, rather than consumption. This indicates a level of generosity, recognised within and beyond the community:

Tweet 67

People often express their gratitude for resources being shared, and in so doing, they become visible as a participant in the activity of #teamenglish. It's quite likely however,

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that there are people who are downloading resources, but remain invisible and possibly never contribute. This may be less likely to lead to a 'tragedy of the commons' (Hardin, 1968) for #teamenglish, since the digital nature of the resources makes them less likely to become depleted. Furthermore, the burden of contribution currently appears to be distributed widely. Whilst people continue to tweet their contributions, rather than invisibly posting them straight into Dropbox, that wide participation remains visible to the community and becomes normalised.

David Bunker
@Mr_Bunker_edu

Follow

Replying to @labourteachers @Team_English1

it's always reciprocal. Plus the reach is large. I share far less than I feel I receive.

9:19 PM - 7 Mar 2017

1
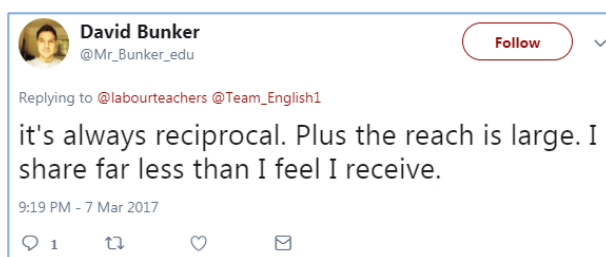
Tweet 68

If people continued to contribute, but behind the scenes without tweeting, then there might be the perception of lower levels of contribution and possible ill will. The tweets can be seen as helping to signal participation, making it visible to all.

Not all resources are shared through Dropbox; some people provide links to resources held within Google Drive. This means those resources tend to drift into and out of the timeline, perhaps becoming forgotten. They lack the longevity and cataloguing that is provided by Dropbox. On the other hand, the resource bundle overall becomes more resilient; if anything happened to the Dropbox, that central repository would be lost.

In the ten day corpus of tweets for #mfltwitterati, although present, resource sharing featured less prominently. Like #teamenglish, they too turned to Dropbox as their repository. Within the corpus of tweets, there was no explicit reference to Dropbox, perhaps because, compared with #teamenglish, it is more mature and its use has become normalised. The community has also created a wiki[85] as a sort of shopfront for the Dropbox, so anyone wanting to know how it works or how to get access has a place to visit. It was from here, rather than through tweets, that I uncovered background information. Access to the MFLTwitterati Dropbox is granted after making a request to any of the voluntary curators who both manage permissions and the content. This monitoring became necessary as the space became more popular, more resources were added and the available space began to diminish. Another researcher (Rosell-Aguilar, 2018)

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[85] http://mfltwitterati-dropboxes.wikispaces.com/home

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found that each of the French, German and Spanish folders contains several thousand items. Dropbox provides only a certain amount of storage in its 'free' plan, so one might argue that the size limitation – like the character limit on Twitter – places restrictions on what is acceptable behaviour. Libraries have a cataloguing system, car parks have marked lines; with so many people using a shared space, some sort of system was needed. This is provided through the guidance and 'DOs' and DON'Ts' on the MFLTwitterati wiki e.g. "Large audio & video files should not be shared via the Dropboxes - they are often copyrighted and simply take up too much space for everyone." The more people that have equal access to the large number of files and folders, the greater the likelihood of mishaps, as #teamenglish was finding. The rules on the wiki provide a common set of expectations to reduce the frequency of problems. The curators[86], a team of around a dozen volunteer teachers, also provide assistance with, as well as permissions to Dropbox, and are contactable through their Twitter handles and accounts.

As mentioned above, the limitations of space might be one reason why activity shifts to other spaces however, there may also be other influences at work and it is to these that I turn in the next section.

Extended spaces

Whilst resources become largely associated with Dropbox, *ideas* which are shared tend to be through blog posts, signposted by tweets:
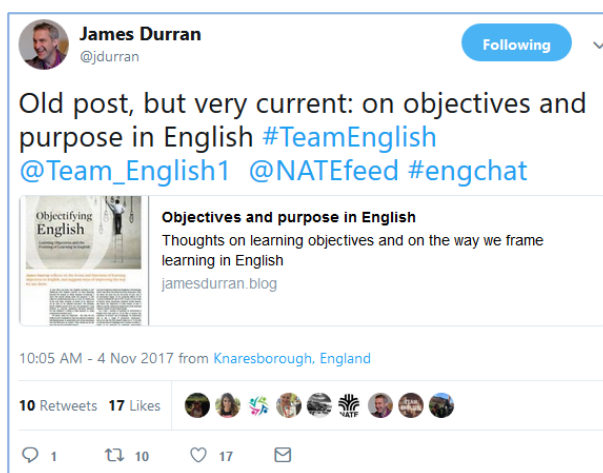
Tweet 69

These may discuss topics relevant to the teaching of English more broadly, or address specific pedagogical issues in particular areas of the curriculum. In either case, the hashtag

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[86] http://mfltwitterati-dropboxes.wikispaces.com/Twitterati%20Dropbox%20curators

helps to bind the blog post within the #teamenglish community. This is also done in another way, through the Team English blog mentioned previously. Although the blog distributes some original posts related to #teamenglish, it also uses the 'repost' facility to increase the reach of those blogging from their own blogs. Where bloggers choose to enable the feature, a one-click button as shown in Figure 43 would allow Team English blog admins to 'Reblog' the post with minimal effort.
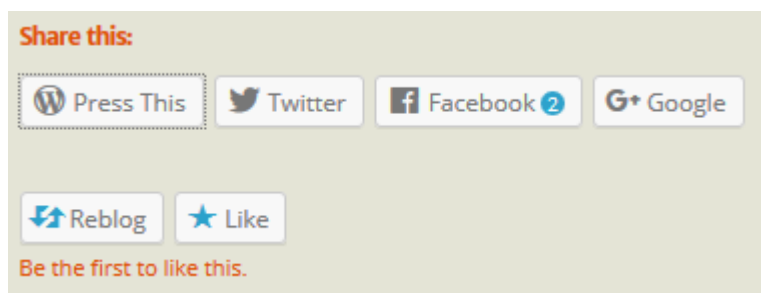
Figure 43: 'Reblog' panel

Reposting creates a dynamic link and establishes connective tissue with the original content. It extends the interconnected webs of information as a result of automated or semi-automated processes maintained by underlying code.

In addition to blog posts about the teaching of English, some are more reflective and somewhat self-referential as they discuss #teamenglish itself. In a post reflecting on the outcomes of sharing resources online[87], Robert Pepper described #teamenglish as 'A new vision of collegiality':

> *Informal collaboratives like this operate as CPD, improve the experience children get in the classroom, and connect us to each other. By helping to relieve the burden of excessive workload they also reinforce our professional kinship. We use other people's materials and we are moved to share as well.*

The extent to which this sharing and support takes place is made clear by Nikki Carlin in a blogpost on Staffrm.io[88]:

> *"Not a day goes by without my phone pinging with endless notifications of resources and chats that have started on the @Team_English1 account. People are sharing constantly with the rest of their team. I happen to think that's pretty special.*

Within this quote, some of the nonhumans make their presence known; having access to the resources and chats is encouraged by the audible 'pings' – 'notifications' delivered

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[87] http://www.labourteachers.org.uk/sharing-resources-online-for-free/
[88] https://staffrm.io/@noopuddles/11FPY7RuUS

through a 'smartphone.' Of course, some might see 'endless notifications' as a distraction, rather than as a blessing, so this might then become a matter of how that intense traffic might be managed.

The cumulative effect of having been exposed to a range of different ideas and resources, including face-to-face experiences, is discussed in the blog post from the link in Tweet 70.

Freya Odell @fod3 Following

When Twitter writing ideas come together - a NEW POST anewhoffod.wordpress.com /2017/11/11/whe ... with thanks to @Xris32 @NSMWells @mrlockyer @MrsSpalding and @toxic_sheep

When ideas from Twitter come together…
I love reading and, as a result, I love teaching reading. Just this week, I got over-excited reading Oliver Twist with year 8, getting into character as the fight between Noah and Oliver ensued. I …
anewhoffod.wordpress.com

8:14 AM - 11 Nov 2017

41 Retweets 157 Likes

10   41   157

Tweet 70

This might be described as lesson planning and thinking in the open, providing not only how the resources will be deployed with the students, but how the intended activities and resources were drawn together through multiple connections. Examine this tweet more closely and the work done by the nonhuman actors comes into view. The blog post preview (or 'Card'), created by Twitter's algorithms with no effort required on the part of the tweet author, gives the tweet reader an immediate sense of what the post might offer. It musters an image, title and introductory text to coax further engagement. Astute bloggers who are aware of this may then tailor their blog composition to service that feature. The engagement through retweeting and Liking of the above post suggest that others appreciate the views expressed. Tweet 70 provides a further example of how grateful people are for the ideas they get from colleagues, and express this gratitude as name-checks or citations.

When people use blog posts to discuss their practice or the benefits they accrue from being associated with #teamenglish, they extend the reach of #teamenglish overall. The content of a post itself may have an effect on the practice of a reader, but might also enrol them into the #teamenglish fold. Each action extends the learning potential by drawing in other people, precipitating further action; some replies (Tweet 71) indicate that shift is into classroom practice:

Tweet 71

The capacity to enrol others is assumed by a different actor in #mfltwitterati. The MFL
Twitterers list[89] curated by Joe performs a number of functions, including contributing to
the sense of community within the MFLTwitterati. 'Lists' are a feature of Twitter available
to all users. By way of example, Figure 44 shows part of my own Lists page.
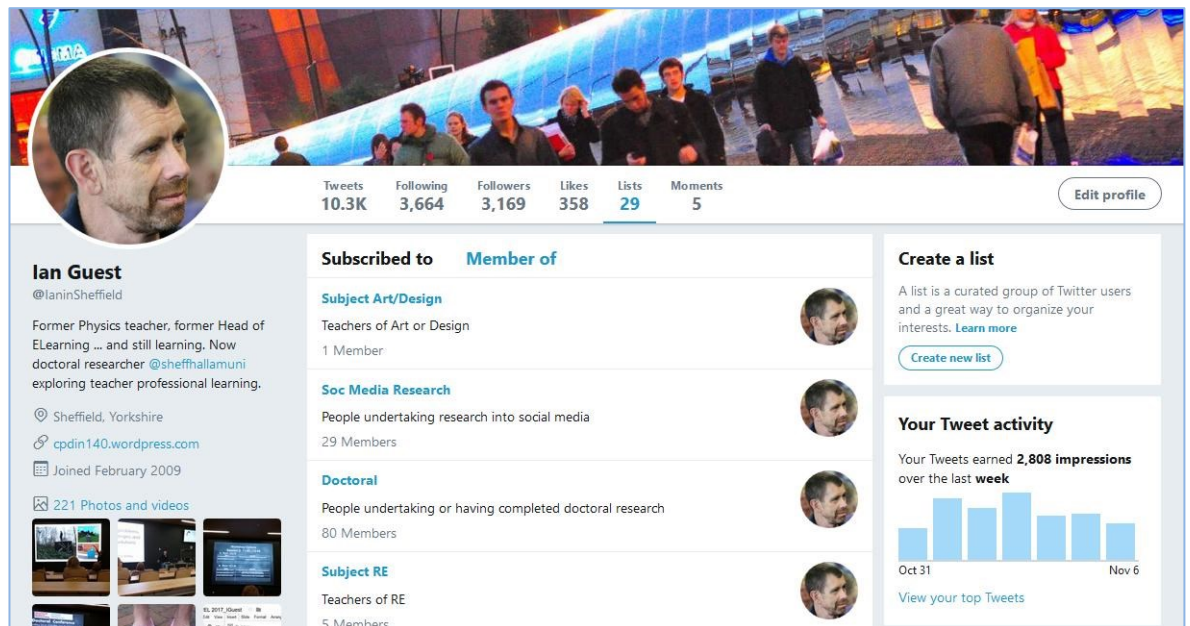
Figure 44: 'Lists' page for @IaninSheffield

When visiting someone's profile, the 'Add to a list' option is available. If you already have a
list ('Language Teachers' for example), you can add them to that, or you can name and
create a new list. The users added are then listed under that name on your lists page.
Provided you have not elected to make the list private, anyone visiting your profile and lists
page can see all your lists, choose a particular list and then view a timeline of tweets
produced by people on that list. Visitors can also hit a button to 'Subscribe' which then

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[89] https://twitter.com/joedale/lists/mfl-twitterers

places that list on their own lists page, thereby making it easier to access, and indicating to anyone who visits the list page the kinds of groups of people in which they are interested.

Lists provide another mechanism through which connections may be forged. For anyone interested in language teaching, the MFL Twitterers list provides around 5000 people who might share that interest, with the bold 'Follow' button facilitating easy connection. The list also has just over 1800 subscribers. This links them in a slightly different way, making the tweets that members of the list are sharing more readily accessible. Using a Twitter client like Tweetdeck enables the tweets from MFL Twitterers, or any other list to which you subscribe, to be viewed in individual timelines (Figure 45). Each of these columns provides content filtered on a particular topic of interest; a language teacher for example might have one column with MFL Twitterers, another of Spanish teachers and another of French.
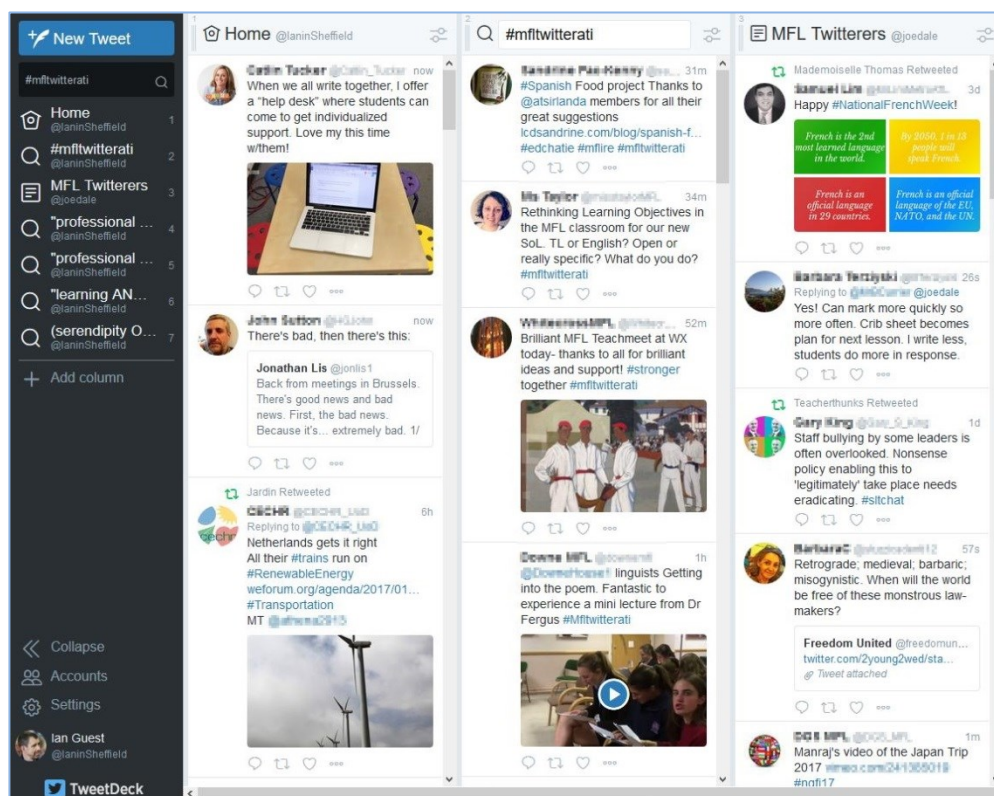
Figure 45: Tweetdeck showing followed lists

Lists to which you subscribe are curated by someone else as opposed to lists of accounts *you* assembled. This means you will see tweets from people you might not be following. In addition to potentially finding new followers, you are also exposed to content you might not otherwise see. This offers new opportunities for learning within the topic of concern, perhaps from people who might share the same interest, but have different views about education, or be from a different educational sector. It's one way to ameliorate the effects of the echo chamber that several of the study participants, like Kevin, mention:

> *"[...]the worry and concern is always that … the echo chamber effect. We're just connecting with the same people whose ideas resonate with us and don't kind of get those outside voices and I think that's always a danger with the social media. I think it's incumbent on all of us to try and expand that as much as possible and invite a lot of voices into the mix as much as possible and so we're not in this kind of narrow vision of how we see teaching[...]"*

I discuss the echo chamber in more detail on pages 214-215.

Other spaces and other resources form loose connections with the MFLTwitterati. The #mfltwitterati hashtag for example, is not restricted to Twitter and has migrated onto other platforms like Pinterest[90]. This is a social media application through which users predominantly share images they've uploaded or found elsewhere on the web. Known as 'Pins,' the images can be categorised into themes or 'PinBoards.' Each Pin can be tagged, and over 500 have attracted the #mfltwitterati hashtag. By using Pinterest's search facility, the images tagged #mfltwitterati can be filtered from the whole database.
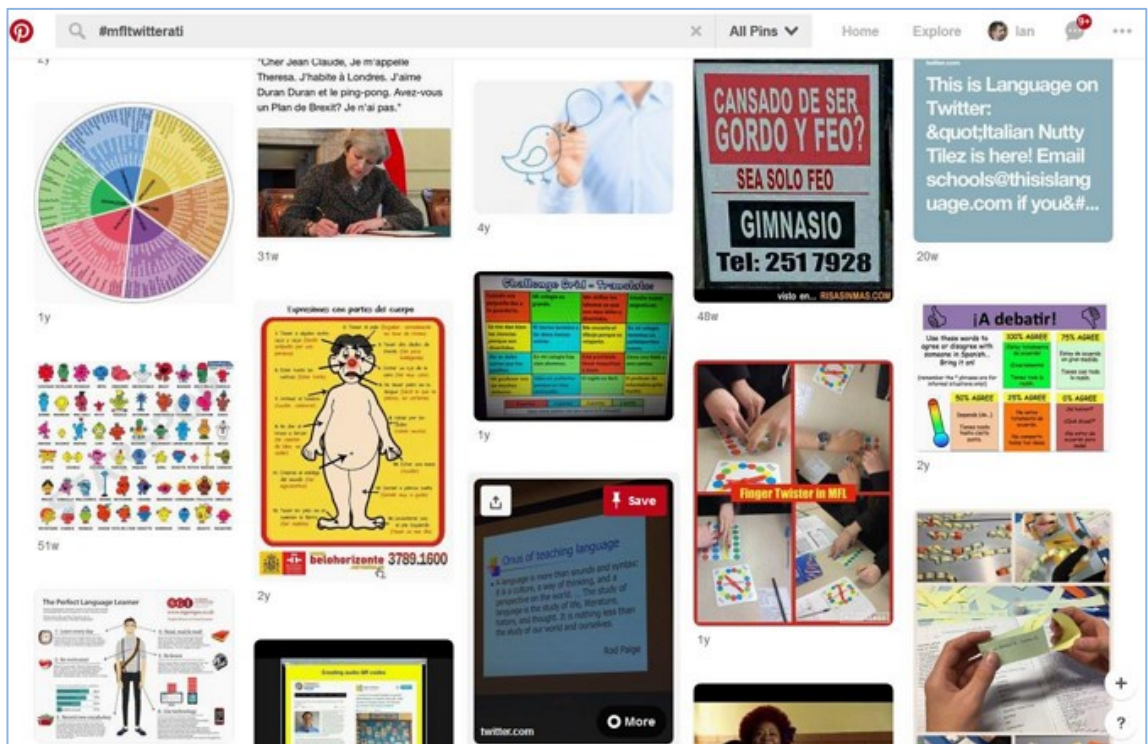
Figure 46: #mfltwitterati Pinterest page

As Figure 46 shows, some Pins illustrate language use in action, others are classroom resources, and others support language teaching pedagogy. In common with other social media, anyone finding someone pinning particularly useful or interesting Pins can connect by following them or their Pinboards. With each image viewed, Pinterest also recommends

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[90] https://www.pinterest.com

'Related' Pins which should be on a similar theme. These recommendation engines can extend what you view beyond your initial choice, but whilst you might benefit from viewing something you might not otherwise have found, it is important to remember it is Pinterest controlling the algorithms which decide what you see.

Perhaps somewhat more peripheral to the community, but acting as signposts for those who might be interested in MFLtwitterati, are numerous blog posts and articles. Some, like 'The language of Twitter: the rise of MFL teachers online'[91] provide the history and background of the MFLtwitterati, whilst others ('2011 and Twitter'[92]) include videos describing how the MFLTwitterati has affected their teaching. A post by Joe ('Mustering the MFL Twitterati!'[93]) attracted around twenty comments including:

> *I only joined Twitter 3 months ago and although I don't tweet a lot I already rely heavily on my fellow MFL Twitterati to keep me informed, to make me reflect, to give me motivation, to trigger inspiration, to make me laugh, to keep me very busy really[...] and I only follow about 20 people properly!*

Whilst posts and comments like these may not be part of the ongoing community activity, they most likely serve the function of attracting newcomers. However, without the network traffic statistics behind the posts, or confirmatory comments from people who have entered the community through that route, these are no more than my observations of what might be possible.

Other online platforms are not the only spaces into which activity expands. Having collaborated together for a couple of years through online media, #teamenglish seemed keen to extend the relationship into the offline world. Eight 'meet-ups' across the UK were planned for Autumn term 2017, each one coordinated by someone in the area:

> *@Team_English1 has become a huge community, and new friendships have been forged across the country. With that in mind, we thought that it would be really nice to arrange a few get-togethers across the country, where people can meet and chat with some of the faces behind the Twitter names.[94]*

All the meet-ups offer the opportunity to meet 'like-minded English teachers' 'make contact with other schools,' are in an informal, out-of-school venue and involve food and drink. As I write this, I have not become aware of any post-meet-up reflections however,

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[91] https://www.theguardian.com/teacher-network/teacher-blog/2013/feb/07/twitter-language-mfl-teachers
[92] https://frenchclassroom.me/2011/02/13/2011-and-twitter/
[93] http://joedale.typepad.com/integrating_ict_into_the_/2010/04/mustering-the-mfl-twitterati.html
[94] https://teamenglish1.wordpress.com/2017/09/12/team-english-meet-ups/

John Johnston, an interviewee remarked "it's good to organise to meet up with people for coffee or something like that if you're at some event so, it maybe acts more like social glue." Or as Sarah shared with me in an online exchange:

Perhaps online contacts are enhanced and bonds strengthened when people also meet offline in a convivial atmosphere.

Being a member of #teamenglish seems to matter to people, to such an extent that some include reference to it in their bio (Figures 47 and 48):

Figure 47: Twitter bio for @MsSfax

Figure 48: Twitter bio for @MissSims4

And in some cases make it their header image (Figure 49), uniting the people and the hashtag.

Figure 49: Team English header pic

Discussing 'Assembling actors'

Making a request by way of a tweet is a common practice amongst educators on Twitter. Levels of response vary, but can be assisted by Twitter. Where a hashtag or a mention is included, reach and therefore the likelihood of response are increased. What unfolds subsequently is much harder to predict.

The opening tweet for this Gathering in which Lauran asked about marking policies in English Departments (Tweet 44), led to some aspects of educator practice on Twitter one might have anticipated, but also into new arenas. In that tweet #teamenglish helped to extend the exchange. Two of the respondents did not follow Lauran, so were only able to participate either as a result of following the hashtag, or perhaps as a result of following one of the other respondents.

Mentoring is a professional development activity which has become increasingly common in schools and on initial teacher education courses. It might therefore come as no surprise that similar activity should bleed across into Twitter, or at least, that the practices and discourses surrounding mentoring make the jump. What is also no surprise is that where mentoring is found, the nature and form it takes morphs. Where mentoring practices occur on Twitter, the open arena obliges them to adapt, with episodes generally being shorter, more timely, unplanned, less private, and involving more individuals than the conventional mentor-mentee pair.

Within the mentoring exchange, the simple act of sharing a single resource led to a rich and complex unfolding. In digital format and distributed through Twitter, a resource shared can precipitate a cascade of re-sharing. Furthermore, immersed as it is within a culture of reuse, repurpose and remix, it travels further and does more. The retweet helps it on its journey; likes and replies provide feedback and critique. The crib sheet travelled round Twitter timelines, outwards into classrooms in hard copy, then back into Twitter as photographs embedded within yet more tweets, but remaining connected with the original through Twitter's threading. All the while the sheet shifted and changed, responding to the contexts in which it surfaced.

Connecting together the mentoring episode and the crib sheet was the #teamenglish hashtag which also led off in another new direction. People have aggregated together for one purpose or another, around shared interests or endeavours, since the early days of the World Wide Web (Rheingold, 1993). In addition to all the activities in which hashtags are engaged as outlined in 'The Hashtag' section, they also provide a point around which

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people can rally. Both #teamenglish and #mfltwitterati are self-identified communities which, given the 'mission statement' of @Team_English, are engaged in nothing more than resource and idea sharing. On the contrary, it transpires that participants in each are involved in a range of professional activities including resource sharing, asking questions, discussing issues and providing mutual support. For these groups, Twitter is partly conduit, partly stage and partly hub; the flâneur might see it similarly to a town square. Activity takes place here, traffic is channelled by it and passes through, and it connects with other locations. Group members meet here, metaphorically kiss cheeks and hug, exchange gifts and news, but also pass through, leaving trails to their next stop at Dropbox, the wiki or blog. They might even meet for a pizza.

Although both #teamenglish and #mfltwitterati have principal actors (generally those who founded them), organisational labour is distributed amongst a wider team. In a similar way to EduTweetOz, different levels of participation are apparent. Whereas in a conventional educational setting where roles are established and conferred within some hierarchy or structure, the roles which emerge within these groups seem to respond to needs as they arise and are more contingent on circumstances. Jobs which need doing are recognised internally and are taken on by the person or people identifying the task. Maintaining either group as a successful enterprise involves considerable unpaid labour, whether for @Team_English1, teamenglish1.wordpress.com, the MFLTwitterers list, Dropbox, the MFLTwitterati Dropbox wiki, or in co-ordinating the offline meet-ups. Though these activities may fall on a core of motivated individuals, the effort of resource sharing is distributed more widely amongst the whole community.

One would hope the unpaid labour that people invest across #teamenglish is recompensed by the benefits they accrue. Participants presumably get at least as much out as they put in. But what of the nonhuman participants? How are they remunerated? That might have little meaning in the context of the #teamenglish hashtag, but Twitter, Dropbox, the smartphone manufacturer, the internet service provider and other businesses are recompensed either financially, or by the data provided as a result of #teamenglish activity. One might speculate on the extent to which people reflect on that as they participate in group activities.

Although #mfltwitterati has a longer genealogy, it is the notion of #teamxxx which seems to have gained traction recently. Since @Team_English1, further Twitter curriculum subject accounts have emerged; @Team_Maths1, @TeamScienceEdu and @TeamRE_UK are just three of which I'm aware.

Addressing the research questions

In the previous Gathering, I showed a number of ways in which a hashtag can affect other actors. In the opening tweet of *this* Gathering, it was the #teamenglish hashtag which made the difference in opening out the exchange to draw in other people. Nevertheless other actors also played significant parts. Twitter's 'threading' allowed the conversations to remain intact and be traced; photo previews provided visible, meaningful exemplars; and quote tweets plus notifications drew in others. Others have noted how pre-service (Carpenter, 2015) or novice teachers (Smith Risser, 2013) can benefit from the support afforded by networks of mentors. This study adds to those findings by illustrating that nonhuman participants broaden the cast of actors, open out mentoring episodes to include others and permit role switching between mentor and mentee.

Sharing resources is one of the most common activities in which teachers on Twitter become engaged (Carpenter and Krutka, 2014; Sauers & Richardson, 2015). Even studies which didn't quantify or compare different activities mentioned resource sharing as at least one strand of participation. Although exchanging resources is part of professional practice, it would be difficult to make the case that it equates to learning (Wesely, 2013). What the crib sheet episode reveals however, is how productive and generative sharing a single resource can be. Not only was the crib sheet shared and reshared, but it was illustrated in practice, opened to scrutiny, discussed at length and adjusted for different settings. As it travelled it jumped from one curriculum area to another, between educational phases and across international borders. One might argue a case for the crib sheet as a boundary object in the way they enable 'a sort of arrangement that allow different groups to work together without consensus' (Star, 2010, p.602).

A range of contributory factors could have produced the flurry of activity around the crib sheet. Greg's blog post, the need to address marking load, or the crib sheet itself could have precipitated the outcomes that people described. On the other hand, given how far the sheet seemed to range and the number of reactions it provoked, one might argue that it was the tweet that generated the greatest effect. All of these actors are crucial once we think about assemblage. The tweet alone couldn't exist without the Twitter platform, which in turn relies on the connectivity that the Internet provides. Greg's blog post too relies on the same backbone, but would have been far less impactful without the capacity for the inclusion of multimedia. Those who are critical of sociomaterial accounts might point to Greg's centrality; without his creativity, his technical ability and his desire to share the product of his labours, none of this would have been possible. That is indeed true, but if

we also erased any of the nonhumans to which we might not ascribe the creativity or generosity that Greg displayed, the outcome as described above still dissolves. It is not a single thing, but the whole that enables the crib sheet to succeed.

The #teamenglish and #mfltwitterati 'communities' are more than people coming together around shared interests or goals. They are entangled with the nonhuman actors which could arguably also constitute the community. Retweets for example resurface tweets in new timelines and perhaps help forge new connections. As discussed earlier, the retweet plays a significant role for #teamenglish particularly, as indicated by the proportion of retweets within the corpus. boyd et al.(2010) saw this as more than mere copying and rebroadcasting, and as a conversational practice; 'not simply to get messages out to new audiences, but also to validate and engage with others.' Perhaps it is one way through which #teamenglish is enacted, renewed and extended?

Other nonhuman actors also help to produce the two communities. Replies to tweets, when working with Twitter's threading algorithms, provide structured conversations from which sense-making becomes easier. Pinned and author-threaded tweets bring related information together, concentrating it for ease of access. The #mfltwitterati hashtag and MFL Twitterers list, sometimes together, sometimes apart, and sometimes with hashtags like #langchat, entangle tweets, people, resources and ideas to translate teaching practice from person to person and classroom to classroom. Each of these two communities perceives itself as a group of people involved in the common endeavour to learn from one another. Attending to the nonhuman participants reveals how those communities persist, or don't, yet their ontological status as constitutive elements *of* the community is rarely discussed.

In the Gathering which follows, I explore the corpus of tweets @PLDBot and I assembled. Although they portray Twitter PD in generally positive terms, by exploring more widely, ambivalences, contradictions and concerns become visible.

7 GATHERING: IT'S PERSONAL … AND PROFESSIONAL, AND…
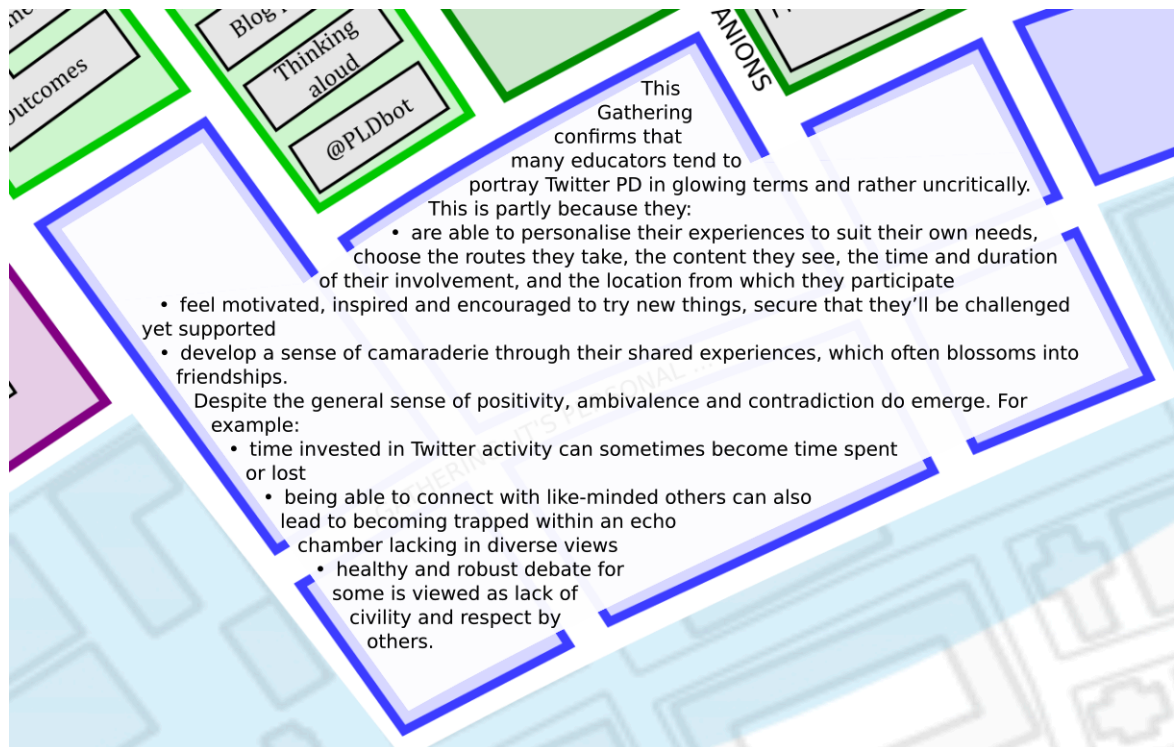
One of the factors prompting this study was the number of people who tweeted how important Twitter was in supporting their professional learning. In Figure 2, I provided a handful of examples to illustrate this, but Tweet 73 provides a reminder of the kind of sentiment expressed:
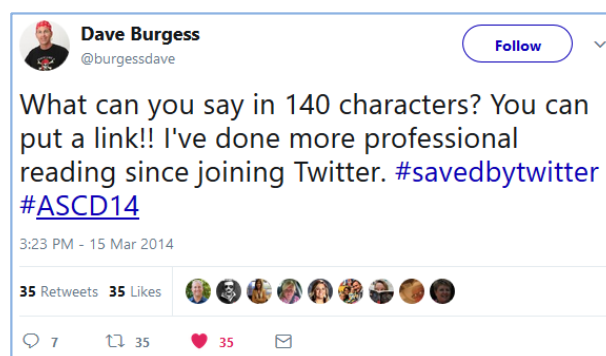
Tweet 73

During participant observation I curated a corpus of educators' tweets which referred in some way to both professional learning and Twitter. I did this by favoriting/Liking, an activity which also constitutes one of the practices of participants. I open this Gathering by drawing on the tweets I bookmarked by Liking, together with evidence from interviews

and blog posts, to explore educators' Liking behaviour and what they have to say about their experiences on Twitter.

Tweet 73 was the first tweet I favorited which mentioned Twitter as a factor in someone's professional learning. (I will be adopting the US spelling of favorite rather than anglicising it, since that is how the word *was* displayed on Twitter). At that time Twitter users were able to click on an icon in a tweet to 'Favorite' it, as in Tweet 74

Tweet 74

however, in 2015[95] Twitter changed the name of the action to 'Liking.'

Before discussing what I found amongst the tweets I favorited, I first explore my favorit**ing** during observation, since this leads into an exploration of participants' favoriting behaviour and how that contributes to their learning. I favorited Tweet 73, and many others, for one reason – to 'bookmark' it, or keep a record to which I could return later. Even before commencing the PhD, I began 'collecting' tweets by favoriting them. I chose favoriting in Twitter rather than bookmarking them in my browser or archiving them elsewhere, simply because of the ease with which the 'Favourite' button could be clicked, whether I was on a desktop computer, laptop or tablet.

Whenever a tweet was favorited, two actions were initiated: 1) a record of the tweet was added to the favorited tweets list, and 2) a notification was sent to the tweet author that their tweet had been favorited by someone. Here are Twitter's original intentions for the Favorite button:

> *"Favorites, represented by a small star icon next to a Tweet, are most commonly used when users like a Tweet. Favoriting a Tweet can let the original poster know that you liked their Tweet, or you can save the Tweet for later."*

> [Originally at https://support.twitter.com/articles/20169874-favoriting-a-tweet, but no longer available]

Nevertheless, different people have different philosophies underpinning their favoriting. In addition to keeping a record, the notification sent to the author could be an indication of approval, a wink, a hat-tip, or a show of appreciation (Rosman, 2013). Since different people favorite for different reasons, coherence between the intention of the person

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[95] https://blog.twitter.com/official/en_us/a/2015/hearts-on-twitter.html

executing the favorite and the person whose tweet was favorited may be missing. For one it might simply be cataloguing, whereas the other may see it as an act of approbation. At the time I favorited the tweet in Fig x, I was only marginally aware of these considerations. That subsequently changed, as I shall explain shortly.

The reasons why someone clicks the favorite button are mostly hidden. During the course of my observations and interviews however, some participants described why they favorited tweets. I wasn't the only one using the favorite button as a way of collecting or bookmarking tweets:

Tweet 75

Tweet 75 also implies that the favorite (Like) button works together with Tweetdeck to support the process of 'collecting' resources. Tweetdeck is not the only other actor to co-operate with the favorite button. Tweet 76 suggests screenshotting is employed as a backup process.

Tweet 76

In addition to constituting a personal benefit, favoriting is used by some, like Todd[96], for reaching out to other people as a way of initiating contact:

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[96] https://www.teacher2teacher.education/2017/09/01/my-onesmallthing-growing-connecting-on-social-media/

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In late 2015, Twitter changed the Favorite to 'Like' and its icon from a star to a heart[97]. This also involved a change in Twitter's rationale for the button:

"Likes are represented by a small heart and are used to show appreciation for a Tweet or a Moment. You can view Tweets an account has liked from their profile page by clicking or tapping into the likes tab."

Somewhat perversely, no longer about liking a tweet, but showing appreciation instead, and certainly no longer 'saving for later.' Whether Favorite or Like, the action for some like Melissa, is about encouraging others:
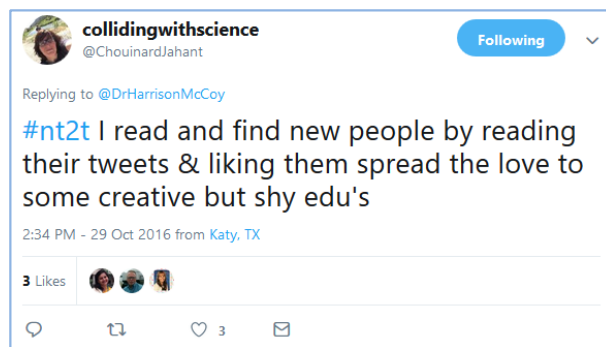
Tweet 77

A number of other people also cited Retweeting and Liking as ways to encourage other people, especially those new to Twitter. However, some like Scott saw such a simple action as less meaningful:

Tweet 78

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[97] https://blog.twitter.com/official/en_us/a/2015/hearts-on-twitter.html

Shallow or not, getting a Like was for Robin, one of my interviewees, and others, an act of validation:

> *There's that kind of gratification that comes from posting something and it being retweeted or liked, and that's just like all social media. There's that kind of little bit of a buzz that people get from that, that sort of validation*

Which John J, another interviewee, took a little further:

> *One of the nice things about Instagram and Twitter is if you have a thought and you put it up there, somebody'll 'like' it.. That's maybe quite shallow to get that, but it does make [pause] it does make the thing quite sticky.*

It would therefore appear that even the simple approbation you get from a Like is enough to make you want to 'stick' around; to make you keep wanting to contribute and keep coming back for more.

So whether a Favorite or Like, the button appears to have a variety of purposes beyond those Twitter intended, and might call others to action, spread the word, poll opinion, influence others to follow, or initiate interaction. It is important to remember however, that the intention of the person clicking the button may not be aligned with the perception of the recipient. Changing from Favorite to Like is unlikely to have helped reduce that tension.

When the star became the heart, I began to consider what effect(s) my 'Liking' might be having on those whose tweets attracted my attention. It was quite possible that when I Liked a tweet, the recipient would perceive my action differently from the way I had intended. Concerned with the physical shift from favorite to Like, and potential perceptual shift, I explored alternative ways to catalogue the tweets I wanted to keep. I began by creating the alternative account @PLDbot (pp.79-81) which had a stated single purpose of 'Liking' and retweeting tweets.

Bringing PLDBot into service raised several methodological issues and some unanticipated <#*ethics*> questions which I pick up later in 'Ethics revisited' (pp.252-254). Between February 2015 and May 2017, PLDbot and I favorited or liked almost four hundred tweets. The criterion which provoked our Liking was that the tweet should include "Twitter" together with "professional development (or learning)," or abbreviations like PD or CPD. Whilst I was Liking tweets which appeared in my timeline, i.e. those authored or retweeted by the people I followed, PLDbot cast its net further by conducting a search for those

terms. Although restricting the tweets that PLDbot found to those from educators only was not possible, it nevertheless appeared to be mainly educators who tweeted about Twitter in this context.

In the next section I begin to explore some of the ways that educators referred to TPD in the corpus of tweets we collected.

Professional

Some of the tweets in this corpus arose as a result of responses to questions similar to the one George asks:
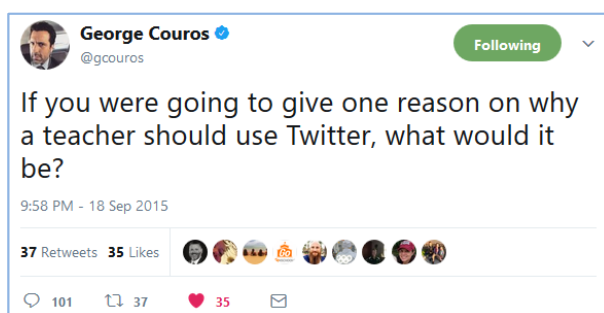
Tweet 79

In the responses to questions like those in Tweet 79, but also more generally, it is common to see bold claims which use superlative terms:
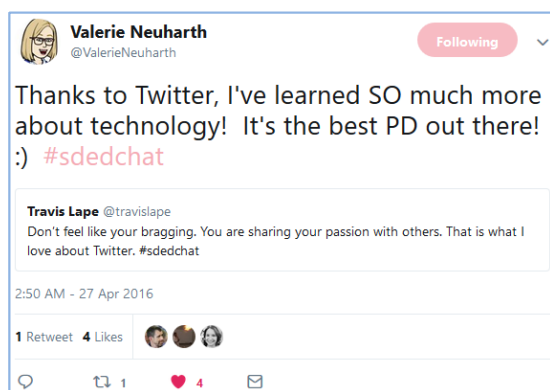
Tweet 80
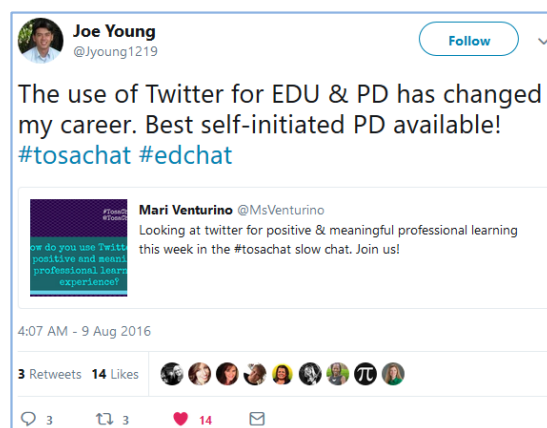
Tweet 81

The tweets within the corpus expressed an almost universally positive inclination towards Twitter. It is of course possible that I only follow people for whom Twitter has become important in their professional learning. Furthermore, those who find no use for it, or are negatively inclined, are unlikely to remain on Twitter for professional reasons at all. There are nevertheless some voices which are more measured in tone:
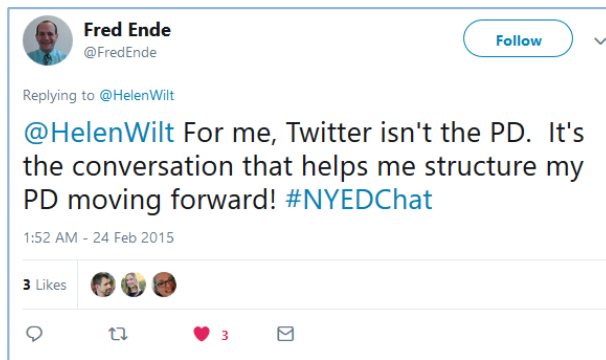
Tweet 82

Others like Doug, in a blog post[98] responding to claims like the ones in Tweets 80 and 81, were more forthright:

> *"No. It's. Not.*
>
> *It might be the best Continual Professional Stimulation (CPS) you've ever received but development is more than getting a bunch of ideas."*

For some, like Doug, professional development is defined in a particular way and because what they observe on Twitter doesn't meet those criteria, it can't be called professional development. For others, Twitter has made a difference to how they work and the job they do, so they therefore claim it (whatever 'it' might be) to be professional development.

Perhaps part of the problem is how tightly our focus is drawn. A proponent of TPD might describe a single, brief activity as professional learning:
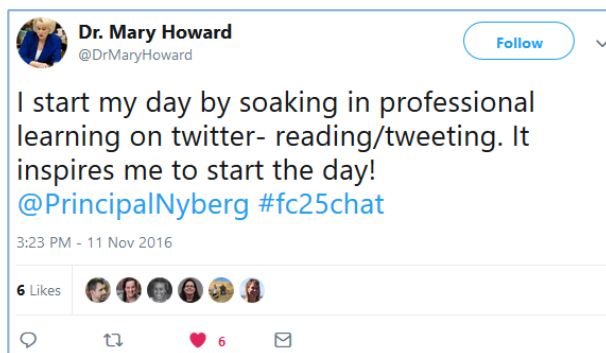
Tweet 83

However, a tweet only presents a brief snapshot of what will probably be a much wider range of activity:

---

[98] http://dougbelshaw.com/blog/2010/05/26/twitter-is-not-the-best-cpd-youve-ever-received/

As Tweet 84 illustrates, in most instances, it is likely that Twitter will form one element within a broad assemblage of other educators, Likes, replies, retweets, profile pics and tweets; one which involves a more extensive network which is continually maintained, adjusted and reconfigured. That rich palette can produce a range of experiences, as Deborah goes on to observe in a blog post:

> *Twitter can be a bespoke news service, individualised professional learning, a vortex of distraction, a cheer squad and a firing squad.[99]*

As I mentioned earlier, it was the number of tweets and blog posts proclaiming the virtues of Twitter that increasingly provoked my curiosity and ultimately led to this study. As I began to explore with a more critical, or at least more balanced eye, contradictions began to appear. For example, when people first come to Twitter, they can see it as a somewhat chaotic environment and rather difficult to comprehend. The timeline doesn't seem to make sense; some tweets stand comfortably alone, whilst others appear to be orphaned from conversations. Anyone frustrated at this point is unlikely to persist, but those who do, do so by finding ways to cope; the chaos doesn't disappear, but they find ways of managing it. Twitter remains a noisy stream of random chunks of information, but also a space which can be organised for improved clarity and cohesion. In actor-network theory terms, this apparent contradiction is termed ambivalence and can be useful for researchers attempting to learn more about a practice. As Singleton & Michael (1993) observed, ambivalence need not lead to misalignment or decomposition of an actor-network, as might happen when people can't get past that initial onslaught of information, but uneasy truces can form which help to sustain it.

So as Tom notes in Tweet 85, ensuring Twitter works for one's professional good involves a degree of time and commitment.

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[99] https://theeduflaneuse.com/2015/10/21/why-i-love-twitter/
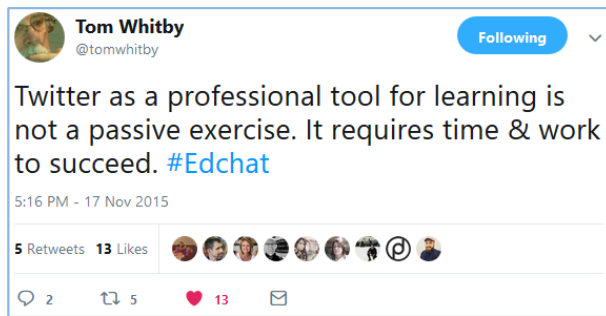
Tweet 85

Since most educators would not claim to be blessed with a surfeit of time (Cockburn, 1994), it might be surprising that TPD became so popular. In the next section I explore the different ways time has an influence on TPD.

Temporal

During my years as a teacher, and subsequently working with teachers, one topic which regularly surfaced as a source of interference was that of time, in particular, that there was never enough. How curious then that teachers should elect to give up so much, of what is for them such a precious resource, in non-mandated, self-directed activity on Twitter. That apparent contradiction is rationalised by some, through what is almost a cost-benefit calculation, as Stacey does here:

> *I've never sort of regretted my time on Twitter [...] I know I've used the expression 'lost 40 minutes' but [pause] I've just been so engaged, 40 minutes have passed by and it's been a worthwhile 40 minutes, or 20 minutes or 30 minutes. I've always gained something from it.*

Rather than time spent, it becomes more like time invested, or as Kristian phrased it on p.201, a matter of efficiency:

> *I think if I can save time by picking up free resources from Twitter, if it's going to make other areas more efficient, then that's a, y'know, that's a case for Twitter.*

However, the sheer volume of information places demands, which, as Robert[100] notes, require not only a strategy for managing that excess, but also the means through which to filter the pertinent from the irrelevant.

> *If anything, the problem that people face is one of curating the best and most relevant links, blogs and articles. Twitter links to an almost limitless online library.*

---

[100] https://robfmac.com/2014/05/31/what-twitter-means-to-me/

This then becomes a fine line to tread. Each participant will have some rule(s) by which they decide that the time invested ceases to provide adequate rewards.

Chris was able to identify where the line was crossed and the unfortunate consequence which ensued:

> *It took over from my spare time, where actually I would have been better, personally, switching off and reading a novel or watching television or doing something that made teaching not be my whole life.*

Incorporating Twitter activity into spare time reduced Chris' capacity to switch off from his job, thereby extending his working day and contributing to what he described as an unhealthy work-life balance, an issue also noted by Elaine in responding to Mr McLugash's request for the reasons people might recommend Twitter:
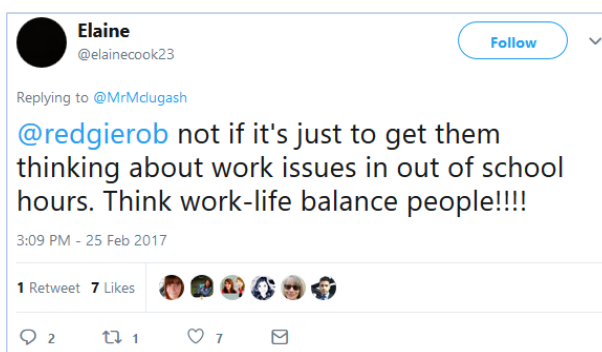
Tweet 86

Not only is the time spent on Twitter a potential source of concern, the time of day at which some activities take place can become an issue for some educators. This hit home with Chris when he found himself in bed, participating in a hashtag chat, when he ought to have been asleep. Having '24-7' opportunities might be an attractive factor for some:
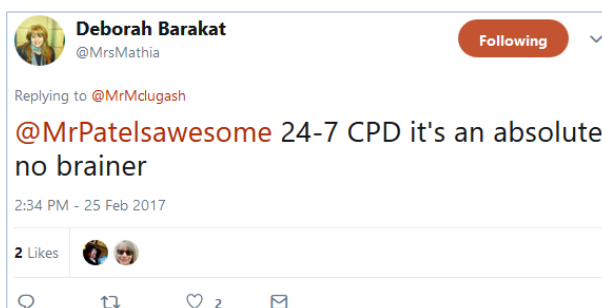
Tweet 87

but for Francis, constitute a real cause for concern:

> *I'm not a big fan of the Twitter chats [...] they tend to be late in the evening [...] I don't do those because, well half eight to half nine is not really a place and time of work.*

Yet for others, the opportunity to participate on a Saturday morning while offspring are having swimming lessons, or to dip in over the course of a week at times which slot neatly into a busy schedule, is appealing. It's as though spending time is seen as more acceptable, when it is at the discretion of the person concerned.

I mentioned earlier in Chapter 6 that teachers appreciate the ease with which they can both share and request resources, contribute and benefit from ideas through Twitter. Resources can be pooled in a particular area, like the way in which the #mfltwitterati or Team English use Dropbox. In particular, it can be the speed and timeliness of response which is often appreciated. As John J observes:

> *You will get help from people quickly if you're stuck with something, it's a really fast place to get help sometimes …if you get connected to one or two people who've got other connections, then you get even more stuff*

Although John goes on to further explain that the speed of response can sometimes be at the expense of the quality or precision of the reply. It might be a balance between posting a general tweet to no-one in particular, thereby allowing for a chance reply from someone unexpected, or using @mentions or hashtags to direct your request to people who might be more likely to be in a position to respond. Kristian is also equivocal about whether turning to Twitter saves or costs time:

> *If I can save time by picking up free resources from Twitter, if it's going to make other areas more efficient, then that's a, y'know, that's a case for Twitter. But if you're going to spend your afternoon dancing around the stream and you haven't got anything out of it, then, y'know, that's a drawback.*

Knowing when and how to turn to Twitter and gain those efficiency savings is doubtless a skill that is gained through experience, which in itself demands an initial investment of time. Early encounters with Twitter are often described as confusing, messy and rather chaotic. It takes time to be able to navigate and make sense of the timeline with its apparently disjointed string of unconnected tweets. Deborah noted that this is exacerbated when participating in a hashtag chat where the flow rate of information can appear overwhelming for those new to the format.

Plenty of advice has been provided to assist those about to embark on their first chat and it would appear that if people persist through the early stages, they develop strategies for making the time they spend more meaningful. Getting the most from Twitter often involves a substantial commitment of time, though some like Stacey are sanguine about this:

Yeah I would never see that as negative, that. I've never sort of regretted my time on Twitter. … I know I've used the expression 'lost 40 minutes' but I suppose I mean I've just been so engaged, 40 minutes have passed by and it's been a worthwhile 40 minutes, or 20 minutes or 30 minutes. I've always gained something from it.

And others go further, expressing their views in the format "I have learned more from Twitter in xxx than in yyy," which has an almost meme-like quality:

Kerri Thompson
@kerriatlearning   Following

Replying to @JacqChch

@JacqChch it is pretty much PD 24/7!! I have learnt more in a year on Twitter than in last 20 years #BFC630NZ

7:39 PM - 17 May 2015

1 Retweet 5 Likes

♡ 1   ⟲ 1   ♥ 5   ✉

Brant Nyberg
@PrincipalNyberg   Follow

I get more great PD from my Twitter PLN in one evening than I can provide my staff in a year. #NYEDChat

1:46 AM - 24 Feb 2015

5 Likes

♡ 1   ⟲   ♥ 5   ✉
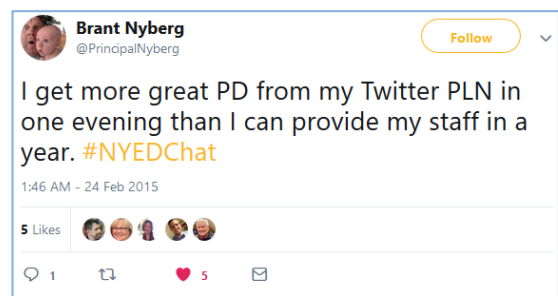
Tweet 88   Tweet 89

One of the benefits that teachers like Lucy[101] identify about participating on Twitter is the way in which the experience can be customised to suit their own preferences and needs:

More than anything, Twitter is bite-sized. CPD doesn't have to come in two-hour slots any more – you can choose when you have two minutes to answer a poll, five minutes to read a resource or ten to comment on a question. Take it in when it suits you; turn it off when it doesn't. The same can't be said for traditional CPD

To borrow and remix an expression from the 'agile' business literature – 'Just in time, just enough and just for me.'

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[101] http://www.cambridgemaths.org/news/view/birds-of-a-feather-tweet-together/

As already mentioned, lack of time is a serious issue for teachers. What is rarely expressed, but (from my experience) equally serious, is that as a teacher most of your time is scheduled by a timetable and you don't have the luxury of flexibly being able to move commitments around.

> *So I try and find times* [pause] *often you'll find I'm using Twitter early in the morning, before I'm out of bed even. It's like one of those times where I feel like I can have this to myself to engage in these ideas.*

For Deborah, being able to find a slot in the day which accommodates her lifestyle is important. For others it's more about not necessarily having to commit to a lengthy period of time, but being able to drop in and out as other commitments allow as Natalie mentions in the exchange in Figure 50:

Figure 50: Exchange discussing 'stress-free' Twitter PD

To pick up on other points Natalie makes here, having a choice, being in control, and deciding one's depth of engagement also matter to her. Like Lucy, Natalie too makes a comparison with traditional forms of PD … albeit prompted somewhat by me. In the next

section I explore more deeply how educators personalise TPD and sometimes frame it in relation with other professional development experiences.

Personal

Where educators can choose the nature of their involvement in TPD, it becomes a personalised experience. Participation is organised, structured and accessed according to one's personal needs, whether they contribute to one's development, or simply because of time commitments. Some, like Robin, are minded to directly compare 'traditional' PD with Twitter PD

Robin Boling
@SoyBolingual

Follow

Replying to @MrMclugash

.@MrMclugash Teacher complaints of traditional PD include mandatory one-size-fits-all. Twitter PD is immediate, personalized, practical.

7:37 PM - 25 Feb 2017

1 Like

♡ 1
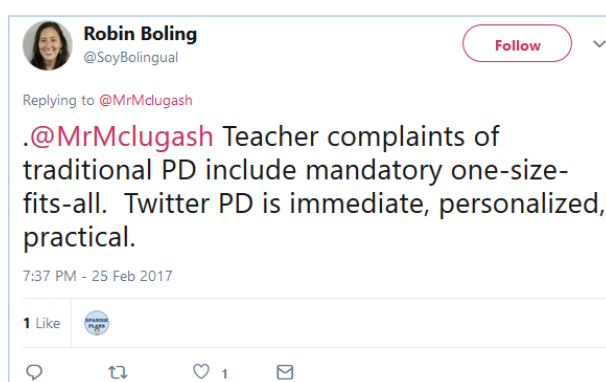
Tweet 90

When viewed in this way, undertaking TPD becomes something rather different as it attempts to become dissociated from work, and yet doesn't fully manage it, as Danielle[102] illustrates:

> *[Participating in the #digimeet chat] was a worthwhile way to spend an evening, and I didn't think it felt like work - though as teachers I'm not sure we ever quite leave the job.*

Although there is a sense in which the capacity to choose becomes a factor in distinguishing between professional and personal – one is directed by someone else, and the other by the person participating. Sometimes there is coherence between the two, and sometimes not, as for Kevin:

> *Whereas personal learning seems to be I'm driven by my own interests, on my own time. I'm following the thread of curiosity and sometimes those intersect with that idea of professional development within my field and sometimes they don't.*

---

[102] https://staffrm.com/@dalynch146/IEvjzEL9LS

Those tensions between what are perceived as professional and personal, work and 'not work,' mandated and self-directed, can also be found in another sphere, that of accreditation. In some locations around the world, teachers are obliged to undertake a certain number of hours of professional development per year to maintain their status as a teacher.

Edward Schumacher
@ColumbiaPapa

Follow

Just sat in on a presentation where a district allows a twitter chat to count as professional development credit. #maesp15

6:41 PM - 15 Mar 2015

6 Retweets 12 Likes

6   12
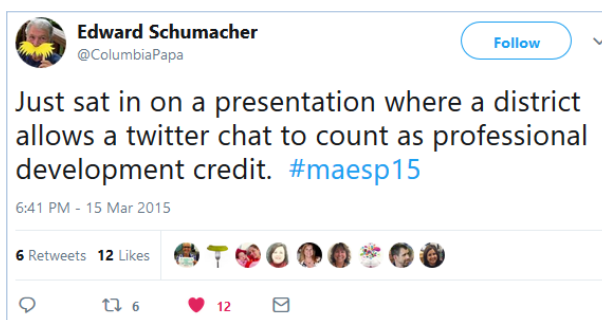
<div align="center">Tweet 91</div>

Whilst some might celebrate the possibility of receiving some form of recognition for the time invested on Twitter, for those in other educational systems, like Deborah, that is not an option

> *But then I think about things like use of social media, blogging, PhD; those things which I think educators are doing which they're doing for themselves, I guess, they're doing for learning. But it's not that anyone's gonna give them a gold star or form that says congratulations*

And others still would doubtless worry about that it might be devalued through becoming a mere box-ticking exercise.

Maintaining a distinction between personal and professional is more important for some people than others. It becomes not about the personal as in personalised, but instead of one's personal life. They prefer to partition off the professional, work-related issues from those associated with home, family and friends. Many do this by using different platforms in different ways:

> *I use Facebook for social interactions and Twitter for my professional development and interests.*

And like Jessica[103], the majority seem to position Facebook as the place for personal, rather than professional interactions. Others like Erin in Tweet 92, adopt a similar strategy, but use two separate accounts to demarcate the two lives:

Erin The Librarian
@butterfli820

Follow

Replying to @AprilMThelen @Dayancee

I have 2 accounts. 1 for professional Development, and 1 for personal. #nt2t

2:17 PM - 29 Oct 2016

2 Likes

2
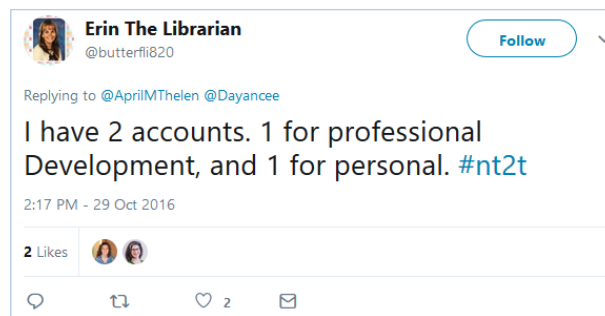
Tweet 92

Some don't see the need for separation, and though they might use Twitter primarily for professional purposes, they see value in posting some aspects of their personal lives. They feel it paints a more rounded picture that some potential followers might want to see. John J for example has a single Twitter account he uses mainly for professional interactions, but through which he also shares some personal interests. He nevertheless self-censors by avoiding certain topics:

> *I'm not a political tweeter and I tend to avoid that unless it's such a sort of educational politics but even then I will probably ignore that unless it's my sphere.*

People are aware that what they tweet can have either positive or negative outcomes on their career. As John also observed:

> *I'm sure I've got jobs because I was an active blogger/tweeter, and nobody looked at my spelling.*

Although that pendulum can also swing the other way and as a senior leader, Kristian is only too well aware of potential consequences:

> *I recognise the ups it can bring to someone's professional practice, but it only takes one or two silly comments or a poorly constructed tweet and that could be a headteacher involved in a serious HR position. So I'm just aware that … it's very good, it's very positive, but there are drawbacks.*

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[103] https://jessicafear.wordpress.com/2017/05/06/costly-conferences-are-dead-long-live-twitter/

The ambivalence for some, like Maria in Tweet 93, comes from the change they experience when progressing from initial reticence, to taking control and tailoring the experience to produce a better fit.
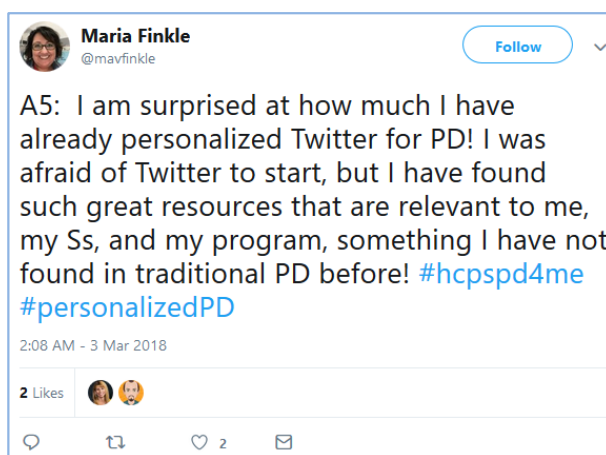
Tweet 93

Maria notes that being able to personalise her activity means the resources she finds are appropriate to her needs, those of her students, and of her program. Having choice also includes the people with whom you make connections, or as Joe phrases it:

> *I think this is a very important point; you get to choose who you follow, and who you block, and who you want to connect with.*

Through the connections people make, they are able to filter the information streams to which they're exposed, at least to some extent. The same is true for Stacey who summarises some of the previously mentioned factors:

> *Sometimes I just lurk and I read and that's fine, and then sometimes I'm tweeting loads of things. So you kind of use it as you want and talk to who you want to, when you want to.*

Not only do time, people and level of participation matter to Stacey, but her involvement is sometimes less conventional: "Very often it's when I'm in the bath if I'm honest [...]" Not needing to be in a specific place, at the appointed time, and dressed for work, were valued attributes of involvement on Twitter for many, whether in bed, bath, wearing slippers, or for Johanna[104]

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[104] http://corelaboratewa.org/twitter-changed-my-teaching-life/

> *While on my couch, under a blanket, with a dog snoring at my feet. If that doesn't sound like the most efficient, enjoyable, interactive, and personalized professional development in the world, I don't know what does.*

Simply being able to tweet from one's pyjamas is valued by Crystal:

Crystal Brown
@MrsBrownC
Following

#nt2t Twitter is the ultimate Pd for teachers, by teachers, because we WANT to be there and know what we need! And I can Tweet in PJs! ;-)

2:38 PM - 29 Aug 2015

1 Retweet 3 Likes

1   1   3
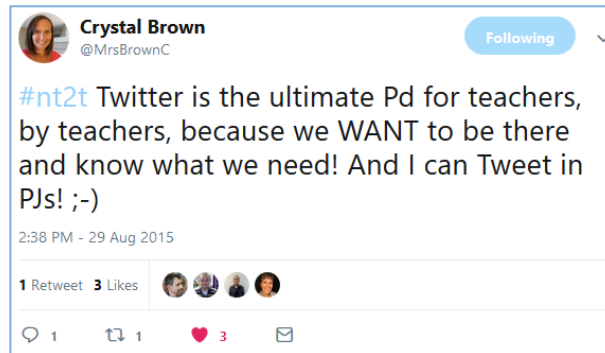
Tweet 94

but as she also notes, knowing precisely what your own needs are and being able to address them in the way you need is crucial. Or as George[105] wrote:

> *That is one of the joys of Twitter for professional development, you access it when you want, not when you are told*

Having the freedom to choose one's path is clearly important, but it appears that being comfortable and relaxed have a part to play too. Hygge, a Danish term, is not something you can point to, but is more a feeling or mood, and is often described as a sense of cosiness. Beauchamp (2017) describes hygge by offering a bundle of words with which those experiencing hygge might identify: 'happiness, contentedness, security, familiarity, comfort, reassurance, kinship, and simpleness.' It can be about simple rituals incorporated into daily life which lift the spirits; a morning cup of coffee or a relaxing bath at the end of the day; good food with good friends.

Although no-one in my study mentioned hygge directly, some of the aforementioned feelings and moods appeared within the data when people were discussing TPD. As mentioned earlier, there's often a sense of release and relaxation associated with opening Twitter, as Robin describes:

> *Yeah so I would sort of be on the tablet in the living room or … relaxing after dinner you know; possibly listening to some music playing and just kind casually having a look.*

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[105] http://gg1952.blogspot.co.uk/2017/05/twitter-for-professional-development-in.html

No pressure and no imperative, and being able to participate in comfort and on your own terms:
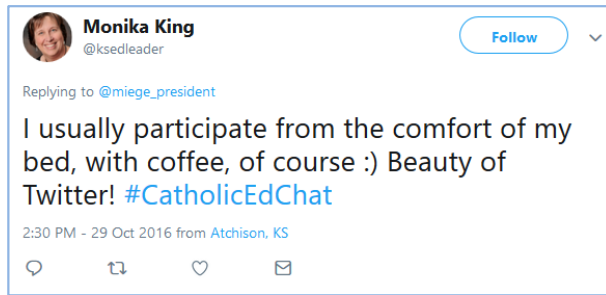
Tweet 95

Or for Deborah (and Stacey, p.207):

sometimes it feels like downtime from other things

The sense of kinship and being associated with other people who share your values arose several times in earlier sections when people proffered the notion of their 'tribe' or as Sarah puts it:

We're a personal learning network, and even more than that it actually feels like a family because y'know, we build that relationship.

People share a sense of belonging, but as Tweets 96 and 97 show, the hashtag once more becomes significant in helping them achieve that:
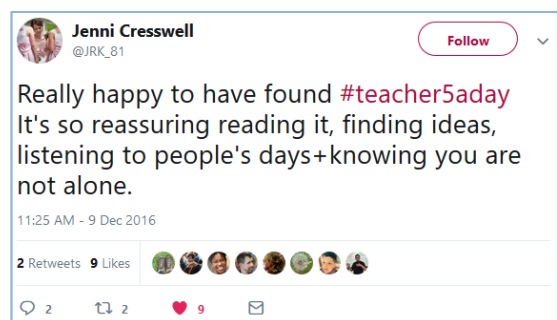
Tweet 96   **Tweet 97**

Despite the relationships that are established through Twitter, for many, like Kevin, (and for Sarah as illustrated on p.111) coming together face-to-face enriches the relationship:

One of the drawbacks of Twitter is that you don't have that in-person experience where you kind of bond in a certain way. Y'know beyond the formal, structural moments. It's the

> *eating over lunch and talking about what's going on and those kind of thing. So although some of that can happen on Twitter, it doesn't happen in the same kind of way.*

As Kevin points out, a contributing factor of the hygge arising from coming together with others is food or drink. A number of people mentioned how when they meet Twitter friends at conferences, it is often over coffee and cake. The #CakeMeet group have even turned it into a regular event[106]:

> *We meet once a term to talk about jobs, life, homes, what is going right, what is annoying us, what is happening and what isn't happening. We talk schools, kids and husbands/wives. You name it, we discuss it! We meet and talk – SIMPLES!!*
>
> *The format follows that of a #TeachMeet; people come together to share, but this is a informal gathering where we eat lovely homemade cakes and casually talk about what's happened in the last few months.*

For those rallying around the #BrewEd movement, other libations help to provide the hygge lubrication.

> *A brilliant pub, great beer, funny and inspiring people, some good discussion about education matters - Oh, and a proper pub quiz. #BrewEd is about people interested in education getting together in a pub or a brewery to talk, laugh, get to know each other and drink some really good beer. #BrewEd events also provide a space to share and challenge ideas.*

Figure 51: #BrewEd bio

Although talking about work might appear the antithesis of what hygge stands for, the above statement from the #BrewEd wiki[107] would seem to challenge that. Or as the founders of #BrewEd put it:

> *One of the best things about an education conference is the 'after party' where you congregate with colleagues in a nearby pub to discuss the day's proceedings over a well-deserved drink. Now, imagine an event that heads straight to the bar.*

(Egan-Simon & Finch, 2018)

The offline and face-to-face meetups seem to be where hygge manifests most markedly however, I'd suggest it's not entirely missing on Twitter. The 'Early Birds' are a handful of

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[106] https://mrovertonprimary.wordpress.com/2016/03/08/cakemeet-leicester/
[107] http://brewed.pbworks.com/w/page/120273042/FrontPage

210

primary headteachers who 'meet' on Twitter around six am most mornings, including weekends. To save space, Figure 52 just shows one strand of a typical exchange, and then only the text.
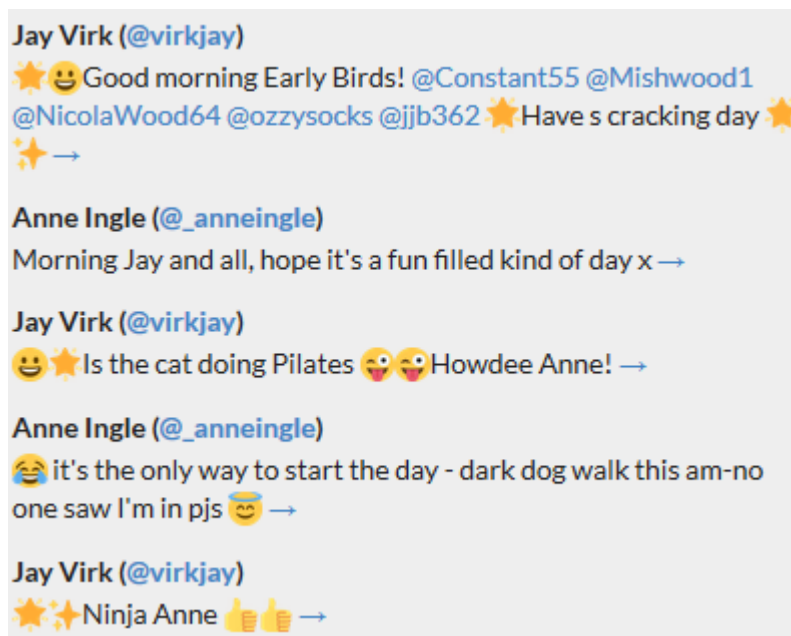
Figure 52: 'Early Birds' exchange

The liberal use of emoticons and, although not visible in this rendering, the extensive use of amusing animated gifs, convey a sense of the familiarity and kinship this small group enjoys. A simple ritual intended to lift the spirits before the pressures of the day begin. The boundaries between professional and personal relationships become blurred, perhaps even dissolve.

Although I opened this section with the notion of 'personalised' arising from within the individual, by introducing hygge, attention is shifted towards the *inter*personal. In the next section I consider some of the factors which contribute towards and result from those interrelations.

Relational

A tweet from Lauren Rodger (@laurenrodger), replying to @jonesieboy:

"Twitter can challenge my thinking, inspire me, connect me with like-minded educators, make me feel part of a learning community."

10:18 PM - 28 Nov 2016

1 Like
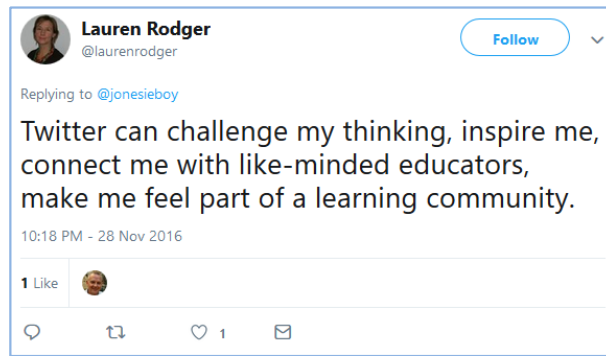
<div align="center">Tweet 98</div>

In responding to a request for people to say how Twitter helps them professionally, Lauren posted Tweet 98. In addition to other benefits, being able to associate with like-minded peers seems to be quite important, as other studies have also shown (Carpenter & Krutka, 2014; Forte et al., 2012; Holmes et al., 2013).

Like-minded educators might be those who are at a similar career stage (e.g. beginning teachers like Georgia[108]), who share a similar role, who teach the same curriculum area or educational phase, or who share a similar educational philosophy:

> *If there's a platform or a forum or something where you can have the same sort of reflective questioning and engagement, that it would be good if you could have it with people who are of a like mind and similar problems in their lives, because sometimes in some of the chats, some of the things that are asked, I can't answer because I don't feel like I have enough experience.*

It is also possible that a more diverse group might briefly gather to discuss a topic in which they share an interest, and this might develop into a more sustained relationships if the topic being discussed is one with which participants identify. In responding to a question posed in the February 18th 2017 #satchatwc "Q1 As an educator, what motivated you to join Twitter?" a number of people, like Jennifer, stated that connecting with like-minded people was at least part of the reason.

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[108] https://www.podomatic.com/podcasts/nzpeteachercast/episodes/2016-12-06T02_26_34-08_00
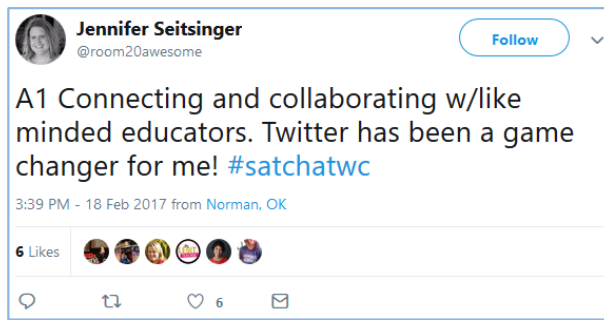
Tweet 99

It was less common across my study however, for people to question whether those with whom they chose to connect were indeed actually like-minded, or to explicitly state *why* like-minded people were so important and what the positive outcomes of finding them actually were. As Wes[109] observed, it was about having the opportunity to participate in a different environment; an antidote to the negative one sometimes experienced in school staffrooms.

> *Sometimes in our staff rooms we can get a bit negative and judgemental of our colleagues but it was refreshing to connect with a group of educators who had this same passion for education that I had burning inside*

The difference it made to Ben[110] in giving him permission to follow a course of action which, up until that point, he'd felt necessary to suppress.

> *Twitter was a revelation. It wasn't long before I realised that there were successful teachers who not only taught like me but were proud to do so … As I gradually lost my shame at being didactic my teaching improved; rather than trying to minimise my explanations I thought hard about how I could make them more memorable. My board-work improved. I read more history than I'd done before and became more knowledgeable, articulate and clearer.*

Having the opportunity to find his in-group and be invigorated by similar views to his own, released him from the sense of obligation to follow a path for which he was not suited. If, in a school or educational environment where people don't share one's views or interests, and where there are fewer opportunities to discuss, develop and refine practice, that can be equally as isolating as being one of a handful of teachers in a remote, rural school.

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[109] http://edufuturestyle.blogspot.co.uk/2013/09/social-software-my-week-on-edutweetoz.html
[110] https://bennewmark.wordpress.com/2017/03/23/plugged-in/

Finding like-minded peers increases the potential that the resources encountered might be useful for your teaching. When people have a similar outlook to you, you are more likely to receive support and advice that address your needs.
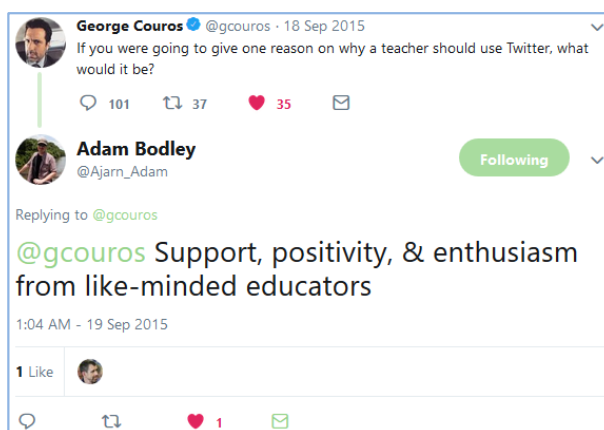
Tweet 100

News streams and educational information that flow your way become more relevant to your circumstances. Furthermore, what you have to offer those with whom you are connected, is also more likely to align with their needs, thereby enhancing reciprocity. The positivity and support are clearly a draw for people, but that solidarity can come at a price, as Deborah cautions:

> *Sometimes, Twitter chats can produce an echo chamber of like-minded people high-fiving each other. In some ways, this feels good, as Twitter is a place many find solidarity and support.*

The 'echo chamber' effect is a concern for many teachers on Twitter. The term in this context is largely attributed to Sunstein (2001), who discussed how, despite having access to an incredibly wide range of opinions through the Internet, we often choose to filter them down to ones which align with our views, whether they be political, artistic or sporting. Sometimes those choices are made for us by hidden algorithms. Even the ostensibly positive act of personalising one's learning can be seen as possibly helping to generate an echo chamber (Cho, 2016). This can then produce certain consequences like those Brett refers to in Tweet 101:

Brett Hoffman
@hoffmanteambret

A2 Distort reality. T's w/alot of same philosophy, feels like a consensus but really only small % #satchatwc

3:48 PM - 18 Feb 2017

1 Like

2   1
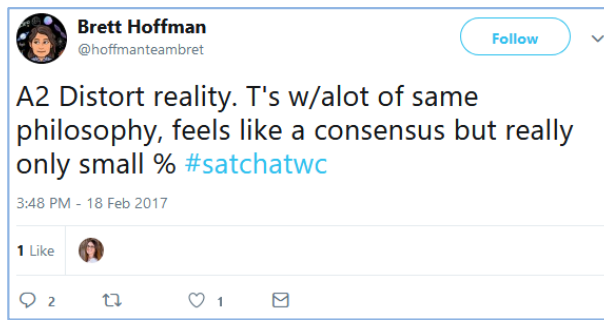
Tweet 101

Forming groups of people 'like us,' whether that's primary school teachers, Maths teachers or Australian teachers, may have consequences other than those intended. As Kevin notes, the more we seek out like-minded individuals, the narrower the set of views we encounter.

> *The worry and concern is always that* [pause] *the echo chamber effect. We're just connecting with the same people whose ideas resonate with us and don't kind of get those outside voices and I think that's always a danger with the social media. I think it's incumbent on all of us to try and expand that as much as possible and invite a lot of voices into the mix as much as possible and so we're not in this kind of narrow vision of how we see teaching.*

Like others who acknowledge the echo chamber effect, Kevin is conscious that we should attend to it. For Kristian, the capacity to address it is a matter of choice:

> *The echo chamber is as constricting and confining as you make it. Again it's about, what do you want to get from Twitter? It's about [pause] do you want people of a shared opinion, or do you want people that are going to challenge your opinion? So for me, I piece it together to make sure I don't hear just the same kind of thing.*

Creating the opportunity to expose yourself to different opinions is one way to address the problem however, the next natural step is to either challenge those views, or conversely expose your own views to the scrutiny of others in order to be challenged. One of Twitter's original features, the 140 character limit now asserts itself as a significant actor. For Deborah[111], being able to conduct an extended discussion, where views and opinions are fully explored is difficult:

> *[...]dissent is hard in 140 characters – and can easily come across as abrasive or attacking, rather than gently provocative or inquiringly questioning – I hope for robust, rather than cursory or jargonistic, discussion from educators. Yet difficult in 140 characters.*

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[111] https://theeduflaneuse.com/2015/10/17/education-twitter-chats/

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The increase of this limit to 280 characters[112] might have made a difference, though for some like Ben, it wasn't entirely necessary. In answering a question I'd posed through the comments on his blog, he pointed out how an individual tweet might be no more than a starting point:

> *140 characters is limiting but I disagree that debate is shallow. I find many teachers use twitter to signpost blogs and other articles and respond in longer comments like we're doing now*

The notion of a 'chamber' implies a bounded space. What Ben seems to be suggesting disrupts that notion; by opening doors to other spaces, exchanges can be conducted where there is more room.

The character limit is not the only actor which asserts itself where the echo chamber is concerned. Those actors within Twitter which assist in forging connections with like-minded people can also be considered complicit in contributing to the echo chamber effect. The Follow button for example, is instantly available in the pop-up which appears when you position the cursor over someone's Twitter handle. Twitter goes a step further and, at least in the browser- based version, provides a 'Who to follow' panel (like that shown earlier in Figure 20) which lists a handful of accounts you don't currently follow. With the prominent Follow button once more inviting connections to be made, how those recommendations are being generated begs scrutiny. Twitter algorithms are once more at work and at least partially feed on 'patterns from your following history.'[113] Some will see those potential connections as like-minded people, others as contributors to the echo chamber.

There are other ways in which an echo can be manifest. Rather than a stream of similar voices with little dissent, a series of echoes could be conceived as repetitions of the same thing. Like reflections in a hall of mirrors, or the repeated sounds heard in a large echoic space, some of the information on Twitter is endlessly bounced around and for people like Josh, simply become noise:

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[112] https://blog.twitter.com/official/en_us/topics/product/2017/Giving-you-more-characters-to-express-yourself.html
[113] https://help.twitter.com/en/using-twitter/account-suggestions

Josh Howard
@joshchoward

Follow

Replying to @room20awesome

Yes, but I'm talking about the serial retweeters that just share every quote/graphic. Let's think about them too. #satchatwc

3:55 PM - 18 Feb 2017

1 Like
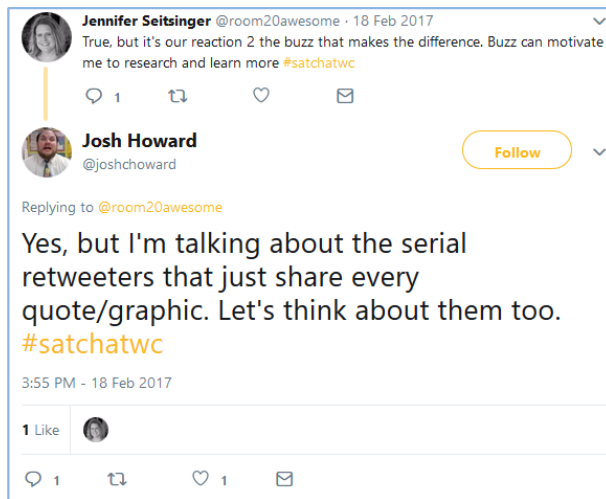
Tweet 102

The retweet function is now expressed through a button and a click or tap, but in the earliest days of Twitter, that functionality was not built in. If users wanted to repeat a tweet, they had to copy it, add the abbreviation 'RT,' attribute the author and then send it. That's a demanding task, but recognising how that amplification or repetition process might benefit the platform, Twitter built in a feature to streamline the process. Now a single click repeats a tweet and the echoes can become a cacophony.

Not everyone sees repetition as a negative however. For some it is more of a reminder:

Sarah Manning
@thegoodjourney

Follow

A2 part 2: I like the repeated inspirational quotes, they serve as good reminders during the hectic days and challenges we face. #satchatwc

3:55 PM - 18 Feb 2017

5 Likes

Tweet 103

And yet opinion remains divided, sometimes even within the same person, as Jennifer expresses when answering the same question as Sarah (What do you see too much of on Twitter?):
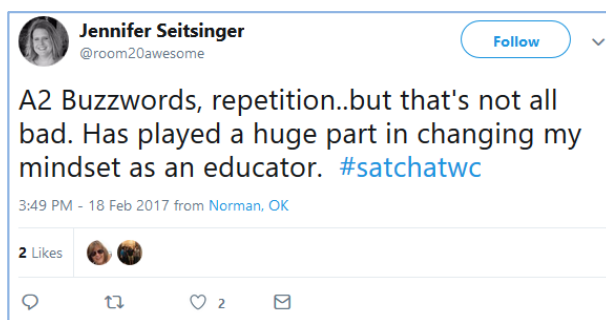
Tweet 104

As John H suggests, it can be a precarious business following enough disparate voices who might express views you find challenging, without that tipping over into becoming oppressive:

> *A lot of people are siloed in the people that they follow. The filter bubble of Twitter [pause] people don't hang out with people that disagree with them all the time because you just can't survive. But again it's a great way to support each other.*

For those who do cite the echo chamber as a potential problem, there are actors which can provide assistance. The chats discussed in the 'Hashtag chats' section for example, introduce a range of people and potentially different views from those that would normally appear in your timeline. As Aaron notes:

> *[...]so the chat offers an opportunity to bounce around thoughts and reflections with a whole range of other people from different contexts. So I think that opportunity to both really refine ideas, but also to get affirmation, is probably the strength of something like Twitter.*

This suggests it might be possible to enjoy the best of both worlds; exposing a set of views to wider scrutiny, but in a supportive, rather than combative arena.

Another activity which expands the range of possibility for those participating is #RoCur, like the one discussed in the 'EduTweetOz' section. Hosts on @EduTweetOz are exposed to a wider range of opinions than through their own timeline, since @EduTweetOz will have a different set of followers. As Madeline[114] remarked:

> *[...]teachers would frequently tweet me a diverse range of articles, thus increasing the scope of my professional reading. Finally, hearing a range of different perspectives from teachings has significantly deepened my personal understanding of education in Australia.*

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[114] https://matthitude.wordpress.com/2014/02/03/reflections-on-my-time-curating-edutweetoz/

Those who *follow* @EduTweetOz will have a similarly expansive experience, though over an extended time period, since the views expressed and the topics covered will change each week with each new host.

One feature of Twitter, the 'List,' can help in providing a wider range of views, without the potential downside that John H referred to, of becoming drained by a continual stream of dissonant views. It is possible to add people to a List without following them. As a consequence, their tweets don't appear in the default timeline, but as Lisa notes can be viewed at times which are convenient:
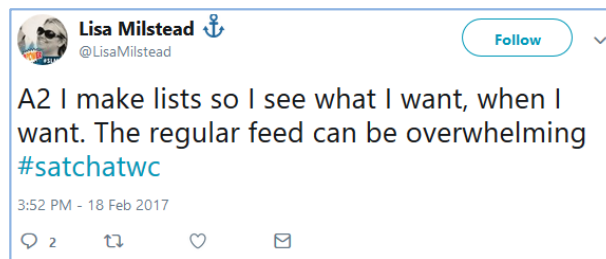
<div align="center">Tweet 105</div>

This does require a degree of intent, in much the same way that Kristian referred to earlier in describing how to carefully choose who you follow. Tomaz illustrates this principle in Tweet 106

<div align="center">Tweet 106</div>

but Claire's response to Tomaz reveals the tension this can sometimes cause when Lists aren't used to separate off the different views. Conversely of course, it could be argued that creating Lists might be no more than assembling specific in-groups. Yet without those support networks, most educators at some point feel isolated from their colleagues and their peers. Isolation might immediately be associated with teachers in geographically

remote, rural schools with few colleagues, or in larger schools with those teachers who are the only teacher of a particular subject, for example someone might be the only music teacher or the sole French teacher, as Joe noted:

> *[...] within their school or maybe they're the only person teaching languages. That's particularly true of the primary languages community.*

Less obvious perhaps, are those colleagues who occupy a particular role, perhaps the SENDCo (special educational needs and disabilities coordinator), or indeed, the head teacher/principal. You might also be the only teacher in your school with a particular interest, for example in the use of technology to support learning, or in project-based learning. Even those like Louise[115], who don't necessarily fall into any of those categories, are likely spend most of their working day in isolation, whether in the classroom with pupils, or during preparation and marking.

> *I work in a small, single-form entry primary school in Cornwall. School life can be a little insular: a day at school is so busy there's barely time to speak to colleagues, let alone find out what is happening in other schools. Twitter gives me this alternative glimpse.*

A natural consequence of this is that the range of views and experiences to which you will be exposed is limited. Twitter is offered as one opportunity to ameliorate those problems, not only in providing access to a wider landscape, but the chance to participate in it as Kevin outlines:

> *…a lot of different social media aspects allow you to kind of move beyond those voices in your own school and your own classroom and feel like you're part of the bigger picture of education.*

Being connected with a wide range of educators on Twitter exposes teachers to ideas which may be new to them individually, or ideas which may be just emerging in more general educational terms.

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[115] https://staffrm.io/@mrsgclass3/MzlpedIJ70
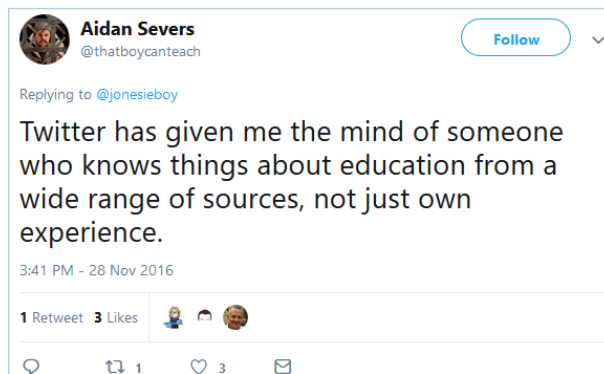
It provides a window into other classrooms, which, when images are included in the tweet, might be an almost literal window as Catherine describes[116]:

> *Twitter feeds are filled with real, in-the-trenches pictures of teaching/learning. When I search for these hashtags, I'm able to see what these structures look like in other classroom, pick up ideas, ask questions, and am motivated to try new things.*

The broadened perspectives this can bring can be quite specific and enabled Tim[117] to:

> *Connect with others involved in education nationally and internationally, which can give you a broader view of current issues and initiatives. For example it has been interesting finding out how other areas of the country are managing: recruitment, PRP and judging teacher performance without grading observations.*

Not only does this help in developing awareness in the areas in which you are particularly involved, but also provides access to arenas where you might be a rare visitor. A senior leader like Kristian for example, is grateful for the window into how people more generally develop their views and ideas:

> *[...]allows me to be able to watch how people construct their viewpoints, and a good lesson I think for leaders to be able to hear how the people they work with develop their ideas and unpack their ideas.*

Though how that knowledge is used will then of course depend on the motives of the person seeking it in the first place.

Careful cultivation of the people with whom you connect can serve as an antidote to the echo chamber, and provide viewpoints one might not previously have considered. Ben[118]

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[116] http://brownbagteacher.com/twitter-in-classroom/
[117] https://timjumpclarke.wordpress.com/2015/01/04/the-professional-power-of-twitter/
[118] https://bennewmark.wordpress.com/2017/03/23/plugged-in/

recognised the eclectic mix of educators on offer, many of whom were not content to merely accept received wisdom, and was clear how that made a difference to his thinking:

> *Twitter is packed full of plugged in teachers, of varying philosophies and with differing motivations …*
>
> *I was helped tremendously by people who disagreed with what I was reading but were able to articulate ideas and draw on a store of knowledge to defend their views I just didn't have. Put most simply, I'd been plugged in and found myself learning and thinking about pedagogy, and specifically the pedagogy of history teaching, in a way I'd never done before.*

To be able to benefit from the views and perspectives others are sharing, it first helps to have an overview. As Louise[119] observed, not only does this provide a glimpse into others' practice, it gives a sense of the educational climate:

> *It enables me to hear about good or different practice going on in different settings. It keeps me up to date with current educational policies and general feelings about them.*

In addition to different settings, for Stacey it was important to be able to initiate discussions with colleagues of different seniority or experience:

> *It's so valuable that, y'know I can talk to an NQT and I can also talk to a headteacher who's been in the profession for 50 or 60 years and get their opinions on a situation and it does change my thinking*

Or even with those to whom one might not easily otherwise have access, like government officials, established educational researchers, or particular educational bodies like Ofsted. Some see this as flattening hierarchies or levelling the field in ways which weren't previously possible. Not only do you get to hear about educational developments, but also have the opportunity to query those responsible for them. Tim (ibid) valued having access to:

> *Regular feeds from organisations like the DfE and Ofsted, with the opportunity to tweet them directly with your views and questions. … Indeed the DfE, Ofsted and some MPs are more regularly meeting with 'edu-tweeters' to discuss policy direction.*

In addition to more general educational news and policy developments, the grapevine into which Drew is tapped extends the range of professional development opportunities he gets to hear of, both online and off.

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[119] https://staffrm.io/@mrsgclass3/MzlpedIJ70
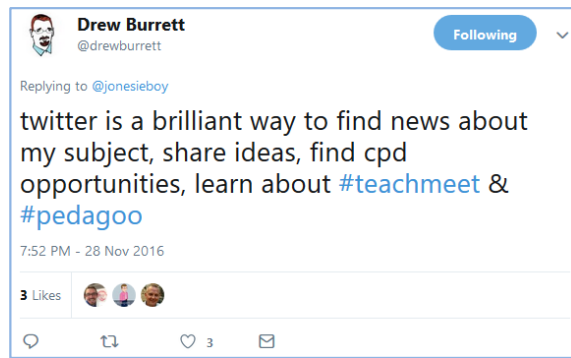
Being tapped into these news and information streams not only benefits the individual, but what they learn and become aware of can pass back into their local communities as Stacey recognised:

> *And all of these connections that we form, we learn from one another, then … we can in turn spread that to our local communities. To our schools … to our, y'know, to our colleagues offline as well*

Having access to such a rich mix of people proves doubly helpful to Aaron, who notes:

> *[…] opportunity to bounce around thoughts and reflections with a whole range of other people from different contexts, and I think that opportunity to both really refine ideas, but also to get affirmation, is probably the strength of something like Twitter.*

For him, being able to post ideas and reflect in a public space increases his capacity to know whether his thinking is on the right track, or to benefit from alternative possibilities. This is similar to how Ben described benefiting from people who disagreed with his views, but some like Stuart go further and appreciate being challenged.

Tweet 109

The implied humour in Tweet 109 doesn't mask however, that being challenged may not always be a positive experience. Recognising that people are on Twitter of their own

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volition, Robin contrasts this with the mood that can sometimes found in school staffrooms:

> *Everybody seemed really positive because it's people who bothered to sign up, so it was fantastic, like this positive, optimistic staffroom, unlike the staffroom that a lot of people experienced back then. So back then it was just kind of [pause] warm and fluffy and laughy and that was great.*

However, it is interesting to note the use of the past tense as he hints at a change towards a rather different undercurrent. This is manifest in a number of ways, but most notably in heated exchanges, which for some are no more than robust discussions, as Robin went on to say:

> *There is certainly a lot more challenge now. People are challenging each other's ideas much more and sometimes that's a good thing, but sometimes it gets a bit sharp and [pause] and some people sort pine for the good old days*

Although others like Charlotte see it somewhat differently:

> *I feel that Twitter has become a soapbox battleground. It feels like many users want to make as much noise as possible, or else tell everyone else how they are wrong (which can be just as post-truthy as telling everyone how they are right)*

And exposing themselves to this form of critique can be very discouraging for those who are openly sharing, like contributors to #PedagooFriday[120] that Francis mentioned:

> *A lot of the people who get involved in the Pedagoo stuff are really enthusiastically, positively sharing their practice and that can work out not so good for them, because there are some not so nice people out there and they can get shot down. They basically just get abuse for it being a load of nonsense, from the people who are so brilliant that they are better than everybody else.*

This can also sometimes extend into the discussions which take place and which, for Stacey are largely enjoyable, interesting and informative, but there can be "debates where it goes a little bit too far." George[121] echoes this sentiment, but provides a reminder that there are other actors that can be recruited to assist:

> *Debate and discussion is fine, but personal abuse is never acceptable. if you are subjected to any of this, I suggest you report and block. Some people will never change their minds or their*

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[120] http://www.pedagoo.org/friday/
[121] http://gg1952.blogspot.co.uk/2017/05/twitter-for-professional-development-in.html

In addition to being able to 'Report'[122] tweets 'for certain violations, including spam, abusive or harmful content, inappropriate ads, self-harm and impersonation,' users have the option to either 'block' another user or 'mute' their tweets. They can also 'Unfollow' someone or set their own tweets to be 'Protected' and therefore only visible to those whom they choose. Each of these actions has consequences regarding the audience people have for their tweets and the view they have of others' tweets. Whether implemented to reduce the likelihood of abuse, reduce the overall burden and volume of tweets, or to benefit from more intimate contact with others, a choice has to be made balancing the need to be open (and possibly exposed) or more closed (and potentially safer).

Deciding whether to participate more openly and become involved with others has drawbacks as well as benefits. These ambivalences also emerge in the way people choose to adopt a professional approach or not, in how they view the time they give over to TPD, and in how personal an experience their involvement becomes.

Discussing 'Its Personal'

Analysing the corpus of Liked tweets revealed that educators frame Twitter PD in different ways. The capacity to be able to choose the routes you take, the content you see, the time and duration of your involvement and the location from which you participate are important to many. However Twitter is perceived, one can find or be exposed to a wide range of resources, ideas, advice, research, inspiration, support, and answers to questions.

In the corpus of Liked tweets, it was less common for people to describe making contributions to wider activity in a similar way to that discussed in the previous Gatherings. It would not be fair however, to describe this as solitary behaviour from passive recipients; people discuss and debate issues, organise and coordinate 'meetings,' both online and face-to-face. Being able to connect with one another is clearly very important since it enables access to people perceived as innovative and knowledgeable. Having access to the expertise of others through the practice they openly share, not only reduces isolation but might also save time, since many of these opportunities arrive without having had to seek them out. Many of those colleagues from whom people learn would be inaccessible without Twitter, coming as they often do from the wider global community. That knowledge gleaned from

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[122] https://help.twitter.com/en/safety-and-security/report-a-tweet

accessing a wider body of educators can be brought back into local contexts, or as Forte et al. (2012, p.112) describe it, participants become 'conduits for new practices and ideas.'

Having found their way onto Twitter, one of the reasons participants stay around is that they feel in control, rather than being directed or impelled to do so by some other. They have the choice to follow the threads they feel are appropriate to their needs and to the context in which they work. The 'always on' nature of Twitter allows them to participate at a time and for a duration of their choosing, one which fits with other aspects of their life. Having the freedom to connect with people with whom they share synergy, makes for a more sociable and mutually beneficial experience.

In addition to having their thinking extended and changing their teaching practice as a consequence, people also remark on the affective ways in which they benefit. They feel motivated, inspired and encouraged to try new things by their encounters on Twitter. Furthermore, the connections they make sometimes develop into friendships which begin online and extend offline as people meet at conferences and more informally. Although I didn't have the opportunity to explore this in more depth, it would seem that the relaxed, restful atmosphere provided by familiar surroundings allows them to approach their experience in a more positive frame of mind. People described with relish being able to participate in learning experiences from the comfort of their beds and with a cup of coffee to hand. This sociomaterial swirl of things and places seems to assemble with Twitter to generate a relaxed and receptive mood.

Although #BrewEd and #CakeMeet both have a stated professional side to their activity, one could argue that most of what I presented in the 'Personal' section as examples of hygge hardly constitute professional development. They are less commonly found in most research studies, articles, or policies addressing professional development. In an exploration of online self-generated teacher communities more generally, as opposed to specifically Twitter, Hur and Brush (2009) found that sharing of knowledge went together with emotional sharing. The reason their participants joined an online community in the first place was to share knowledge and experiences; the reason they stayed was because of the camaraderie which developed. The technology of Twitter, Tweetdeck and a tablet are not the only nonhumans enacting TPD, but perhaps tea and toast do too?

I'd suggest that achieving hygge might either put people in a better frame of mind to learn there and then, or in the longer term helps their well-being, thereby making it more likely they'll be so inclined to learn at other times. In Denmark, hygge provides an antidote to the long, cold, grey days of winter. For teachers on Twitter, perhaps the ability to engage with

like-minded others while in the comfort of their own home is a counterpoint to the intensity and pressure the school day often brings. Hyggelig encounters – those infused with hygge – do not have a predetermined plan, are open ended and allow potentiality (Linnet, 2012). As Linnet (2011, p.23) also points out:

> *Hygge signifies a safe, low-key, intimate form of socialization. For many people, the notion of having 'a hyggelig time' would refer to being with good friends or with one's family or partner, having fun in an easy-going yet not overly exciting way.*

Participants have described their activity on Twitter as similarly 'safe' and 'low-key,' in the company of 'good friends' and often 'fun.' Part of hygge is 'being there' and enjoying the moment; some would say that burying one's face in a screen to interact through social media is the converse of hygge. And yet for those like the Early Birds, separated by distance, perhaps Twitter, tweets, hashtags and gifs facilitate a different kind of hygge.

Ambivalence, ambiguity and contradictions on Twitter quickly become apparent when actively searching for them. They manifest in different ways however. Imagine a thread of tweets in which a handful of people are disagreeing about the implications of an educational story in the press. For some, that might represent a healthy and robust debate in which they're keen to be involved. Others might be frustrated by the tone, and wish people could be more civil in their disagreements, so therefore distance themselves from similar exchanges. Ambivalence here is in the different reactions of different people to the same provocation. On the other hand, ambivalence could be expressed by the same person to different, although similar events. They might see one hashtag chat as informative, stimulating and not to be missed, whilst another is irrelevant, repetitive and unchallenging.

Many of the benefits presented in this Gathering confirm those found in previous research: timely access to resources, information and support, local and global connections which reduce isolation, participation in meaningful discussion and dialogue, keeping up to date with current trends, and access to like-minded and diverse perspectives (Carpenter & Krutka, 2014b; Skyring, 2014; Trust, 2012). The 'levelling effect' where educational hierarchies are flattened, as reported by Beadle (2014), also appeared in this Gathering. However, this study also extends what we know about the benefits that teachers report from participation on Twitter in a number of ways. Some participants reported how helpful images can be in providing 'windows' into other educational settings, or as exemplars of specific resources or practice (see also Figure 28). For some, Twitter proved useful as a sandpit where they can float ideas, benefit from feedback and comment, and revise accordingly. Some even relished the challenge this brought about. A handful of people

even remarked how their activity on Twitter positioned them in such a way that their career path changed.

Inevitably, where there are benefits, often there are also drawbacks. Twitter can be a chaotic and messy space, especially for the unfamiliar. Coping with that, and regular involvement more generally, demands a time commitment which can become intrusive on other aspects of your life. Some features of Twitter exacerbate this; notifications invite attendance, then the infinite scroll of the timeline makes departure more difficult. The space constraints that Twitter imposes can lead to shallow interactions and furthermore, attempting to engage in deeper debate can descend into unpleasantness and distress. As the examples show, people either tend to be aware of these shortcomings and develop strategies to address them, or accept them for the other benefits. One might argue that finding ways to work around the drawbacks constitutes learning activity in itself and which may be valuable in one's practice more generally.

The ease with which people can associate with like-minded others is one of the important features for teachers on Twitter. It increases the likelihood of them finding relevant resources and news, it provides an antidote to the negative atmospheres they sometimes find themselves in elsewhere, and can provide affirmation of their views and practices. Many acknowledge however, that 'affirmation' can become a liability if views are never challenged. There is the risk of becoming exposed to a more limited set of views or becoming frustrated by seeing the same views expressed over and over again. The benefit of being able to craft a personal learning network and personalise one's learning may indeed exacerbate the echo chamber (Cho, 2016). Ameliorating these issues first of all requires an awareness that they can exist, and secondly, being proactive in seeking to reduce them. This requires attending closely to the choices made of accounts to follow and the activities in which one participates. It is possible to be exposed to greater diversity in communities or groups where membership and attendance regularly fluctuate (Gilbert, 2016); this is where the value of participating in experiences like EduTweetOz, as discussed in Chapter 5, should not be understated. It is also important to appreciate that the Twitter assemblage (the follow and retweet buttons, character limits and lists, unfollow and mute) can act to both amplify and suppress the echo chamber effect, depending on how they are enacted.

To summarise:

- Educators enjoy having choices; the freedom to choose what, when, and how they participate.

- Having access to a breadth of opportunities including resources, ideas, advice, expertise, and support is appreciated.
- In addition to learning, there are also affective benefits including motivation, inspiration and encouragement.
- Educators also face challenges, including the time commitment required, the need to cope in a chaotic environment, possibility of only seeing confirmatory views, the constrained space, and for some, tensions between personal and professional activity.
- Making the most of the benefits or ameliorating the drawbacks only comes with experience, and requires work and effort.

Having said that, it is important to acknowledge that different people cite different benefits and drawbacks; there appear to be no characteristics that are universally loved, nor universally loathed.

Addressing the research questions

The Like (Favorite) button is a busy and far from trivial actor. It responds to tweets, provides a means of nonverbal communication, and serves as a storage and retrieval system (Meier, Elsweiler, & Wilson, 2014). However, it has no universally accepted meaning or function. For teachers, it often acknowledges or affirms the contributions or presence of others. Together with the retweet and reply, the Like especially can contribute towards people developing a sense of ambient intimacy; what Lin et al. (2016) describe as 'an emotional process, [involving] the feeling of closeness toward certain others on social media.' Liking may be a modest, one-click act for some, but cumulatively, it can contribute towards what Visser et al. (2014, p.407) describe as the formation of 'meaningful, interpersonal relationships within a participatory culture.'

Once comfortable on Twitter, the capacity to direct one's own learning activity, to feel in control, to be able to decide with whom to connect and communicate, in short to be able to personalise the experience, is clearly important. More than this however, is the sense of being with like-minded people in a shared experience, an experience which sometimes develops into arranging face-to-face meetups where the social and professional intertwine.

Few studies into teachers' use of Twitter discuss the drawbacks of Twitter, beyond the 140 character limitation. As Carpenter and Krutka (2015a) noted, this could be because of methods used and participants self-referring who are largely positively inclined towards Twitter. Although that was partially the case in this study too, by attending closely to

ambivalences, shortcomings could more easily bubble to the surface. I would suggest that a flânography in which fellow participants could be observed, rather than solely relying on self-reports through either surveys or interviews, probably helped here.

It would be easy to attempt to resolve ambivalence by claiming for example that on balance, people tend to find Twitter a positive environment in which they are happy to invest time engaged in activity which supports their learning. However, attuning to ambivalence means differences and tensions should be expected … and even accepted. As Fenwick and Edwards (2010, p.155) remind us, 'Networks are a dynamic, ever-bubbling series of connections and failed connections.' The simple, one-click act of retweeting a tweet for example could lead to: the tweet author being notified and a subsequent follow initiated; someone seeing important information they might otherwise have missed; or someone being sufficiently irritated by that retweet that they unfollow. The connections which are made or lost, the learning which is enriched or foreclosed, and the opportunities which ensue or have been stifled, are unpredictable, complex and messy. This is rather different from a facilitated course or workshop which has been planned and structured to provide a coherent, consistent, pathway with transparent expected outcomes. Perhaps what matters for those who find Twitter useful is that it accommodates ambivalence, rather than excluding it.

Whilst the literatures addressing teacher professional development focus on the features of the activities, what the outcomes are, and whether programmes have been effective, they sometimes overlook the individuals at the centre of the process and the environment within which they learn. This study begins to shed some light on those aspects and suggests that Twitter PD might be better conceived as a bundled package of activities, attitudes and atmosphere. As Korthagen (2017) proposes in 'Professional Development 3.0,' there is a need to connect the personal with the professional aspects of learning. I would go one further and include the material.

In the following chapters I draw together what I learned from the Gatherings and how that might help conceptualise Twitter PD.

8   RETRACING MY STEPS

In this chapter I briefly summarise the Gatherings, then explore what I learned from reading across them. Although Twitter professional development (TPD) resisted distillation, I offer a conceptualisation built around two dimensions. The first I call 'Compound Learning,' using the epithet 'compound' in different ways to propose how TPD might be constituted through assemblage. The second dimension, 'scales,' illuminates how compound learning might be enacted through acts, activities and practices. I close the chapter by attempting the distillation which proved so elusive.

Some teachers have expressed the view that the professional development they experience through Twitter is highly valued - 'the best PD I've ever had.' This study sought to explore that assertion by asking what forms of professional development take place, how Twitter supports the associated practices, and the extent to which those practices are confined to, or expand beyond Twitter. This was done through an approach I called 'flânography,' developed from digital or online ethnographies and inspired by the activities of the flâneur. Within this I assembled a range of methods including participant observation, semi-structured interviews and analysing blog posts. As a result of my adaptive and responsive approach, new methods emerged during the study, which, though not fully explored, offered potential for future consideration. Together these methods produced a wealth of data from which three 'Gatherings' presented the findings.

Each of the three Gatherings preceding this chapter takes a peregrination through the data. In the same way a flâneur might occasionally stand, ponder, note and reflect upon the surroundings as he strolls through and chronicles the city, through the Gatherings, I have attempted the same. In the three Gatherings, I traversed the data, weaving together illustrations of teachers' activities within and beyond Twitter.

Gatherings revisited

Here I attempt to briefly summarise what each of the three Gatherings described. Brevity did not yield itself easily however, a point to which I shall return, so what I first present is *two* versions that attempt to summarise. Flâneurs and flâneuses like Elkin (2016a), White (2001) and Woolf (1942), don't render their experiences through soundbites and bullet points. Within the Gatherings I have done that a number of times and on each occasion I felt uncomfortable. Reducing the rich and varied experiences of a flâneur into a handful of key findings seems somewhat inappropriate, despite being necessary to satisfy the conventions of a doctoral thesis. I open this section with *two* accounts as a modest attempt to disrupt those conventions. One account (on the left) flows and attempts to maintain as much detail as space permits. The other is more analytical and attempts to present an emerging theme.

This account has more in common with flânerie and I offer it as the meandering pathway of experiences a flâneur might produce. In an attempt to be comprehensive, it is somewhat untidy and unkempt.

In Gathering 1 I introduced some of the nonhuman actors including Likes, retweets and hashtags, and how they help to make connections and establish relationships. They filter information, aggregate it, bring people together under a rallying point, but (because of Twitter) do so through a simple click or search. Connecting with a rich, eclectic mix of educators across a range of contexts becomes possible, thereby establishing new learning potential. One way in which people assemble is through hashtag chats, professional discussions which can transcend time and space. Different actors participate in and

This account offers a possible theme which emerged. 'More than…' confirms findings from other studies, but also extends or enhances them in some way. This is a somewhat more sanitised, distilled, tidier account.

More than …

… sharing

This is more than a simple one-to-one exchange and is perhaps better conceived as additionally one-to-many- and many-to-one. It involves a reciprocal relationship in which resources and ideas are contributed to the common good, on the understanding, but not expectation, of repayment.

Some groups, like TeamEnglish, implement structured, managed repositories for documents using online storage like Dropbox or Google Drive.

enable these discursive events; threading allows different strands of the discussion to be followed, Tweetdeck pulls all relevant tweets together and Storify archives them for later use. Participation at different levels of intensity is possible as teachers move between lurker, contributor or moderator. EduTweetOz takes this principle a stage further, allowing different educators to temporarily take on the mantle of hosting the ETO Twitter account. In so doing they expose their views to a wider, different audience to that from their own account. This Gathering illustrated how learning through Twitter can be as simple as a single click to make a connection, but when aggregated together those simple actions enact a complex endeavour like EduTweetOz.

Gathering 2 illustrated how educators come together through Twitter in different ways, for different purposes, resulting in a range of outcomes. I showed how a single tweet in which a simple question was posed, developed into a 'pop-up' mentoring episode. Within here, the crib sheet appeared which exemplified how rich the ostensibly simple act of resource sharing can become. Remixing and resharing saw the crib sheet enacted in different classrooms, different curriculum areas and different educational contexts. Also prompted by the single tweet, #TeamEnglish was explored and

Maintaining such a resource across such an eclectic mix of individuals however, demands considerable time and effort. Other online spaces like Instagram, Pinterest or Flickr are also used for different 'goods.'

Resources become 'fluid' as they are shared, discussed, adapted for different phases or disciplines, re-shared and re-distributed.

… discussing

Despite (and sometimes because of) the limitations, Twitter provides a place for ad hoc exchanges of views, heated debates and planned, structured discussions.

Over three hundred educational hashtag chats take place each week, originating, but not limited to, various locations around the globe. Different times and durations, different themes and disciplines, different formats and purposes; a wide range of possibilities emerges.

… filtering

Sharing a link to an article, retweeting a tweet or commenting on a photo shared by someone, is an act of filtering information for one's followers. Careful selection and cultivation of those followed allows inbound information streams to be refined and personalised. This is another reciprocal process in which careful consideration is given to incoming and outgoing information. Failure to do so can limit

compared with #mfltwitterati, as two heterogeneous 'communities' of educators and nonhumans. The hashtag, Dropbox, retweets, blogs and wikis help to enact these communities and the activities in which they are engaged.

Although the 'Like' began for me as simply a method for bookmarking tweets, it also emerged in Gathering 3 as a non-trivial actor. It acknowledges and affirms the actions of others, and in so doing, maintains relationships through ambient intimacy. Those tweets I bookmarked revealed a range of reasons why educators take to Twitter and some of the benefits they gained. Part of their experiences for many is in establishing friendly relations with like-minded others around topics of shared interest; 'ambient affiliation' as Zappavigna (2011) terms it. A sense of reassurance, familiarity and comfort can be cultivated through the online connections, and sometimes migrate into face-to-face meetups. Exploring more widely within the data began to surface ambivalences: that there are drawbacks as well as benefits; that the positivity that many enjoy is sometimes countered with negativity; and that the like minds that many seek out can easily lead to an echo chamber.

knowledge assembled either personally or for others and can lead to adjustment in connections and shifts in the assemblage.

… supporting

Giving and receiving support also operates reciprocally and is less bound by locational or temporal limitations, nor those of scale. Acknowledging someone's tweet with a simple Like, through to mentoring a distant colleague or contributing to the wellbeing of others through #teacher5aday, can have impacts in predictable and unforeseen ways. Providing support in a public arena may provide benefits beyond those at whom that support was ostensibly aimed … or it could of course put giver and receiver of support at risk.

… personalising

The degrees of freedom that Twitter affords enable teachers to cultivate the learning practices in numerous ways. The time, duration and locations for participation, together with those with whom connections are preferred, are all customisable. This may generate tensions with the development plans of participants' schools, or bring about limitations like the echo chamber.

… keeping abreast

Whilst it is still possible to maintain a sense of current issues through subject associations, union bulletins and the

broader educational media, participation on Twitter adds a further layer. In addition to information flowing in, rather than having to go out and seek it, notifications or @mentions can bring information to one's attention in a timely fashion. This need not be restricted to larger educational news, events and developments, but can be at a local or individual level. What becomes pressing then is managing the flow of information so as not to be overwhelmed. This is where having the capacity to filter or moderate that influx becomes important.

Both of these accounts attempt to summarise the Gatherings. The 'messy' account presents a summary which follows the original trails. The 'tidy' account draws out some of the salient themes from across those trails. As I read through the 'messy' account, I am minded by Law's (2007, p.595) observation 'If this is an awful mess … then would something less messy make a mess of describing it?' Then I look across to the tidy account and notice how it is ordered, much clearer, and easier to comprehend. Of course in smoothing out the mess some details were discarded and thereby become absented.

Law (2007, p.595) claims that 'research needs to be messy and heterogeneous' because the world is (largely) messy and unknowable in 'ways that are definite or coherent.' When conducting research into how a local hospital trust handled patients suffering from alcoholic liver disease (ALD), he and Singleton (Law and Singleton, 2005) experienced great difficult in trying to map out trajectories of people passing through the health and social care systems. They contended this likely wasn't a case of inadequate or poorly designed or executed methods, but that that they were trying to provide an ordered, coherent description of a situation which, by virtue of its messy nature, defied clarity. This was partly due to their shape-shifting, moving target; ALD was variously couched as liver disease, alcoholic cirrhosis, alcohol abuse or alcoholism.

In my study, participants have used various terms to describe their activity on Twitter: professional development, CPD, professional learning to name a few. The different views

they express, the experiences they describe and the practices they produce are so disparate, that the point of focus keeps blurring as attention shifts. This is exacerbated by the diverse hinterlands each brings. Whether human or hashtag, actors often jump across space and time, hop from one activity to another and sometimes fade from view. Like Law and Singleton (2005), I may also be facing a similar 'moving target' which generates an unknowable mess, at least unknowable in conventional terms. As Fenwick and Edwards (2011a, p.729) observed, 'ANT's key contribution is to focus on the mess, disorder, and ambivalences that order phenomena and not try to reduce them to tidy explanations.' One might therefore argue that in opting to bring actor-network theory to the study, it and I actually *generated* the mess. This is not necessarily a weakness if from the mess, new knowledge emerges.

In the sections which follow, I present my attempt at addressing the 'mess' from what emerged through the Gatherings.

Conceptualising TPD

The literatures covered in the Hinterlands chapter offered different ways to conceptualise TPD. The professional development literatures and workplace learning literatures parallel one another, yet remain only poorly connected (Hodkinson & Hodkinson, 2005). The emerging research into teachers' professional development through Twitter has yet to bridge the two literatures, yet perhaps that is not necessary. Interpretations of what teachers do on Twitter could be aligned with the professional development literature more generally (Alderton et al., 2011; Carpenter and Krutka, 2014b; Holmes et al., 2013), or with workplace learning, at least in a loose sense, through communities of practice (Britt and Paulus, 2016; Davis, 2015; Wesely, 2013). However, given its grassroots nature (Forte et al., 2012), it tends to lack the structured formality typically associated with professional development, nor does it often take place in the workplace. In reviewing workplace learning across a range of fields, Fenwick (2010, p.88) identified various ways in which workplace learning is conceptualised, but rather than being different worldviews she offers them as different objects 'Different and the same at once, co-existing, sometimes in the same space. They are messy objects.' Perhaps TPD is both different from and the same as professional development or workplace learning, depending on the way it is performed by those involved and by how researchers make it through the methods they deploy.

Compound Learning

As described on pages 45-47, learning can be conceived of as an individual enterprise of interpretation and representation; as collegial participation in shared, situated activity; or as ongoing (re)formation of webs of relations generated as a process of assemblage. These ostensibly different phenomena could be explained by assuming they represent different worldviews or different perspectives on the same phenomenon; interpretative, participatory or relational. To do so however, assumes a single, independent, anterior world 'out there' from which we make sense 'in here' in order to be able to represent it. This may be consistent with a view of learning centred on the individual, but lacks coherence with the relational view in which learning is not the sense-making of an anterior, exterior world, but is bringing the world into being through assemblage. An actor-network theory-infused flânography requires a shift away from the visual metaphors of different perspectives, different views or different lenses towards one of performance, interaction and enactment, of things being done. In this rendering, different performances will result in the production of different worlds, different realities; a question of ontology. There is no anterior notion of learning; whether process or product; whether interpretation, participation or performance. What learning is depends on how it is performed. One consequence then is that the difference, profusion and variety illustrated in 'Gatherings revisited' emerge. My attempt to capture this is through what I call 'compound learning.'

'Compound' is a word with multiple meanings and which does different grammatical work. This is helpful. In common usage, it can refer to:

- something composed of two or more parts (n);
- a substance in which the atoms of two or more elements are linked by chemical bonds (n);
- adding interest to both the original capital and accumulated interest (v).

In the sections which follow, I have applied these different conceptions of compound to the learning practices of teachers on Twitter. However, I also acknowledge that there are some meanings of compound that lend themselves less easily to my study. Compound as an enclosure for example, seemed antithetical to everything I'd observed and experienced; somehow less appropriate in an environment where it is easy to link together multiple spaces. The three aspects of compound learning which follow are those which aligned more closely with my findings.

Compound as mixture

Firstly, my study confirms what previous researchers have found; learning practices on Twitter involve an eclectic range of activities. From across all three Gatherings, these include, although are not limited to: sharing knowledge & resources; filtering information, cultivating a sense of belonging; experiencing emotional/social support; encountering diverse perspectives; exerting choice/personalisation; connecting widely; keeping abreast through timely access; reducing isolation; accessing experts; establishing relationships with like-minded peers; benefiting from a levelling effect; and enjoying positivity (Alderton et al., 2011; Beadle, 2014; Carpenter & Krutka, 2014b; Cho, 2016; Colwell & Hutchison, 2017; Davis, 2015; Handel, Hochman, & Santoro, 2015; Holmes et al., 2013; Rodesiler & Pace, 2015; Wright, 2010). Learning is no single thing, but different mixes of humans and nonhumans, different activities and practices. This is compound learning at its simplest.

What learning *is*, depends on how both the human and nonhuman participants accomplish it as practice (Mulcahy, 2014). Learning does not exist separate from the networks of associations through which it is enacted and is better conceived as an immanent assemblage (Fenwick & Edwards, 2013). The making, unmaking, reconfiguring, expanding and contracting of heterogeneous actors during assemblage constitutes learning. These mutations produce what Sørensen (2009, p.129) calls liquid knowledge, typified by a continual process of reactivation and (re)formation. Liquid knowledge 'is performed as part of the flow of the ongoing mutation, not as a human possession or ability.' The fluid learning 'does not belong to the human individual; instead, each participant is affected by mutation of the space, not in terms of "more or less" but "qualitatively" in terms of differences' (Sørensen, 2009, p.131). The crib sheet and the threaded Twitter exchange into which it was folded, as discussed in the second Gathering, provide one example of fluid learning and this form of compound as mixture.

Compound (chemically framed)

A second form of 'compound' is to be found in science, and moves compound learning beyond a jumbled accumulation of different parts. In a (chemical) compound, different atoms are linked together by bonds. These bonds are electrostatic forces of attraction and repulsion which pulse back and forth as mechanical or electrical forces act on the compound. Introducing other atoms into the structure may further distort the molecular configurations of the atoms, or cause bonds to break and reform in different ways; in some cases new compounds form. I argue that this is similar to the way learning practices are performed through Twitter. There is an analogy to be drawn here with 'connecting' as

described in Gathering 1, and to reiterate Fenwick's (2015, p.87) observation that 'A sociomaterial perspective tends to view all things – human and non-human, hybrids and parts, knowledge and systems – as effects of connections and activity.'

There are a host of different chemical compounds, each different from the last as a result of different combinations of atoms; even a narrow range of atoms can be combined in different ways to form different compounds (e.g. hydrocarbons, built from carbon and hydrogen). Thinking with assemblage emphasises the range of actors between which relations assemble, reassemble and disassemble, and thereby enact particular practices. Teacher learning practices as compound learning can therefore be conceived as assemblage, ongoing processes of bundling and maintaining heterogenous associations of people, materials, technical and cognitive elements.

Team English and MFLTwitterati exemplify this; they have some 'atoms' in common in the form of Dropbox and a hashtag, but others which are different, like @TeamEnglish and the MFLTwitterers list. These two assemblages are different forms of TPD, different versions, different performances (as Mol, (1999, p.79) puts it, or as I suggest, different compounds.

Multiplicity is consistent with compound learning. As described in Chapter 5, there are various types of educational hashtag chats. Although the format is similar - a conversation planned in advance at a set time on a set topic and co-ordinated by a hashtag (Gilbert, 2016) - hashtag chats are enacted in different ways. Most are fast paced and an hour in duration, whilst some stretch out over a week. Both #ukedchat and #BFC530 are recognisably chats involving teachers discussing educational issues, but their timings, duration, and numbers of questions are different. They are enacted differently, in the same way that the sheep entangled within the 2001 UK 'foot and mouth' crisis, were presented by Law and Mol (2008) as actor-enacted 'veterinary,' 'epidemiological' and 'economic' sheep (amongst others). In the same way the different sheep versions both include and exclude each other, there is partial overlap too in the different chat versions; the hashtag symbol, the tweet as the exchange token, perhaps some of the human participants. Also like the sheep, not only are different chats being done in different ways, they do differently. One might produce a sense of ambient affiliation (Zappavigna, 2011) within a community or group, whilst the other invokes intellectual challenge. Chats, Team English, Team RE and Team Science are multiple and compound.

One area of carbon chemistry deals with polymeric molecules in which extended chains or meshes of atoms are assembled from similar individual units; polythene, for example,

consists of multiple ethene units bonded together. This leads into another meaning of 'compound,' one more usually associated with the financial sector.

Compound (financially framed)

Compound interest is that added on to both an original investment, and to the previous interest already accrued. If learning is conceived as 'ongoing (re)formation of webs of relations generated as a process of assemblage' as I described on pages 45-47, then I argue that teachers learning through Twitter will benefit more than incrementally as they participate more. Some illustrations of this were provided in 'Gatherings revisited'. In Gathering 1 for example, EduTweetOz is enacted initially by human and nonhuman actors involved in simple, one-click actions. These assemble with replies and threads to produce more extended activities like discursive exchanges, which combine to become the extended practices of EduTweetOz. Tweeting, retweeting or replying may be one starting point; lurking may be another. Small actions and the learning associated with them become progressively compounded as EduTweetOz unfolds. In hashtag chats and EduTweetOz, as described in Gathering 1, compounding emerged in another form. Participation in Twitter activities often begin by lurking, then moving on to participating, perhaps moderating, and in some cases, initiating new chats (like #NZBTchat) or other activities. When moving from one stage to another, people don't relinquish the role they previously had; a moderator continues to lurk some of the time, whether in their chat, or in others. As such their activity and learning becomes compounded.

This form of compounding is a cumulative effect in which small incremental additions can build up over time to produce bigger effects as time passes. This introduces a sense of scale which I return to shortly.

Summarising compound learning

Through the concept of compound learning, I have suggested TPD is an ongoing process of assemblage in which actors like teachers and tweets, hashtags and hygge, communities and crib sheets, are bundled together, form, reform and break associations. TPD is more than growth in representational knowledge, more than skilled participation in the practices of a social group, and can instead be 'conceptualised as a performative knowledge practice constituted and enacted by people and tools in complex collectives or assemblages' (Mulcahy, 2012, p.133).

Teachers' professional learning, professional development, CPD, PLD can be framed as 'practices of gathering, assembling and intervening. Knowing is not separate from doing

but emerges from the very matter-ings in which we engage.' (Fenwick & Edwards, 2014, p.43). Since different teachers are engaged in different practices and follow different people, they see different tweets in their timelines, reply to and retweet different tweets, follow different hyperlinks and read different blog posts. As a consequence, the knowledge performed is different and is better able to address the needs and proclivities of the individual. Compound learning produces diversity in the same way that different atoms and molecules react together and form different compounds. Through that diversity, personalisation becomes not only possible, but inevitable.

Personalisation is an act of assemblage in which a swirl of choices is made, offers accepted or rejected, and practices undertaken or side-lined. As the assemblage shifts, settles and readjusts, different outcomes emerge. Where in one instance, a teacher's practices might have helped reduce their sense of isolation or broaden their horizons, in another the teacher is exposed to the wisdom and experiences of more senior or more junior colleagues as hierarchies are levelled. Or indeed their activity might have forged friendships and trusting relationships, bolstered over coffee, cake and conversation enjoyed in a bricks and mortar establishment. It is important to remember however, that personalisation is not just '*person*-al;' nonhumans are also involved. Notifications may coax participation when none was planned. Twitter offering 'Who to follow' might result in new connections. A timeline filled with more political, sporting or media related tweets than anticipated might bring an ongoing session to an early close. The beer in a #BrewEd or cake in a #CakeMeet are not just there to be consumed, but actually enact the learning events and participate in those compounds.

Scales

Finding the language to discuss the issue of size, extent or degree of involvement in Twitter PD proved challenging. Although one might initially be drawn to describing different 'levels' of activity, this seems rather structural or hierarchical and would sit uncomfortably within an actor-network conception. As I struggle to find more comfortable language, I offer 'scale' as a starting point to extend the notion of 'compound' across a further dimension. I propose three 'scales' at which TPD is enacted: **acts**, **activities** and **practices**. This builds from van Dijk and Rietveld (2017, p.4) who, in seeking to broaden the scope of ecological psychology through a sociomaterial understanding of affordances, proposed 'that the whole (the practices) gives form to its parts (the activities unfolding within it) and these activities equally give form to the practices as a whole.'

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As a researcher, attending to scale in this way necessitates zooming in and out through space and time to allow different aspects to come into prominence. This is not about developing different perspectives on the same activities, nor a matter of examining different levels in a hierarchy, but attending to different degrees of ongoing involvement. I am keen to avoid the trap that Latour (2005, p.183) identifies:

> [...]*social scientists use scale as one of the many variables they need to set up before doing the study, whereas scale is what actors achieve by scaling, spacing, and contextualizing each other through the transportation in some specific vehicles of some specific traces. It is of little use to respect the actors' achievements if in the end we deny them one of their most important privileges, namely that they are the ones defining relative scale.*

In the sections which follow, I first outline the three scales by drawing examples from the Gatherings which illustrate TPD at those different scales. I then go on to consider how they mesh with each of the different forms of compound learning.

Acts

Professional learning practices on Twitter begin with a single click … or tap. From the moment a new user clicks 'Sign up' to begin the process of creating an account, a learning assemblage begins to unfold. At times within the following accounts, I will draw attention to a single object. This is not to suggest it sits in isolation, unbound from the network in which it acts, but to help foreground the practices within which it is manipulated and manipulates (T. L. Thompson & Rimpiläinen, 2012).

Each Twitter user's timeline is populated by tweets from those followed, so clicking a Follow button begins the process of assembling a network. One Follow after another increases the information flow through the timeline and begins to open new possibilities. With each new person followed, not only do their tweets begin to trickle through your timeline, so too will any tweets they retweet, and these may come from people not (yet) being followed. This is one example of compounding.

The tweets which appear often contain hyperlinks. These might be internal links, like the hashtag, which when clicked open a timeline of tweets containing that hashtag. They might also be external and enable a leap from Twitter to elsewhere on the web. A wider body of information now begins to assemble, other potential connections begin to emerge and learning is once more compounded.

As tweets pass by, two further one-click actions offer themselves: the Like and the Retweet. Even the mundane act of Liking a tweet affords a number of possibilities for liker

and liked. After the Follow, it is the simplest act through which one might be noticed by someone else, but Liking a tweet is not merely initiating a connection, but makes a statement. Similarly the Retweet, though this goes further and amplifies through repetition and exposure to a potentially different audience. The Like and Retweet are communicative and invitational acts which are directed through a tweet, back to its author. They offer feedback, invite further action and begin using connective threads to establish relationships.

Launching a tweet into the Twitterstream begins the process of authorship, yet once more, might require no more than a single click. Articles and posts elsewhere on the Web often offer a button inviting the reader to 'Tweet this,' which pre-populates a readymade tweet to be sent.

Clicking the reply button or 'Mentioning' someone in a tweet is more than simply presenting your thoughts or those of others, but is an offer to open a dialogue or discussion. This is another form of compounding where Twitter participants have extended their repertoire from lurking, through acknowledgements using Like and retweet, through to deliberately engaging others.

These acts of course don't exist in isolation; they work together as part of other enactments within ongoing assemblage.

Activities

Asking questions, giving advice, sharing resources, providing support, discussing issues, keeping abreast and answering questions are all activities compounded from combinations of acts.

Simply monitoring one's timeline allows one to keep abreast of educational news, the resources and ideas others are sharing, and to a greater or lesser extent, what is taking place in people's lives. However, anyone who moves beyond lurking, contributes to, and receives from the whole. Each participant within the Twitter environment, even when involved in (what might appear to be) a one-to-one exchange, is engaged in reciprocal acts with the whole. Professional learning practices are not solely about how to improve one's own capabilities and extend one's own knowledge, but they're also about contributing to the learning of others. These may be deliberate in replying to someone else's question or request, or may be unintended, simply as actions undertaken in a public sphere and therefore visible to those who may be lurking.

Rather than relying solely on serendipity, people often make specific requests, ask questions or seek advice, like the tweet which opened the second Gathering. At other times they may respond to other people's requests, questions or offer advice. A dialogue may open as a result, and a wider discussion ensue.

Although somewhat less tangible, a nevertheless significant aspect of participation is how people support and encourage one another. Tweets which reveal someone in difficulty or unsure how to proceed are quite likely to receive a positive response. Conversely, recipients of support, encouragement or advice invariably express their gratitude publicly and acknowledge the contributions of others.

The capacity of tweets to show previews of photos provides a window into colleague's classrooms which has not previously been possible. Document previews offered in a similar way provide a snapshot which helps the viewer quickly decide whether the resource shared is relevant and worth pursuing.

Despite tweets enabling a range of embedded media, not all ideas, resources, advice and news can be accommodated within a tweet. Sharing a hyperlink to elsewhere can overcome that shortcoming, or tweets can be threaded together to sidestep the character limit.

When activities become compounded by assemblage into various configurations, practices are produced.

Practices

It is possible to share a teaching resource by posting a link to a Google document as isolated action. Following a link in a tweet to a blog post about how Art takes its place within STEAM (science, technology, engineering, art and mathematics), might merit a retweet, but matters may proceed no further. However, when people come together in a more concerted way, on a regular basis, 'practices' like mentoring, EduTweetOz, Team English, hashtag chats and crib sheets become possible.

In the mentoring episode described in the second Gathering, a question was posed which a hashtag then helped to distribute amongst a group of people who might be well placed to answer. Direct replies to the question were provided courtesy of the Reply button but an exchange was also opened which, though largely between two people, also included others. This brief exchange concluded its business for the participants and though no longer active, endures within the Twitter database.

The crib sheet which was shared during the mentoring exchange provided an example of how complex and rich the act of sharing can be. Sharing a resource by retweeting could be

no more than an 'act,' yet when others retweet it to their followers, and when many people reply expressing their gratitude and describing how useful they found it, the extent of its impact begins to emerge. This is extended yet further when some people repurpose and remix the resource for their own contexts, but, in conjunction with the reply button, re-share it back within the threaded stream of tweets. Paper crib sheets completed in December 2017 by P5 pupils in a Scottish school, are entangled with a digital resource within a tweet posted on 24th September 2016, which included an image of the resource just after it had been used with Y10 pupils in a History lesson in a school in England.

Team English is an assemblage in which resources are shared, documents are stored, news is distributed, matters discussed. The hashtag filters relevant tweets from the Twitterstream; the handle and Twitter account work with Retweet to ensure messages travel around the network; Upload and download buttons, Dropbox folders and hyperlinks distribute resources. New people find and follow the hashtag or @Team_English1 account, whilst others may unfollow. Team English is continually being made and reshaped with each new follow, tweet, resource, and request made.

Each post on the EduTweetOz blog signals the arrival of a new host and sets out their strategy (or absence thereof) for the forthcoming week. A brief tweet exchange signals the handover and those following the @EduTweetOz account or hashtag begin to drink from a fresh stream of tweets. The Reply button and threading feature manage the discussions which unfold, though the experience differs whether in the audience or from the ETO account itself.

Each of these professional learning experiences begins with the acts and activities described, but each emerges differently depending on how they are assembled and sustained, or not. Mentoring and the crib sheet are one-off, brief encounters, relying principally on reply and retweet respectively. Hashtag chats are episodic and intense, so in addition to the hashtag and reply, other actors like the calendar, Tweetdeck and question-answer conventions become more significant. Yet in both these examples, learning is compounded as acts assemble activities into practices. The ongoing, rather than episodic, nature of ETO and Team English perhaps best exemplify this form of compound learning. Not only does each new host, each new member or each new resource add to the learning assemblage, but they also bring the actor-networks with which they are associated.

Combining compound learning and scales

In Table 3 I draw examples from the Gatherings, illustrating how these two dimensions of TPD map across one another.

Table 3: 'Compound learning - Scales' matrix

Scales / Compounds	Acts	Activities	Practices
Compound (as mixture)	Scrolling through the Twitter timeline exposes the viewer to an eclectic mix of different tweets from different people, assembled from a variety of resources, and which fulfil a range of outcomes.	Participating in an ad hoc exchange of multiple tweets from multiple participants (human and nonhuman), like the one in the 'Mentoring' exchange.	Becoming involved in sharing, re-sharing, remixing and repurposing resources and ideas. The crib sheet episode involved a temporary gathering of people, resources, classrooms, images and ideas, circulating around a fluid resource and held together through a Twitter thread.
Compound (chemical framing)	Clicking the 'Follow' button opens a relationship, which can then subsequently be maintained by Retweeting or Liking the tweets of the account followed. Mentioning the person also serves to reaffirm the connection. This is the 'connecting' that participants often referred to.	Regular involvement in a hashtag chat, whether as participant or moderator, creates opportunities for new relations and refreshes previous connections. Chats often involve the same group of humans and nonhumans but also involve newcomers. The hashtag itself, the question or topic format, and the opening welcome are all involved in maintaining connections.	Participating in or maintaining an interconnected, rich 'community' spread across multiple online (and offline) spaces. @Team_English1 and #teamenglish on Twitter provides continual connective threads interlinking participants, the Team English blog, Dropbox resource repository and YouTube.

Scales / Compounds	Acts	Activities	Practices
Compound (financial framing)	Adding a hashtag to a tweet exposes the tweet to a wider audience, thereby opening possibilities for inbound connections from new followers. Clicking on a hashtag allows tweets that might not normally appear in the timeline to be seen, this time opening possibilities for outbound connections.	Clicking a hashtag invokes the search function, but adding the hashtag to a column in Tweetdeck for example (Figure 45) means it can be followed on an ongoing basis. More tweets are seen, from more people, which over time accumulates into an extended body of information or new connections.	Participating in or facilitating a hashtag event like #12daystwitter where individual participants undertake activities from which they benefit. When coupled with the activities of diverse fellow participants the interactions which result intensify the outcomes beyond those a single individual might enjoy.

Reading across the matrix shows how within assemblage, acts come together in activities which, when associated with one another, build to form practices. In compound learning as mixtures, this is achieved through a variety of actors mixing together in acts, activities and practices on an ad hoc basis. In compound learning (chemically framed), bonds form and reform between participants through the acts, activities and practices they enact. The practice or community is sustained and made more resilient when more associations form, or when those associations are regularly renewed. In the financial framing of compound learning, there is an intensification of any practice through the acts and activities which contribute to its assemblage. Through all the connections they bring, each new participant increases potential participation and activity by much more than that of a single individual.

By offering three nested scales, it allows us to think differently about Twitter PD in temporal or spatial terms. TPD can be brief and fleeting, as in an act, or it can be long-lasting and durable, as in practices. Importantly, this is not about devaluing acts as ephemeral events, but recognising that they work through activities to produce practices. The connectivity enabled through Twitter's layered architecture, as described on pages 148-149, extends network associations and increases participation space. Involvement in TPD becomes possible at each of the three scales depending on the choices and needs of the participant. They can feel their way with a few tentative acts, or leap straight into an

activity. Scales allow a progression path for those who need it, or the opportunity to jump in at the deep end. Scales help facilitate personalisation.

Tidying up

By reading across the Gatherings, it became clear that Twitter professional development (TPD) defies simple description and neat pigeon-holing. It involves a rich mix of learning, development, support and friendship. It shifts along continua between planned and unplanned, structured and unstructured, social and professional, formal and informal.

I have thus far stepped over, around and through the mess, but another hinterland now resurfaces. When I was a teacher, I could never leave a messy classroom for the colleague who followed me. Despite my earlier reluctance to provide too simple an account, I cannot leave this chapter without an attempt to tidy up, which I will endeavour to do by returning to the questions I sought to answer. Furthermore, in the spirit of succinctness that many participants pointed to being a virtue of Twitter, in Figures 53 and 54, I and the PLDbot present our summary:

Figure 53: Twitter thread summarising Twitter PD

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Prof Learning @PLDBot
Following ∨

The following thread is a series of tweets summarising what I (and @IaninSheffield) found out about how Twitter participates in teachers' learning practices on its platform:

12:47 PM - 15 Oct 2018

🗨 1   ↻   ♡   ✉

Tweet your reply

Prof Learning @PLDBot · 36s   ∨
For both knowledge and relationship building, connecting is important. Profiles, the Follow button, hashtags and other Twitter actors participate in making and maintaining connections.

🗨 1   ↻   ♡   ✉

Prof Learning @PLDBot · 36s   ∨
Twitter can be accessed through a number of apps, on a variety of devices, and links with a range of other applications. Following, unfollowing, muting, creating lists, adding hashtags and editing your profile all enable customisation and personalisation.

🗨 1   ↻   ♡   ✉

Prof Learning @PLDBot · 36s   ∨
Twitter's architecture provides the capacity to participate at different levels. Sometimes a single click to Like a tweet. At others, participating in a time-bound activity managed by a hashtag. Or continuing involvement in group activities like Team English.

🗨 1   ↻   ♡   ✉

Prof Learning @PLDBot · 35s   ∨
Overcoming character limitations, tweets expand to include images, videos, multiple @mentions, or even another tweet. By easing the process of bringing external spaces in, whilst simultaneously bridging out through hyperlinks, learning space is extended. Compact, yet expansive.

🗨 1   ↻   ♡   ✉

Prof Learning @PLDBot · 35s   ∨
Different 'communities' can be assemble in different ways. An individual can seek membership by following a hashtag, an account or by joining a list, or can curate a group with those same actors. Importantly, multiple memberships of, and flow between groups are possible.

🗨   ↻   ♡   ✉

Figure 54: Twitter thread summarising Twitter's contribution to TPD

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9   CONCLUDING

In this final chapter, I reflect on what I learned during this study and the contributions to knowledge which were assembled. I consider the approach I called flanography, the sensibilities I adopted and the ethical issues which arose. Finally, I reflect on the study's limitations and potential implications.
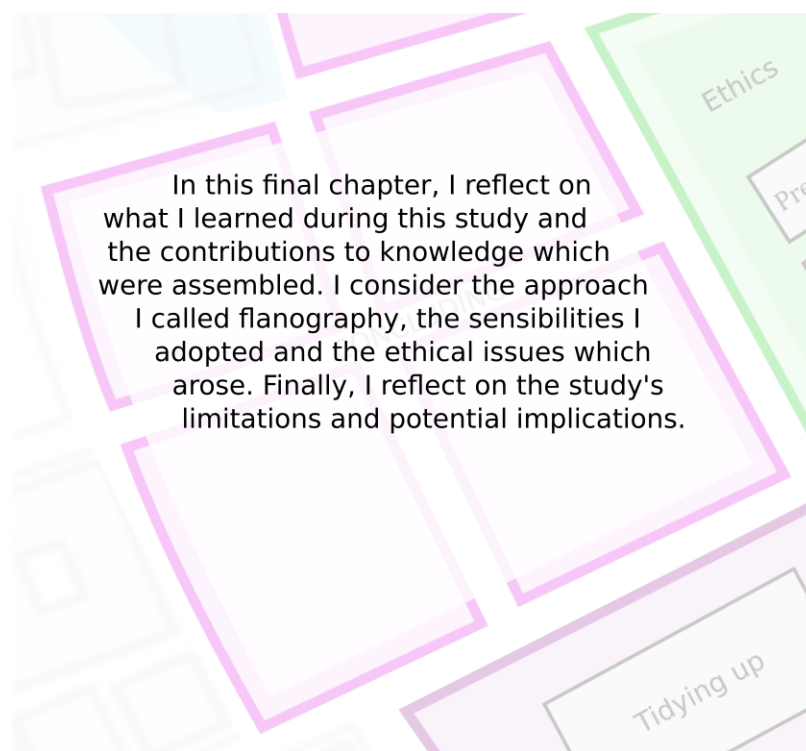
The professional development that teachers undertake on and through Twitter resists easy, simple description. Despite my efforts, it cannot easily be condensed into a single list of characteristics, set of features or tight-knit package of outcomes. Where one teacher finds no more than a place to keep abreast of current educational developments, another might be seeking a virtual staffroom to unwind and either celebrate or pick apart the challenges they are facing in the classroom. Someone else might relish an opportunity to debate received wisdom within a broader educational arena, whilst another wishes to become part of a committed group of fellow practitioners seeking to extend and enhance their classroom practice and capabilities. People don't appear to set out on Twitter with the above as objectives they're keen to achieve, but instead develop a range of practices which address their needs and provide the benefits appropriate to them.

Despite the bold claims some make, teachers don't tend to see what they do on Twitter as offering a *replacement* for other PD in which they would be involved, but they do see it as a supplement. That is to say it runs alongside other PD, sometimes intersecting it, informing it and even at times challenging it. Twitter PD provides access for some teachers to opportunities unavailable through other channels

Participation in learning practices on Twitter is more than just an individual or social affair. Practices are a sociomaterial endeavour in which teachers, Twitter, tweets, hashtags, likes,

mentions, threads and notifications are entangled in social and material relations. It is difficult to conceive how experiences like EduTweetOz could arise and flourish without the infrastructure and capabilities that Twitter provides. Continually forming, reforming and reshaping, assemblage brings forth knowledge, but does so coupled with a sense of goodwill and good feeling amongst the human participants. Perhaps there is something of the flâneuse or flâneur in the way that teachers approach their learning practices on and through Twitter, sometimes setting out with a particular intent, and sometimes wandering where links, hashtags, clicks and taps take them. They are at the one time purposeful and purpose-less, open to serendipity, engaged in what Lemke (2002; 2005) would call a traversal rather than a trajectory. The flâneur never gets a birds-eye view and has to piece their picture together bit by bit in an ongoing process of knowledge assemblage. Perhaps most of all, the freedom from constraint is liberating and refreshing.

Methodological reflections

In undertaking this research study, I sought to answer the broader question of 'what's going on here?' when teachers learn on and through Twitter. In this highly mediated, materially-infused arena, I was guided by a sociomaterial, actor-network theory guided approach. This was undertaken through an approach I called flânography which relies on movement and mobility in tracing out pathways of experience through the 'field,' through the data, and in presenting findings.

Within the Gatherings and here in this final discussion, I have outlined how assemblage, multiplicity and fluidity, as part of a sociomaterial approach, helped to produce 'compound learning.' As that concept was beginning to unfold, similarities between the practices of teachers on Twitter and my experience as researcher, flâneur and thesis author began to emerge.

Becoming a researcher and flâneur of and on Twitter is a process of assemblage involving some of the same actors and practices as teachers: tweets, hashtags, Likes, apps, scrolling through the timeline, following hashtags, bookmarking tweets, asking questions. There are also other actors that a teacher on Twitter would be less likely to use, like voice recorders and visualisations; assemblage brings them all together as a heterogenous 'mixture' of forming and reforming associations, but also makes some connections more durable. The Twitter timeline - viewed through Echofon[App] - and I, became intimately bound together with each visit and revisit. And yet if the app had folded the bond would have been broken, only to be subsequently replaced by another. Each observation or participation in a hashtag

chat, or each visit to Team English, begins to intensify the data collected. Each visit back to those data intensifies the unfolding understandings. Like the flâneur who becomes increasingly familiar with the streets the more times he wanders along them, repeatedly moving between and amongst the data produces intensification.

Research enacted in assemblage is not an epistemological search for a singular truth, but is ontological practice in which reality is produced. But which reality? Different method assemblages involving, say case study or survey instruments, would doubtless have enacted different versions of TPD. So too would different researchers, since each brings a different hinterland. Different methods, different researchers, result in what Rimpiläinen (2015) terms 'reality-in-the-making.' As Burnett (2017, p.27) observes, we're prompted

> to consider how - as we observe, measure, analyse and conclude - we tangle together certain things and not others, and to consider the insights we might gain, or the educational possibilities we might generate, were we to tangle things up differently.

That tangling not only applies to the research process, but also to how that might be revealed to others. Not only did I come to the 'field' and to the overall study as flâneur, but so too to this text. This thesis is also a heterogenous mix of various parts brought together in a process of assemblage. Strong associations are formed, renewed and refreshed between some parts of the thesis, whilst others are only fleeting. As paragraphs, sections and chapters assemble, they intensify the knowledge fragments, building towards the thing which enacts 'thesis.'

Tangled within the entire study, including the production of this thesis, was a running ethical thread in which I attempted to maintain an ethical sensibility which responded to issues as they arose. In the section which follows, I shall attempt to draw some of those threads together.

Ethics revisited <#ethics>

Throughout this study I have aimed to maintain an ethical sensibility which responded to issues as they arose. Within this thesis, I have highlighted those areas which triggered <#*ethics*> concerns and now return to summarise them. Here I'll set out some of those observations and the way I responded.

One complex arena which tested my ethical sensibility was in the degrees of subtlety required when conducting online interactions. Simply asking a question, whether on Twitter or through a blog, obliged me to communicate my status as a researcher. Taking a cue from the norms of Twitter, I chose to include the hashtag #4MyResearch in each

encounter, as described on p.70. It was later that I realised this could be a double-edged sword. Hashtags are of course searchable, so #4MyResearch could be one mechanism – albeit somewhat blunt – through which to bring one strand of my research together. Anyone could then check through the hashtag and view the way I had previously interacted with other people. That of course then makes each encounter more public than it otherwise might be, something of which a respondent might not initially be aware if they lose sight of *potential* audience in what Marwick and boyd (2010) term 'context collapse.'

Before interacting on Twitter, my ethical sensibility became heightened. Responding to a single isolated tweet seemed different to jumping into a discussion which was already underway, even if that exchange was within the already discursive space of a hashtag chat. Imposing my research agenda in a space where the activity was altogether different felt intrusive. To ameliorate this, I instigated a 'wait-time' to allow the proceedings to conclude. I felt that asking my question(s) later was at least an act of politeness and hopefully meant I wasn't interrupting someone active in other practice.

Guided by the norms and practices of participants (and following the guidance in Appendix N) the contributions of participants was acknowledged, rather than anonymised. Requesting permission to quote them in either a presentation or the thesis requires more thought than in a pre-planned interview where this can be incorporated within the consent-seeking process. Some the tweets in this thesis arose during unobtrusive observations, as discussed on pages 84-85, where seeking consent was less relevant. I mostly avoided approaching participants in the public twitterstream to request permission to 'publish' their tweet, lest that bring undue pressure to bear. Whenever possible I made these requests through Twitter's direct message service, or using other contact details if available. If I *did* have to make a request in public, I always offered the opportunity to reply in private.

Tweets feature within this thesis in a number of formats: as single tweets, brief exchanges and within timeline views. Permission for all single tweets and brief exchanges was sought from participants. In timeline views, identifying features were anonymised for two reasons. Firstly these views were presented to illustrate how they might support practices, rather than for the significance of their contents. Secondly, the larger number of participants made seeking permission from each of them impractical.

In presenting single, unaltered tweets, another concern became apparent. In some of the tweets, the author mentioned other individuals or unavoidably identified them when replying to tweets. I began to consider whether I also needed to seek permission from that second level of participants. For this I found no guidance or precedence in the literatures

and instead settled on a risk analysis which returned to some of the arguments in the 'Ethics' section of Chapter 4. I reasoned that those individuals mentioned in tweets were unlikely to suffer harm as a result of their name or Twitter handles appearing in tweets published in this thesis, given the subject matter being discussed. Had any tweets been discussing more controversial issues, I would have sought permission before publishing.

When new methods like the PLDbot emerged, I explored, rather than suppressed them for two main reasons: to attempt to open this area of study and reveal different knowledge from previous research, and to avoid producing a clean, purified account from practices which seemed anything but. As Fenwick and Edwards (2010, p.144) suggested,

> *Research methods are often designed to simplify the messy lumpishness and most interesting complications of the world, in well-intentioned efforts to know them and make things clear,' and that our research may 'distort or completely repress the very things we want to understand.'*

For example, when the PLDBot was running in automated mode, it began to Like tweets from commercial providers of professional development. I hadn't anticipated dealing with the <*#ethics*> of my bot becoming enrolled as a company's advertising tool. Nor had I considered that anyone would want to interact with the bot by following it in the way that several people did. Although this concerned me at first, it also presented potential avenues for exploration, but would also require a fresh <*#ethics*> submission, a route I couldn't take within the time constraints of this study. Rather than 'simplify' the mess, the PLDbot seemed to amplify it, producing its own 'interesting complications.'

These reflections highlight the need, in unique circumstances such as these, to maintain an ongoing sensitivity to resolve issues at the stages they arise in a study. Furthermore, as Markham and Buchanan (2012, p.7) note, tensions may arise between top-down and bottom up approaches to ethics which 'should be acknowledged and considered, even if there are no easy solutions.'

In the remaining section of this Chapter, I attempt to tidy up some of the mess outlined in preceding sections.

Contributions

This study makes four contributions to knowledge which I first list, then explain:

- Empirical, through its rich account of teacher learning practices on Twitter. Conceptualising those practices as 'compound' at different scales provides a preliminary framework which helps to legitimise this activity.
- Empirical, in revealing the important role nonhuman participants have in enabling TPD to be personalised.
- Methodological, in offering 'flânography' as a different approach.
- Methodological, through two newly emerging methods.

By adopting a sociomaterial approach, this study illuminates teachers' professional learning practices on Twitter through a lens not previously used. As a result it provides an empirical contribution which extends the work of previous research, revealing more detail about teachers' professional learning on Twitter. Previous studies revealed that teachers share information and resources, communicate with one another, discuss issues, and seek and provide support and guidance. This study both confirmed and extended that by providing detailed examples of how some of those activities unfold through practices like EduTweetOz, and communities like Team English. I proposed 'compound learning' as a process of assemblage to help conceptualise this, where webs of relations are (re)formed and intensified thereby extending temporal and spatial reach. This helps us to think about how we might broaden professional learning experiences and enable them to reach beyond local contexts and narrow windows of time.

Secondly, the ANT approach ensured the nonhuman participants were not relegated to mere tools or background context, and that they are actors which affect and effect, especially within the mediated world of Twitter and social media. This study revealed how they make it easier to personalise the learning experience: choose content to engage with, establish groups with similar interests, choose the people and communities with whom you would rather connect, and choose the time and duration of participation. Although that was mostly presented as a positive outcome, it also became clear that professional activities conducted in this way are increasingly blurring the distinction between professional and personal lives.

A third contribution is made through a novel approach I call 'flânography.' This involves bringing together ethnographic, ethical and sociomaterial sensibilities with those of the flâneur. Flânography is characterised by a particular form of mobility in which attentive

pathways of experience are traced through time, the field, the data and the text. This enabled different insights to emerge than might not have done with a different approach. Rather than solely producing a 'rich description,' flânography offers the means to produce a description of riches, and highlight what is significant, telling and potent. This approach offers potential in studies seeking sociomaterial insights from activities which range across different temporo-spatial dimensions. One important strand of flânography extends this contribution through the use of visualisations. Although common in quantitative studies as a data presentation technique, in this qualitative study I moved the use of visualisations into new ground, using them to capture and store data, provide analytical windows, and present qualitative, rather than numerical outputs. Visualisation became a process more often than a product; composing each visualisation provoked me to ask different questions of the data and generate richer insights. As such, it offers a technique for other researchers conducting qualitative studies to deploy and become entangled differently with their data.

A further contribution resulted from two new methods which emerged during the study. The adaptive and responsive nature of flânography allowed me to capitalise on opportunities which presented themselves. When a participant suggested using Voxer, a 'walkie-talkie' app, to conduct asynchronous interviews, I was able to respond quickly, try it out and as a consequence allow someone to contribute who might not otherwise have been able. Voxer, or similar apps using smartphone technology, could provide future studies with a simple way to conduct asynchronous audio exchanges - either individual interviews or focus groups - thereby widening potential participation. The second method arose when I needed to respond to the disruption caused by Twitter changing Favorite to Like. My solution was the PLDbot, a way of automatically gathering and responding to tweets containing specific terms. Although this was only a limited initial exploration of the technique, it nevertheless offers potential for future researchers keen to explore alternative ways of collecting Twitter data and interacting with participants.

Limitations and further possibilities

As I outlined in the preceding chapter, I chose certain paths through my research project and through the data and not others. I hope those choices were made for practical and pragmatic reasons, rather than with any intention to privilege one set of outcomes over another. Yet I have to acknowledge the biases I carry with me, some of which I may be unaware. For example, as I outlined in 'Personal hinterlands' (pp.8-9) prior to commencing this study, I had been an advocate for using Twitter professionally. Although I feel I have

become more critical, it is possible that original bias influenced my approach and the outcomes.

Another instance which left me in somewhat of quandary was whether to follow up the suggestion that some people were voicing, that Twitter was becoming less comfortable and a more aggressive, confrontational space. If this was affecting learning practices, then it was worth following up, but this was late into the study, and I felt I lacked the resource to do much more than scratch the surface.

There are a wide range of self-identified 'communities' on Twitter; in the second Gathering, Team English and MFLTwitterati were explored. Although a rather loosely defined term, community often refers to a (bounded) group of people, having shared values and beliefs, and a shared sense of identity. However, those parameters exclude the nonhuman actors which are such significant participants within Team English and the MFLTwitterati. Without hashtags, Lists, blogs, Dropbox, wikis and especially Twitter itself, it's difficult to conceive how these communities would hold together. The question then arises, how *should* we conceptualise a sociomaterial, rather than sociocultural, community? This study only began that process by identifying some of the actors, but didn't go so far as to better understand alternative criteria through which a sociomaterial community might be defined.

The Twitter space occupied by teachers is never short of possibilities for a researcher, typified as it is by people who are keen to experiment. #NZBTchat emerged during the course of my study for example, and though some data from Georgia and Mallory found their way into the section which described it (pp.132-133), it offered a much richer potential focus. Although research into trainee teachers' use of Twitter has been conducted (Carpenter, 2015; Lemon, 2016; Mills, 2014), that has largely been with students who have been obliged to use Twitter as part of their course. #NZBTchat offered the opportunity to explore how 'beginning teachers' chose to use Twitter to provide a support network for their community. Other examples like #BrewEd and #TeamScience also emerged, albeit somewhat later in my study, so having the chance to follow initiatives like these more tightly from their inception, through growth, and if it arises, their decline is possible if not predictable. A longitudinal study exploring how they come about, how they are sustained and what they achieve could prove fruitful.

People who found and sustain projects like #NZBTchat, EduTweetOz, Team English and others might be embarking on an alternative pathway through which they develop leadership skills. This may be because the systems and structures available through their

schools are somewhat restricted or limited. Permission to proceed is not required in the more open environment of Twitter. Perhaps there is scope here for extending notions of 'teacher system leadership' through teachers 'leading from below' (Boylan, 2013)?

Another aspect which emerged in my research and is open to further exploration is those who are 'missing in action.' Lurking, by its very nature, is difficult to detect and track. It is part of the progression from being a new participant finding one's feet through to more adept usage. It is also one among several levels of participation that most people cycle through during their Twitter practices. What is less clear and would benefit from greater scrutiny, are the learning benefits that lurking bestows for those who predominantly lurk. Furthermore, although some note that lurking is not associated with free-loading (Nonnecke and Preece, 2003), in an arena where reciprocity appears to be foundational, is there an effect on those who are net contributors?

Almost inevitably, research studies will focus on some things rather than others. As I outlined in 'Thinking aloud' (pp.78-79), one of the areas I unsuccessfully attempted to access directly through this technique was the 'real-world' setting of participants while they were involved in Twitter. There is perhaps more to learn here about the way pyjamas and slippers, the cat and coffee - as discussed in the 'Personal' section of Chapter 7 - become involved in and contribute towards TPD. Finding ways to learn more about this otherwise hidden place could prove revealing.

Implications for practice

If some of the most enthusiastic participants in this study are to be believed, using Twitter to support teachers' learning practices should be encouraged and developed more widely in schools. I have to confess to a greater degree of ambivalence. There are those for whom Twitter appears to provide connections through which they: can develop their practice and knowledge; extend the range of resources and techniques they take into their classroom; and become aware of wider educational issues and challenges and how others are addressing them. However, achieving that *through Twitter* may not be appropriate for all. Those who seem to get the most from Twitter commit considerable time and energy into their participation; this is largely their personal time. It would be unconscionable to demand that of others who may not be in a position to dispose of their time in that way, even if they were so inclined. Another concern is the degree to which those who choose to be involved in Twitter become beholden to a commercial enterprise which is profiting from their presence, their activity and the data they generate. An individual may be capable of making the decision whether to participate or not however, the ethical and legal

questions of a school requiring or even suggesting its teachers participate on a platform like Twitter need careful consideration. For a teacher to choose to be on Twitter is one thing, for them to be obliged to do so is quite another.

Whilst it may be inappropriate for school leaders to encourage the use of Twitter, it is another matter for them to recognise that some of their teachers might use it, and may be gaining professional benefits useful to the school. Perhaps it is more a matter of ensuring that systems are in place which capitalise on the developing capabilities of all staff, wherever they are gaining their experiences from. Of being open to possibilities and ensuring those who might be keen to explore and experiment have the opportunity to do so and can share their successes. This is not necessarily so easy within current systems of performance measures and accountability where only particular forms of professional development are acknowledged as valid.

Rather than thinking solely about PD on Twitter, it might be more fruitful to consider what can be learned about teachers' learning practices more generally from this study, which just happened to focus on Twitter? When teachers talk about their 'PD on Twitter' it would seem they have in mind a broader conception of the practices found in conventional PD. Friendship, camaraderie, fun, hygge, are also valued and valuable constituents which contribute to a more fulfilling experience. If schools and CPD providers are considering how their PD programmes might be enhanced, then exploring ways through which these elements could be incorporated might offer one way forward. One of the most valued aspects of their activity on Twitter is the extent to which teachers are able to choose their own path, the degree of autonomy and independence they enjoy, and the opportunity to pursue their interests. As a consequence, and despite the need to drive through whole-school strategies, schools might do well to consider how teacher choice and autonomy might be accommodated, and well-being addressed, within their PD programmes.

Implications for (online) research

During the course of this study I was fortunate to be learning amongst a group of reflective and innovative practitioners. Their direct and indirect contributions suggested particular paths I might consider, like Joe suggesting the audio app Anchor for recording contributions. This led to the use of Voxer, another audio app for recording asynchronous, threaded conversations. Although this came too late in the study to explore fully, given the way in which it enabled Aaron to participate where he might not otherwise have been able, it might be worth further consideration as a research instrument. Perhaps the research into

Voxer use by educators (Carpenter & Green, 2017) missed an opportunity when using a survey, rather than Voxer itself, as the data gathering instrument?

It was actually the change in how Anchor operated that led to Voxer which suggests that, as researchers, we must be vigilant for the opportunities that breakdowns afford. This was the case when Twitter changing Favorites to Likes led indirectly to the creation of the Twitter research bot. This was another opportunity I regret not having the resource to explore more fully, but one which might have value in future research. If I can borrow, but remix, from Bayne (2015) for a moment, the bot needn't be intended to:

> '*solve any productivity deficits in [*researchers*], or to replace [*them*], but rather to explore how an assemblage of [*researcher-participant*]-code might be [*methodologically*] generative.*

Rather than merely hoovering up data without the knowledge of those to whom that data belongs, a research bot which interacts with participants, like Bayne's teacher bot did with students, might generate different knowledge.

Logging off

Ian Guest
@IaninSheffield

Writing my first tweet!

6:33 PM - 19 Feb 2009
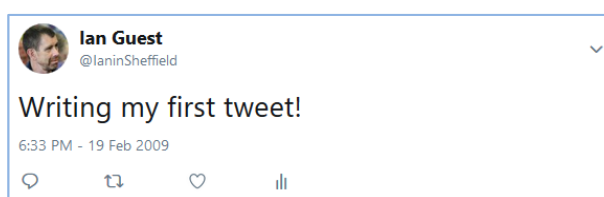
Tweet 110

When I sent that first tweet in 2009, having been encouraged by a fellow student on the Masters programme to do so, I spent far less than the 140 characters I was then allowed. I could never have imagined it was the first step leading towards the 84 107 words which precede this, nor the 210 000+ words on my research blog. My Twitter activity since that first tweet, though not visible in this thesis, is nevertheless still present in the way it informed my research questions, the approach that I adopted, and the conclusions I ultimately drew.

Teachers' learning practices on Twitter are about more than professional development. Or to say it another way, teachers' professional development is more than learning practices. Knowledge is developed, classroom practices change, beliefs are challenged, friends are made, colleagues are supported, cake is eaten and beer is drunk. Although I had some sense at the outset that actors other than humans would be significant in mediated activity of this nature, I hadn't appreciated just how much. Simple acts such as a clicking, following, liking

or retweeting, through compound learning, can have far-reaching and significant impacts, in the same way the tweet above did.

At the outset, I had never heard the word flâneur, was unaware of the Voxer app and couldn't conceive that I might create a bot. Perhaps it was the same curiosity that nudged me to send that tweet that also allowed me to be open to the methodological possibilities which presented themselves. I certainly never imagined that the visualisations I produced might influence my thinking rather than just presenting it.

As this thesis shifts onto the University stacks in printed form and into the digital repository, I'm minded to think of it amongst the pantheon of other research as no more than a single tweet. A brief statement made at a particular time. Yet I hold out the hope that like my tweet above and the 109 other tweets herein, it too will resurface from time to time, prompt someone to a particular thought and perhaps rekindle the conversation.

10 REFERENCES

Adams, C., & Thompson, T. L. (2011). Interviewing objects: Including educational technologies as qualitative research participants. *International Journal of Qualitative Studies in Education, 24*(6), 733-750. doi:10.1080/09518398.2010.529849

Adams, C., & Thompson, T. L. (2016). *Researching a posthuman world: Interviews with digital objects.* Basingstoke: Palgrave Macmillan.

AERA code of ethics: American Educational Research Association. (2011). *Educational Researcher, 40*(3), 145-156. doi:10.3102/0013189X11410403

Alderton, E., Brunsell, E., & Bariexca, D. (2011). The end of isolation. *Journal of Online Learning and Teaching, 7*(3), 354-365.

American Sociological Association. (2008). *Code of ethics and policies and procedures of the ASA committee on professional ethics* American Sociological Association.

Australian Institute for Teaching and School Leadership. (2011). *Australian professional standards for teachers.* (Professional Standards). Victoria, Australia: Education Services Australia. Retrieved from http://www.aitsl.edu.au/australian-professional-standards-for-teachers

Avalos, B. (2011). Teacher professional development in teaching and teacher education over ten years. *Teaching and Teacher Education, 27*(1), 10-20. doi:10.1016/j.tate.2010.08.007

Baker-Doyle, K., & Yoon, S. A. (2011). In search of practitioner-based social capital: A social network analysis tool for understanding and facilitating teacher collaboration in a US-based STEM professional development program. *Professional Development in Education, 37*(1), 75-93. doi:10.1080/19415257.2010.494450

Barley, R. (2011). Why familiarise? *Social Research Update,* (62), 1-4. Retrieved from http://sru.soc.surrey.ac.uk/SRU62.pdf

Barnett, R. (2001). Learning to work and working to learn. In F. Reeve, M. Cartwright & R. Edwards (Eds.), *Supporting lifelong learning. vol. 2, organizing learning* (pp. 7-20). London: RoutledgeFalmer.

Baudelaire, C. (1964). In Mayne J. (Ed.), *The painter of modern life: And other essays* (J. Mayne Trans.). Phaidon.

Baym, N. K. (2000). *Tune in, log on: Soaps, fandom, and online community.* London: Sage Publications.

Bayne, S. (2015). Teacherbot: Interventions in automated teaching. *Teaching in Higher Education, 20*(4), 455-467. doi:10.1080/13562517.2015.1020783

Beach, R. (2012). Can online learning communities foster professional development? *Language Arts, 89*(4), 256-262. Retrieved from https://search.proquest.com/openview/e49ffa6f8a67b6ae7332fbdbf9cbf37a/

Beadle, H. (2014). (2014). The tweet smell of success: Perceptions of Twitter as a CPD tool. Paper presented at the *Re-Thinking Models of Professional Learning,* Aston University, Birmingham. 16-25.

Beauchamp, A. (2017). Hygge house. Retrieved from http://hyggehouse.com/hygge

Beckett, D., & Hager, P. (2002). *Life, work and learning. practice in postmodernity.* London/New York: Routledge.

Beninger, K., Fry, A., Jago, N., Lepps, H., Nass, L., & Silvester, H. (2014). Research using social media; users' views. *NatCen Social Research,*

Benjamin, W. (1999). In Tiedemann R. (Ed.), *The arcades project.* Cambridge, Mass: Belknap Press.

BERA. (2011). *Ethical guidelines for educational research.* London: British Educational Research Association.

Bicen, H., & Cavus, N. (2012). Twitter usage habits of undergraduate students. *Procedia-Social and Behavioral Sciences, 46*, 335-339. doi:10.1016/j.sbspro.2012.05.117

Bigsby, J. B., & Firestone, W. A. (2016). Why teachers participate in professional development: Lessons from a schoolwide teacher study group. *The New Educator,* , 1-22. doi:10.1080/1547688X.2015.1063743

Birman, B. F., Desimone, L., Porter, A. C., & Garet, M. S. (2000). Designing professional development that works. *Educational Leadership, 57*(8), 28-33.

Blainey, G. (1966). *The tyranny of distance: How distance shaped Australia's history* Macmillan.

Boellstorff, T. (2008). *Coming of age in second life: An anthropologist explores the virtually human.* Princeton; Oxford: Princeton University Press.

Bosley, J. C., Zhao, N. C., Asch, D. A., Becker, L., & Merchant, R. M. (2011). The heart of the matter: Cardiac arrest and public health information on Twitter. *Circulation, 124*(21)

boyd, d., & Ellison, N. (2007). Social network sites: Definition, history, and scholarship. *Journal of Computer-Mediated Communication, 13*(1), 210-230. doi:10.1109/EMR.2010.5559139

boyd, d., Golder, S., & Lotan, G. (2010). Tweet, tweet, retweet: Conversational aspects of retweeting on Twitter. Paper presented at the *System Sciences (HICSS), 2010 43rd Hawaii International Conference On,* 1-10.

Boylan, M. (2013). Deepening system leadership teachers leading from below. *Educational Management Administration & Leadership, 44*(1), 57-72. doi:doi.org/10.1177/1741143213501314

Boylan, M. (2016). Enabling adaptive system leadership: Teachers leading professional development. *Educational Management Administration & Leadership, 46*(1), 86-106. doi:doi.org/10.1177/1741143216628531

Boylorn, R. (2008). Participants as co-researchers. In L. Given (Ed.), *The SAGE encyclopedia of qualitative research methods* (pp. 599-601). Thousand Oaks, California: SAGE.

doi:10.4135/9781412963909 Retrieved from
http://methods.sagepub.com/reference/sage-encyc-qualitative-research-methods

Brewer, J. D. (2000). *Ethnography*. Buckingham England]: Open University Press.

British Psychological Society. (2017). *Ethics guidelines for internet-mediated research*. Leicester:
British Psychological Society (BPS).

Britt, V. G., & Paulus, T. (2016). "Beyond the four walls of my building": A case study of#
edchat as a community of practice. *American Journal of Distance Education, 30*(1), 48-59.
doi:10.1080/08923647.2016.1119609

Broad, K., & Evans, M. (2006). *A review of literature on professional development content and delivery
modes for experienced teachers*. University of Toronto, Ontario Institute for Studies in
Education.

Bruckman, A. (2002). Ethical guidelines for research online. *Retrieved June, 18*, 2005.

Bryden, J., Funk, S., & Jansen, V. A. (2013). Word usage mirrors community structure in
the online social network Twitter. *EPJ Data Science, 2*(1), 3. doi:doi.org/10.1140/epjds15

BSA statement of ethical practice (2017). Durham, UK: British Sociological Association (BSA).

Bubb, S., & Earley, P. (2007). *Leading & managing continuing professional development: Developing
people, developing schools* Sage.

Bueger, C. (2013). Actor-network theory, methodology, and international organization.
International Political Sociology, 7(3), 338-342. doi:10.1111/ips.12026_3

Burden, K. J. (2010). Conceptualising teachers' professional learning with web 2.0. *Campus-
Wide Information Systems, 27*(3), 148-161.

Burke, S. (2016). Rethinking validity and trustworthiness in qualitative inquiry. In B. M.
Smith, & A. C. Sparkes (Eds.), *Routledge handbook of qualitative research in sport and exercise* (pp.
330-339). London: Routledge.

Burnett, C. (2017). The fluid materiality of tablets: Examining 'the iPad multiple' in a
primary classroom. In C. Burnett, G. Merchant, A. Simpson & M. Walsh (Eds.), *The case of
the iPad: Mobile literacies in education* (pp. 15-30). Singapore: Springer.

Burrell, J. (2009). The field site as a network: A strategy for locating ethnographic research.
Field Methods, 21(2), 181-199. doi:10.1177/1525822X08329699

Cacciattolo, K. (2015). Defining workplace learning. *European Scientific Journal, ESJ, 11*(10)

Carpenter, J. P. (2015). Preservice teachers' microblogging: Professional development via
Twitter. *Contemporary Issues in Technology and Teacher Education, 15*(2), 209-234.

Carpenter, J. P., & Green, T. D. (2017). Mobile instant messaging for professional learning:
Educators' perspectives on and uses of Voxer. *Teaching and Teacher Education, 68*, 53-67.
doi:10.1016/j.tate.2017.08.008

Carpenter, J. P., & Krutka, D. G. (2014a). Chat it up: Everything you wanted to know about Twitter chats but were afraid to ask. *Learning & Leading with Technology,* (February), 10-15.

Carpenter, J. P., & Krutka, D. G. (2015a). Learning in 140 characters: English teachers' educational uses of Twitter. *International Journal of English and Education, 4*(2)

Carpenter, J. P., & Krutka, D. G. (2014b). How and why educators use Twitter: A survey of the field. *Journal of Research on Technology in Education, 46*(4), 414-434. doi:10.1080/15391523.2014.925701

Carpenter, J. P., & Krutka, D. G. (2015b). Engagement through microblogging: Educator professional development via Twitter. *Professional Development in Education, 41*(4), 707-728. doi:10.1080/19415257.2014.939294

Casas, A., Davesa, F., & Congosto, M. (2016). Media coverage of a "connective" action: The interaction between the 15-M movement and the mass media. *Revista Espanola De Investigaciones Sociologicas,* (155), 73-94. doi:10.5477/cis/reis.155.73

Chandler, R., Anstey, E., & Ross, H. (2015). Listening to voices and visualizing data in qualitative research: Hypermodal dissemination possibilities. *SAGE Open, 5*(2), 2158244015592166.

Cho, V. (2016). Administrators' professional learning via Twitter: The dissonance between beliefs and actions. *Journal of Educational Administration, 54*(3), 340-356.

Clarke, D., & Hollingsworth, H. (1994). Reconceptualising teacher change. Paper presented at the *Proceedings of the 17th Annual Conference of the Mathematics Education Research Group of Australasia,* 153-164.

Cockburn, A. D. (1994). Teachers' experience of time: Some implications for future research. *British Journal of Educational Studies, 42*(4), 375-387. doi:10.1080/00071005.1994.9974010

Colley, H., Hodkinson, P., & Malcolm, J. (2003). *Informality and formality in learning: A report for the learning and skills research centre* Learning and Skills Research Centre.

Colwell, J., & Hutchison, A. C. (2017). Considering a Twitter-based professional learning network in literacy education. *Literacy Research and Instruction,* 1-21. doi:10.1080/19388071.2017.1370749

Condie, J. M., Ayodele, I., Chowdhury, S., Powe, S., & Cooper, A. (2018). Personalizing Twitter communication: An evaluation of 'rotation-curation' for enhancing social media engagement within higher education. *Journal of Marketing for Higher Education,* 1-18. doi:10.1080/08841241.2018.1453910

Cook, J., Kenthapadi, K., & Mishra, N. (2013). Group chats on Twitter. Paper presented at the *Proceedings of the 22nd International Conference on World Wide Web,* 225-236.

Corden, A., & Sainsbury, R. (2006). *Using verbatim quotations in reporting qualitative social research: Researchers' views* University of York. York, UK.

Cordingley, P., & Bell, M. (2012). Understanding what enables high quality professional learning: A report on the research evidence. *London: CUREE and Pearson,*

Cordingley, P., Bell, M., Evans, D., & Firth, A. (2005). *The impact of collaborative CPD on classroom teaching and learning: What do teacher impact data tell us about collaborative CPD? ()*. London: Evidence for Policy and Practice Information and Co-ordinating Centre.

Cordingley, P., Higgins, S., Greany, T., Buckler, N., Coles-Jordan, D., Crisp, B., . . . Coe, R. (2015). Developing great teaching: Lessons from the international reviews into effective professional development. Retrieved from http://oro.open.ac.uk/43343/

Cordingley, P. (2015). The contribution of research to teachers' professional learning and development. *Oxford Review of Education, 41*(2), 234-252.

Coughlan, T., & Perryman, L. (2015). A murky business: Navigating the ethics of educational research in Facebook groups. *European Journal of Open, Distance and E-Learning, ,* 146-169.

Dabbagh, N., & Kitsantas, A. (2012). Personal learning environments, social media, and self-regulated learning: A natural formula for connecting formal and informal learning. *Internet and Higher Education, 15*(1), 3-8. doi:10.1016/j.iheduc.2011.06.002

Dalton, M. (2013). "What would I tweet?": Exploring new professionals' attitudes towards Twitter as a tool for professional development. *Journal of Library Innovation, 4*(2), 101-110.

Darling-Hammond, L., Hyler, M. E., & Gardner, M. (2017). *Effective teacher professional development.* Palo Alto, CA: Learning Policy Institute. Retrieved from https://learningpolicyinstitute.org/product/teacher-prof-dev

Darling-Hammond, L., & Richardson, N. (2009). Research review/teacher learning: What matters. *Educational Leadership, 66*(5), 46-53.

Darling-Hammond, L., Wei, R. C., Andree, A., Richardson, N., & Orphanos, S. (2009). Professional learning in the learning profession. *Washington, DC: National Staff Development Council.*

Davis, K. (2015). Teachers' perceptions of Twitter for professional development. *Disability and Rehabilitation, 37*(17), 1551-1558. doi:10.3109/09638288

Day, C. (1999). *Developing teachers: The challenges of lifelong learning* Psychology Press.

de Laat, M. (2012). *Enabling professional development networks: How connected are you?* Open Universiteit.

De Laet, M., & Mol, A. (2000). The Zimbabwe bush pump mechanics of a fluid technology. *Social Studies of Science, 30*(2), 225-263. doi:10.1177/030631200030002002

Decuypere, M., & Simons, M. (2016). On the critical potential of sociomaterial approaches in education. *Teoría De La Educación.Revista Interuniversitaria, 28*(1), 25-44. doi:doi.org/10.14201/teoredu20162812544

Deleuze, G., & Guattari, F. (1987). *A thousand plateaus: Capitalism and schizophrenia* (B. Massumi Trans.). University of Minnesota Press.

Denzin, N. K. (1997). *Interpretive ethnography: Ethnographic practices for the 21st century* Sage.

Desimone, L. M., & Garet, M. S. (2015). Best practices in teacher's professional development in the United States. *Psychology, Society, and Education, 7*(3), 252-263. doi:10.25115/psye.v7i3.515

Desimone, L. M. (2009). Improving impact studies of teachers' professional development: Toward better conceptualizations and measures. *Educational Researcher, 38*(3), 181-199. doi:10.3102/0013189X08331140

Desimone, L. M. (2011). A primer on effective professional development. *Phi Delta Kappan Magazine, 92*(6), 68-71. doi:10.1177/003172171109200616

DeWalt, K. M., & DeWalt, B. R. (2002). *Participant observation: A guide for fieldworkers* Rowman Altamira.

DfE. (2016). *National standards for school-based initial teacher training (ITT) mentors.* (). London: HMSO. Retrieved from https://www.gov.uk/government/publications/initial-teacher-training-government-response-to-carter-review

DfES. (2005). *National framework for mentoring and coaching.* (). London: HMSO. Retrieved from National Archive Retrieved from http://webarchive.nationalarchives.gov.uk/20110809172825/http://nsonline.org.uk/node/132345

Dicks, B., & Mason, B. (1998). Hypermedia and ethnography: Reflections on the construction of a research approach. *Sociological Research Online, 3*(3), 1-15. doi:10.5153/sro.179

Doecke, B., Parr, G., North, S., Gale, T., Long, M., Mitchell, J., Williams, J. (2008). *National mapping of teacher professional learning project.* (). Canberra: Department of Education, Employment and Workplace Relations.

Doessel, N., & Freedman, K. (2011). How to write a paper in 140 characters or less: Social media for professional development. Paper presented at the *ALIA 15th Information Online Conference and Exhibition, Convention and Exhibition Centre,* 1-3.

Dunlap, J. C., & Lowenthal, P. R. (2009). Tweeting the night away: Using Twitter to enhance social presence. *Journal of Information Systems Education, 20*(2), 129-136.

Eakle, A. J. (2007). Literacy spaces of a Christian faith-based school. *Reading Research Quarterly, 42*(4), 472-510. doi:10.1598/RRQ.42.4.3

Easton, L. B. (2008). From professional development to professional learning. *Phi Delta Kappan, 89*(10), 755-761. doi:10.1177/003172170808901014

Economic and Social Research Council (ESRC). (2015). ESRC framework for research ethics. Retrieved from http://www.esrc.ac.uk/funding/guidance-for-applicants/research-ethics/

Education Scotland. (2014). *Career-long professional learning: Guidance for teachers on approaches to professional learning*

Egan-Simon, D., & Finch, E. (2018). BrewEd: Pints, pedagogy and the birth of a grassroots movement. *CollectivED,* (2), 28-31. Retrieved from http://leedsbeckett.ac.uk/-/media/files/research/collectived-feb-2018-issue-2.pdf

Elavsky, C. M., Mislan, C., & Elavsky, S. (2011). When talking less is more: Exploring outcomes of Twitter usage in the large-lecture hall. *Learning, Media and Technology, 36*(3), 215-233. doi:10.1080/17439884.2010.549828

Elkin, L. (2016a). *Flâneuse: Women walk the city in Paris, New York, Tokyo, Venice, and London.* London: Chatto & Windus.

Elkin, L. (2016b). Radical flâneuserie. Retrieved from https://www.theparisreview.org/blog/2016/08/25/radical-flaneuserie/

Elliott, R., Fischer, C. T., & Rennie, D. L. (1999). Evolving guidelines for publication of qualitative research studies in psychology and related fields. *British Journal of Clinical Psychology, 38*, 215-229. doi:10.1348/014466599162782

Eraut, M. (2000). Non-formal learning and tacit knowledge in professional work. *British Journal of Educational Psychology, 70*(1), 113-136. doi:10.1348/000709900158001

Eraut, M. (2004). Informal learning in the workplace. *Studies in Continuing Education, 26*(2), 247-273. doi:10.1080/158037042000225245

Ess, C. (2002). Ethical decision-making and internet research: Recommendations from the aoir ethics working committee. *Readings in Virtual Research Ethics: Issues and Controversies,*

Evans, C. (2014). Twitter for teaching: Can social media be used to enhance the process of learning? *British Journal of Educational Technology, 45*(5), 902-915. doi:10.1111/bjet.12099

Evans, L. (2002). What is teacher development? *Oxford Review of Education, 28*(1), 123-137.

Fenwick, T. (2012). Co-production in professional practice: A sociomaterial analysis. *Professions and Professionalism, 2*(2), 1-16. doi:10.7577/pp.v2i1.323

Fenwick, T. (2010). Workplace 'learning' and adult education. Messy objects, blurry maps and making difference. *European Journal for Research on the Education and Learning of Adults, 1*(1-2), 79-95. doi:10.3384/rela.2000-7426.rela0006

Fenwick, T. (2015). Sociomateriality and learning: A critical approach. In D. Scott, & E. Hargreaves (Eds.), *The SAGE handbook of learning* (pp. 83-93). Los Angeles: SAGE.

Fenwick, T. (2016). Social media, professionalism and higher education: A sociomaterial consideration. *Studies in Higher Education, 41*(4), 664-677. doi:10.1080/03075079.2014.942275

Fenwick, T., Doyle, S., Michael, M. K., & Scoles, J. (2015). Matters of learning and education: Sociomaterial approaches in ethnographic research. In S. Bollig, M. Honig, S. Neumann & C. Seele (Eds.), *MultiPluriTrans in educational ethnography* (pp. 121-142) Transcript Verlag/Columbia University Press.

Fenwick, T., & Edwards, R. (2010). *Actor-network theory in education.* London: Routledge.

Fenwick, T., & Edwards, R. (2011a). Considering materiality in educational policy: Messy objects and multiple reals. *Educational Theory, 61*(6), 709-726. doi:10.1111/j.1741-5446.2011.00429.x

Fenwick, T., & Edwards, R. (2011b). Introduction: Reclaiming and renewing actor network theory for educational research. *Educational Philosophy and Theory, 43*(1), 1-14. doi:10.1111/j.1469-5812.2010.00667.x

Fenwick, T., & Edwards, R. (2013). Performative ontologies: Sociomaterial approaches to researching adult education and lifelong learning. *European Journal for Research on the Education and Learning of Adults, 4*(1), 49-63. doi:10.3384/rela.2000-7426.rela0104

Fenwick, T., & Edwards, R. (2014). Networks of knowledge, matters of learning, and criticality in higher education. *Higher Education: The International Journal of Higher Education and Educational Planning, 67*(1), 35-50. doi:10.1007/s10734-013-9639-3

Fenwick, T., Edwards, R., & Sawchuk, P. (2011). *Emerging approaches to educational research: Tracing the socio-material* Routledge.

Fenwick, T., & Landri, P. (2012). Materialities, textures and pedagogies: Socio-material assemblages in education. *Pedagogy, Culture & Society, 20*(1), 1-7. doi:10.1080/14681366.2012.649421

Forte, A., Humphreys, M., & Park, T. H. (2012). Grassroots professional development: How teachers use Twitter. Paper presented at the *International Conference on Weblogs and Social Media,* Dublin, Ireland. Retrieved from http://www.aaai.org/Library/ICWSM/icwsm12contents.php;

Fraser, C., Kennedy, A., Reid, L., & Mckinney, S. (2007). Teachers continuing professional development: Contested concepts, understandings and models. *Journal of in-Service Education, 33*(2), 153-169. doi:10.1080/13674580701292913

Friedman, A., & Phillips, M. (2004). Continuing professional development: Developing a vision. *Journal of Education and Work, 17*(3), 361-376. doi:10.1080/1363908042000267432

Gao, F., & Li, L. (2017). Examining a one-hour synchronous chat in a microblogging-based professional development community. *British Journal of Educational Technology, 48*(2), 332-347. doi:10.1111/bjet.12384

Garet, M. S., Heppen, J. B., Walters, K., Parkinson, J., Smith, T. M., Song, M., Wei, T. E. (2016). Focusing on mathematical knowledge: The impact of content-intensive teacher professional development. *National Center for Education Statistics,* Retrieved from Https://Nces.Ed.Gov/Pubsearch/Pubsinfo.Asp? Pubid= NCEE20164010,

Garet, M. S., Porter, A. C., Desimone, L., Birman, B. F., & Yoon, K. S. (2001). What makes professional development effective? results from a national sample of teachers. *American Educational Research Journal, 38*(4), 915-45. doi:10.3102/00028312038004915

Gee, J. P. (2005). Semiotic social spaces and affinity spaces. *Beyond Communities of Practice Language Power and Social Context.* 214-232.

Geertz, C. (1973). *The interpretation of cultures: Selected essays* Basic books.

Gilbert, S. (2016). Learning in a Twitter-based community of practice: An exploration of knowledge exchange as a motivation for participation in #hcsmca. *Information, Communication & Society, 19*(9), 1214-1232. doi:10.1080/1369118X.2016.1186715

Gillen, J., & Merchant, G. (2013). Contact calls: Twitter as a dialogic social and linguistic practice. *Language Sciences, 35*, 47-58. doi:10.1016/j.langsci.2012.04.015

Gold, R. (1958). Roles in sociological field observations. *Social Forces, 36*(3), 217-223.

Goldate, S. (1998). The 'cyberflâneur' - spaces and places on the internet. Retrieved from http://www.ceramicstoday.com/articles/050498.htm

Goodall, J., Day, C., Lindsay, G., Mujis, D., & Harris, A. (2005). *Evaluating the impact of continuing professional development (CPD).* (No. 659).Department for Education and Skills.

Greenhalgh, S. P., & Koehler, M. J. (2016). 28 days later: Twitter hashtags as "Just in time" teacher professional development. *TechTrends, 61*(3), 273-281. doi:10.1007/s11528-016-0142-4

Greenhow, C., & Gleason, B. (2012). Twitteracy: Tweeting as a new literacy practice. Paper presented at the *The Educational Forum, 76*(4) 464-478.

Grinyer, A. (2002). The anonymity of research participants: Assumptions, ethics and practicalities. *Social Research Update, 36*(1), 4. Retrieved from http://sru.soc.surrey.ac.uk/SRU36.html

Guba, E. G., & Lincoln, Y. S. (1989). *Fourth generation evaluation.* California: Sage.

Gurjar, N., & Sivo, S. (2017). Tweeting for #professional capital: Preservice teachers' perception and practice. Paper presented at the *Society for Information Technology & Teacher Education International Conference,* 1568-1577.

Guskey, T. R. (2002). Professional development and teacher change. *Teachers and Teaching: Theory and Practice, 8*(3), 381-391. doi:135406002100000512

Guskey, T. R. (2003). Analyzing lists of the characteristics of effective professional development to promote visionary leadership. *NASSP Bulletin, 87*(637), 4-20. doi:doi.org/10.1177/019263650308763702

Hamidon, I. S., Alias, N., Siraj, S., Kokila, K., Mohammed, M., & Thanabalan, T. V. (2013). Potential of Twitter in post-reading activities among community college students in malaysia. *Procedia-Social and Behavioral Sciences, 103*, 725-734. doi:10.1016/j.sbspro.2013.10.393

Hammersley, M., & Atkinson, P. (2007). *Ethnography: Principles in practice* Routledge.

Handel, D., Hochman, J., & Santoro, D. (2015). Visualizing teacher tweets: Finding professional learning networks in topical networks. *Proceedings of the Association for Information Science and Technology, 52*(1), 1-3. doi:10.1002/pra2.2015.1450520100138

Hardin, G. (1968). The tragedy of the commons. *Science (New York, N.Y.), 162*(3859), 1243.

Harricharan, M., & Bhopal, K. (2014). Using blogs in qualitative educational research: An exploration of method. *International Journal of Research & Method in Education, 37*(3), 324-343. doi:10.1080/1743727X.2014.885009

Hawley, W. D., & Valli, L. (1999). The essentials of effective professional development: A new consensus. In L. Darling-Hammond, & G. Sykes (Eds.), *Teaching as the learning profession handbook of policy and practice* (pp. 127-150). San Francisco: Jossey-Bass.

Henderson, M., Johnson, N. F., & Auld, G. (2013). Silences of ethical practice: Dilemmas for researchers using social media. *Educational Research and Evaluation, 19*(6), 546-560. doi:10.1080/13803611.2013.805656

Henderson, S., & Segal, E. H. (2013). Visualizing qualitative data in evaluation research. *New Directions for Evaluation, 2013*(139), 53-71. doi:10.1002/ev.20067

Hendrickson, C. (2008). Visual field notes: Drawing insights in the Yucatan. *Visual Anthropology Review, 24*(2), 117-132. doi:10.1111/j.1548-7458.2008.00009.x

Hine, C. (2009). How can qualitative internet researchers define the boundaries of their projects. In A. N. Markham, & N. K. Baym (Eds.), *Internet inquiry: Conversations about method* (pp. 1-20) Sage.

Hine, C. (2011). Internet research and unobtrusive methods. *Social Research Update,* (61), 1. Retrieved from http://sru.soc.surrey.ac.uk/SRU61.pdf

Hine, C. (2015). *Ethnography for the internet: Embedded, embodied and everyday* Bloomsbury Publishing.

Hine, C. (2000). *Virtual ethnography*. London; Thousand Oaks, Calif.: SAGE.

Hodkinson, H., & Hodkinson, P. (2005). Improving schoolteachers' workplace learning. *Research Papers in Education, 20*(2), 109-131. doi:10.1080/02671520500077921

Hogan, A. (2016). Network ethnography and the "cyberflâneur": Evolving policy sociology in education. *International Journal of Qualitative Studies in Education (QSE), 29*(3), 381-398. doi:10.1080/09518398.2015.1053159

Holdaway, S. (1983). *Inside the British police: A force at work.* Blackwell.

Holmes, K., Preston, G., Shaw, K., & Buchanan, R. (2013). Follow me: Networked professional learning for teachers. *Australian Journal of Teacher Education, 38*(12), 55-65. doi:10.14221/ajte.2013v38n12.4

Honeycutt, C., & Herring, S. C. (2009). Beyond microblogging: Conversation and collaboration via Twitter. Paper presented at the *System Sciences, 2009. HICSS'09. 42nd Hawaii International Conference On,* 1-10.

Hookway, N. (2008). Entering the blogosphere': Some strategies for using blogs in social research. *Qualitative Research, 8*(1), 91-113. doi:10.1177/1468794107085298

Hull, K., & Dodd, J. E. (2017). Faculty use of Twitter in higher education teaching. *Journal of Applied Research in Higher Education, 9*(1), 91-104. doi:10.1108/JARHE-05-2015-0038

Hur, J. W., & Brush, T. A. (2009). Teacher participation in online communities: Why do teachers want to participate in self-generated online communities of K–12 teachers? *Journal of Research on Technology in Education, 41*(3), 279-303. doi:10.1080/15391523.2009.10782532

Ingvarson, L. (2009). Developing and rewarding excellent teachers: The Scottish chartered teacher scheme. *Professional Development in Education, 35*(3), 451-468. doi:10.1080/19415250903016707

Jackson, A. Y., & Mazzei, L. A. (2012). *Thinking with theory in qualitative research: Viewing data across multiple perspectives*. Oxford, UK: Routledge.

Jackson, A. Y., & Mazzei, L. A. (2013). Plugging one text into another: Thinking with theory in qualitative research. *Qualitative Inquiry, 19*(4), 261-271. doi:10.1177/1077800412471510

Java, A., Song, X., Finin, T., & Tseng, B. (2007). Why we Twitter: Understanding microblogging usage and communities. Paper presented at the *Proceedings of the 9th WebKDD and 1st SNA-KDD 2007 Workshop on Web Mining and Social Network Analysis,* 56-65.

Jenks, C., & Neves, T. (2000). A walk on the wild side: Urban ethnography meets the flâneur. *Cultural Values, 4*(1), 1-17. doi:10.1080/14797580009367183

Johnson, B. D., Dunlap, E., & Benoit, E. (2010). Organizing "mountains of words" for data analysis, both qualitative and quantitative. *Substance use & Misuse, 45*(5), 648-670. doi:10.3109/10826081003594757

Johnson, S., & Rasulova, S. (2017). Qualitative research and the evaluation of development impact: Incorporating authenticity into the assessment of rigour. *Journal of Development Effectiveness, 9*(2), 263-276. doi:10.1080/19439342.2017.1306577

Jordan, K. (2016). Academics' online connections: Characterising the structure of personal networks on academic social networking sites and Twitter. Paper presented at the *10th International Conference on Networked Learning: Looking Back – Moving Forward,* Lancaster, UK.

Joubert, M., & Sutherland, R. (2009). *A perspective on the literature: CPD for teachers of mathematics.* Bristol: National Centre for Excellence in the Teaching of Mathematics.

Junco, R., Elavsky, C. M., & Heiberger, G. (2013). Putting Twitter to the test: Assessing outcomes for student collaboration, engagement and success. *British Journal of Educational Technology, 44*(2), 273-287. doi:10.1111/j.1467-8535.2012.01284.x

Kawulich, B. B. (2005). Participant observation as a data collection method. *Forum: Qualitative Social Research, 6*(2) Retrieved from http://www.qualitative-research.net/index.php/fqs/article/view/466/996L

Keay, J. K., Carse, N., & Jess, M. (2018). Understanding teachers as complex professional learners. *Professional Development in Education*, 1-13. doi:10.1080/19415257.2018.1449004

Kemp, S. (2018). *2018 Q2 global digital statshot.* ().We Are Social/Hootsuite. Retrieved from https://wearesocial.com/blog/2018/04/social-media-use-jumps-in-q1-despite-privacy-fears

Kendall, L. (2009). How can qualitative internet researchers define the boundaries of their projects: A response to Christine Hine. In A. N. Markham, & N. K. Baym (Eds.), *Internet inquiry: Conversations about method* (pp. 21-25). Thousand Oaks, CA: Sage.

Kennan, M. A., Cecez-Kecmanovic, D., & Underwood, J. (2010). Having a say voices for all the actors in ANT research? *International Journal of Actor-Network Theory and Technological Innovation (IJANTTI), 2*(2), 1-16. doi:10.4018/jantti.2010040101

Kennedy, A. (2011). Collaborative CPD for teachers in Scotland: Aspirations, opportunities and barriers. *European Journal of Teacher Education, 34*(1), 25-41. doi:10.1080/02619768.2010.534980

Kennedy, M. M. (1998). Education reform and subject matter knowledge. *Journal of Research in Science Teaching, 35*(3), 249-263. doi:10.1002/(SICI)1098-2736(199803)35:33.0.CO;2-R

Kennedy, M. M. (2016). How does professional development improve teaching? *Review of Educational Research, 86*(4), 945-980. doi:10.3102/0034654315626800

Kim, Y. (2011). The pilot study in qualitative inquiry identifying issues and learning lessons for culturally competent research. *Qualitative Social Work, 10*(2), 190-206. doi:10.1177/1473325010362001

Knapp, M. S. (2003). Professional development as a policy pathway. *Review of Research in Education, 27*, 109-157. doi:10.3102/0091732X027001109

Knight, P. (2002). *A systemic approach to professional development: Learning as practice.* Oxford ;: doi:10.1016/S0742-051X(01)00066-X

Kohn, E. (2013). *How forests think: Toward an anthropology beyond the human* University of California Press.

Korthagen, F. (2017). Inconvenient truths about teacher learning: Towards professional development 3.0. *Teachers and Teaching, 23*(4), 387-405. doi:10.1080/13540602.2016.1211523

Kozinets, R. V. (2009). *Netnography: Doing ethnographic research online.* London: SAGE.

Krutka, D. G., & Carpenter, J. P. (2016). Participatory learning through social media: How and why social studies educators use Twitter. *Contemporary Issues in Technology and Teacher Education, 16*(1), 38-59. Retrieved from http://www.citejournal.org/volume-16/issue-1-16/social-studies/participatory-learning-through-social-media-how-and-why-social-studies-educators-use-twitter

Kwak, H., Lee, C., Park, H., & Moon, S. (2010). What is Twitter, a social network or a news media? Paper presented at the *Proceedings of the 19th International Conference on World Wide Web,* 591-600.

Kwakman, K. (2002). *Factors affecting teachers' participation in professional learning activities.* Oxford. doi:10.1016/S0742-051X(02)00101-4;

Kyndt, E., Gijbels, D., Grosemans, I., & Donche, V. (2016). Teachers' everyday professional development: Mapping informal learning activities, antecedents, and learning outcomes. *Review of Educational Research, 86*(4), 1111-1150. doi:10.3102/0034654315627864

Kyndt, E., Govaerts, N., Verbeek, E., & Dochy, F. (2014). Development and validation of a questionnaire on informal workplace learning outcomes: A study among socio-educational care workers. *The British Journal of Social Work, 44*(8), 2391-2410.

Lange, P. G. (2007). Publicly private and privately public: Social networking on YouTube. *Journal of Computer-Mediated Communication, 13*(1), 361-380. doi:10.1111/j.1083-6101.2007.00400.x

Lather, P., & St. Pierre, E. A. (2013). Post-qualitative research. *International Journal of Qualitative Studies in Education, 26*(6), 629-633. doi:10.1080/09518398.2013.788752

Latour, B. (1999). On recalling ANT. In J. Law, & J. Hassard (Eds.), *Actor network theory and after (Sociological Review monographs)* (pp. 15-25). Oxford, England: Blackwell Publishers.

Latour, B. (2005). Reassembling the social. *London: Oxford,*

Latzko-Toth, G., Bonneau, C., & Millette, M. (2017). Small data, thick data: Thickening strategies for trace-based social media research. In L. Sloan, & A. Quan-Haase (Eds.), *The SAGE handbook of social media research methods* (pp. 199-214). London: Sage.

Law, J. (2004a). *After method: Mess in social science research* Routledge.

Law, J. (2004b). And if the global were small and noncoherent? Method, complexity, and the baroque. *Environment and Planning D: Society and Space, 22*(1), 13-26. doi:10.1068/d316t

Law, J. (2007). Making a mess with method. In W. Outhwaite, & S. P. Turner (Eds.), *The SAGE Handbook of Social Science Methodology* (pp. 595-606). London: Sage Publications Ltd.

Law, J. (2008). On sociology and STS. *The Sociological Review, 56*(4), 623-649. doi:10.1111/j.1467-954X.2008.00808.x

Law, J. (2009). Actor network theory and material semiotics. In B. S. Turner (Ed.), *The New Blackwell Companion to Social Theory* (pp. 141-158). Chichester: Wiley-Blackwell. doi:10.1002/9781444304992.ch7.

Law, J., & Hassard, J. (Eds.). (1999). *Actor network theory and after.* Oxford: Blackwell Publishers.

Law, J., Ruppert, E., & Savage, M. (2011). The double social life of methods. *CRESC Working Paper Series, Paper No. 95* Retrieved from http://research.gold.ac.uk/id/eprint/7987

Law, J., & Singleton, V. (2005). Object lessons. *Organization, 12*(3), 331-355. doi:10.1177/1350508405051270

Law, J., & Singleton, V. (2015). ANT, multiplicity and policy. *Critical Policy Studies, 8*(4), 379-396. doi:10.1080/19460171.2014.957056

Law, J., & Lien, M. E. (2013). Slippery: Field notes in empirical ontology. *Social Studies of Science, 43*(3), 363-378. doi:10.1177/0306312712456947

Law, J., & Mol, A. (2008). The actor-enacted: Cumbrian sheep in 2001. *Politica Y Sociedad, 45*(3), 75-92. doi:10.1007/978-0-387-74711-8_4

Le Clus, M. (2011). Informal learning in the workplace: A review of the literature. *Australian Journal of Adult Learning, 51*(2), 355-373.

LeCompte, M. D., & Schensul, J. J. (2010). *Designing & conducting ethnographic research: An introduction* (2nd ed.). Lanham, MD.: AltaMira Press.

Lee, T., Fuller, A., Ashton, D., Butler, P., Felstead, A., Unwin, L., & Walters, S. (2004). Workplace learning: Main themes & perspectives. *Learning as Work Research Paper,* (2)

Lemke, J. (2004). Learning across multiple places and their chronotopes. Paper presented at the *AERA 2004 Symposium, April,* 12-16.

Lemke, J. L. (2002). Travels in hypermodality. *Visual Communication, 1*(3), 299-325. doi:10.1177/1470357200100303

Lemke, J. L. (2005). Multimedia genres and traversals. *Folia Linguistica, 39*(1-2), 45-56. doi:10.1515/flin.2005.39.1-2.45

Lengler, R., & Eppler, M. J. (2007). Towards a periodic table of visualization methods of management. Paper presented at the *IASTED International Conference on Graphics and Visualization in Engineering,* Clearwater, Florida, USA. 83-88.

Lewis, B., & Rush, D. (2013). Experience of developing Twitter-based communities of practice in higher education. *Research in Learning Technology, 21*(1) doi:10.3402/rlt.v21i0.18598

Li, J., & Greenhow, C. (2015). Scholars and social media: Tweeting in the conference backchannel for professional learning. *Educational Media International, 52*(1), 1-14. doi:10.1080/09523987.2015.1005426

Lieberman, A. (1995). Practices that support teacher development: Transforming conceptions of professional learning. *Innovating and Evaluating Science Education: NSF Evaluation Forums, 1992-94, 67.*

Lieberman, A., & Miller, L. (2000). Teaching and teacher development: A new synthesis for a new century. In R. S. Brandt (Ed.), *Education in a new era* (pp. 47-66) Association for Supervision & Curriculum Development.

Lieblich, A., Zilber, T., & Tuval-Mashiach, R. (1998). *Narrative research: Reading, analysis and interpretation.* Thousand Oaks, Calif.: Thousand Oaks.

Lin, R., Levordashka, A., & Utz, S. (2016). Ambient intimacy on Twitter. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace, 10*(1) doi:10.5817/CP2016-1-6

Lincoln, Y. S. (1995). Emerging criteria for quality in qualitative and interpretive research. *Qualitative Inquiry, 1*(3), 275-289. doi:10.1177/107780049500100301

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry* Sage.

Linnet, J. T. (2011). Money can't buy me hygge: Danish middle-class consumption, egalitarianism, and the sanctity of inner space. *Social Analysis, 55*(2), 21-44. doi:10.3167/sa.2011.550202

Linnet, J. T. (2012). The social-material performance of cozy interiority. Paper presented at the *Ambiances in Action/Ambiances En Acte (s) - International Congress on Ambiances,* Montreal. 403-408.

Little, J. W. (1993). Teachers' professional development in a climate of educational reform. *Educational Evaluation and Policy Analysis, 15*(2), 129-151. doi:10.3102/01623737015002129

Lomicka, L., & Lord, G. (2012). A tale of tweets: Analyzing microblogging among language learners. *System: An International Journal of Educational Technology and Applied Linguistics, 40*(1), 48-63. doi:10.1016/j.system.2011.11.001

Loucks-Horsley, S., Stiles, K., & Hewson, P. (1996). Principles of effective professional development for mathematics and science education: A synthesis of standards. *NISE Brief, 1*(1)

Luehmann, A. L., & Tinelli, L. (2008). Teacher professional identity development with social networking technologies: Learning reform through blogging. *Educational Media International, 45*(4), 323-333. doi:10.1080/09523980802573263

Luo, T., Sickel, J., & Cheng, L. (2017). Preservice teachers' participation and perceptions of Twitter live chats as personal learning networks. *TechTrends, 61*(3), 226-235. doi:10.1007/s11528-016-0137-1

Madden, R. (2010). *Being ethnographic: A guide to the theory and practice of ethnography.* Los Angeles, Calif.] ; London: Sage.

Malcolm, J., Hodkinson, P., & Colley, H. (2003). The interrelationships between informal and formal learning. *Journal of Workplace Learning, 15*(7/8), 313-318. doi:10.1108/13665620310504783

Malinowski, B. (1923). The problem of meaning in primitive languages. In C. K. Ogden, & I. A. Richards (Eds.), *The meaning of meaning. A study of the influence of language upon thought and of the science of symbolism* (pp. 296-336). New York: Harcourt, Brace & World.

Markham, A. N. (1998). *Life online: Researching real experience in virtual space.* Lanham, Md.; Plymouth: Lanham, Md.; Plymouth: AltaMira.

Markham, A. N. (2013a). Fieldwork in social media: What would Malinowski do? *Qualitative Communication Research, 2*(4), 434-446. doi:10.1525/qcr.2013.2.4.434

Markham, A. N. (2013b). Remix cultures, remix methods: Reframing qualitative inquiry for social media contexts. In N. K. Denzin, & M. D. Giardina (Eds.), *Global dimensions of qualitative inquiry* (pp. 63-83) Left Coast Press.

Markham, A. N. (2016). Ethnography in the digital era: From fields to flow, descriptions to interventions. In N. K. Denzin, & Y. S. Lincoln (Eds.), *The SAGE handbook of qualitative research (forthcoming)* (5th ed.,). Thousand Oaks, Calif.; London: Sage.

Markham, A. N., & Buchanan, E. (2012). *Ethical decision-making and internet research: Version 2.0.* Association of Internet Researchers.

Marr, J., & Dewaele, C. S. (2015). Incorporating Twitter within the sport management classroom: Rules and uses for effective practical application. *Journal of Hospitality, Leisure, Sport & Tourism Education, 17*, 1-4. doi:10.1016/j.jhlste.2015.05.001

Marsick, V. J., & Watkins, K. E. (2001). Informal and incidental learning. In S. B. Merriam (Ed.), *The new update on adult learning theory: New directions for adult and continuing education* (pp. 25-34) Jossey-Bass.

Marwick, A. E. (2013). Ethnographic and qualitative research on Twitter. In K. Weller, A. Bruns, J. E. Burgess, M. Mahrt & C. Puschmann (Eds.), *Twitter and society* (pp. 109-122). New York: Peter Lang.

Marwick, A. E., & Boyd, D. (2011). I tweet honestly, I tweet passionately: Twitter users, context collapse, and the imagined audience. *New Media and Society, 13*(1), 114-133. doi:10.1177/1461444810365313

Matteson, A. (2010). Tweacher (n): The Twitter enhanced teacher. *School Library Monthly, 27*(1), 22-23.

Mayer, D., & Lloyd, M. (2011). Professional learning: An introduction to the research literature. *Australian Institute for Teaching and School Leadership, Melbourne. Prepared in Partnership with Deakin University and the Queensland University of Technology,* 978-970.

Maykut, P., & Morehouse, R. E. (2005). *Beginning qualitative research: A philosophic and practical guide.* London: Falmer.

Mazzei, L. A. (2013). A voice without organs: Interviewing in posthumanist research. *International Journal of Qualitative Studies in Education, 26*(6), 732-740. doi:10.1080/09518398.2013.788761

McArthur, J. A., & Farley White, A. (2016). Twitter chats as third places: Conceptualizing a digital gathering site. *Social Media & Society, 2*(3), 1-9. doi:10.1177/2056305116665857

McCormick, R., Banks, F., Morgan, B., Opfer, D., Pedder, D., Storey, A., & Wolfenden, F. (2008). *Schools and continuing professional development (CPD) in England-state of the nation research project (T34718): Literature review.*Cambridge University/The Open University.

McGarrigle, C. (2013). Forget the flâneur. Paper presented at the *19th International Symposium on Electronic Art,* Sydney.

McGregor, J. (2004). Spatiality and the place of the material in schools. *Pedagogy, Culture & Society, 12*(3), 347-372. doi:10.1080/14681360400200207

McKee, H. A., & Porter, J. E. (2009). Playing a good game: Ethical issues in researching MMOGs and virtual worlds. *International Journal of Internet Research Ethics, 2*(1), 5-37.

McPherson, M., Budge, K., & Lemon, N. (2015). New practices in doing academic development: Twitter as an informal learning space. *International Journal for Academic Development, 20*(2), 126-136. doi:10.1080/1360144X.2015.1029485

Megele, C. (2014). Theorizing Twitter chat. *Journal of Perspectives in Applied Academic Practice, 2*(2), 46-51. doi:10.14297/jpaap.v2i2.106

Meier, F., Elsweiler, D., & Wilson, M. L. (2014). More than liking and bookmarking? towards understanding Twitter favouriting behaviour. Paper presented at the *Eighth International AAAI Conference on Weblogs and Social Media,* Ann Arbor, Michigan, US. Retrieved from https://www.aaai.org/ocs/index.php/ICWSM/ICWSM14/paper/view/8094

Meissel, K., Parr, J. M., & Timperley, H. S. (2016). Can professional development of teachers reduce disparity in student achievement? *Teaching and Teacher Education, 58*, 163-173. doi:10.1016/j.tate.2016.05.013

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed.) Sage.

Miles, M. B., Huberman, A. M., & Saldana, J. (2014). Qualitative data analysis: A method sourcebook. *CA, US: Sage Publications,*

Miller, D., & Slater, D. (2000). *The internet: An ethnographic approach.* Oxford: Berg.

Miller, V. (2008). New media, networking and phatic culture. *Convergence, 14*(4), 387-400. doi:10.1177/1354856508094659

Mills, M. (2014). Effect of faculty member's use of Twitter as informal professional development during a preservice teacher internship. *Globe, 14*(4)

Mitchell, R. (2013). What is professional development, how does it occur in individuals, and how may it be used by educational leaders and managers for the purpose of school improvement? *Professional Development in Education, 39*(3), 387-400. doi:10.1080/19415257.2012.762721

Mol, A. (1999). Ontological politics. A word and some questions. In J. Law, & J. Hassard (Eds.), *Actor network theory and after (sociological review monographs)* (pp. 74-89). Oxford, England: Blackwell Publishers.

Mol, A. (2002). *The body multiple: Ontology in medical practice* Duke University Press.

Mol, A. (2010). Actor-network theory: Sensitive terms and enduring tensions. *Kölner Zeitschrift Für Soziologie Und Sozialpsychologie.Sonderheft, 50*, 253-269. Retrieved from http://hdl.handle.net/11245/1.330874

Mol, A., & Berg, M. (1994). Principles and practices of medicine: The co-existence of various anemias. *Culture, Medicine and Psychiatry, 18*(2), 247-265. doi:10.1007/BF01379451

Morris, A. (2015). *A practical introduction to in-depth interviewing.* London: Sage.

Moser, I., & Law, J. (2006). Fluids or flows? Information and qualculation in medical practice. *Information Technology & People, 19*(1), 55-73. doi:10.1108/09593840610649961

Mulcahy, D. (2012). Thinking teacher professional learning performatively: A socio-material account. *Journal of Education and Work, 25*(1), 121-139. doi:10.1080/13639080.2012.644910

Mulcahy, D. (2014). Re-thinking teacher professional learning: A more than representational account. In T. J. Fenwick, & M. Nerland (Eds.), *Reconceptualising professional learning: Sociomaterial knowledges, practices, and responsibilities* (pp. 52-66). New York: Routledge.

Murthy, D. (2008). Digital ethnography: An examination of the use of new technologies for social research. *Sociology, 42*(5), 837-855. doi:10.1177/0038038508094565

Nadji, T. (2016). Twitter and physics professional development. *Physics Teacher, 54*(8), 486-487. doi:10.1119/1.4965271

Nardi, B. A. (2009). *My life as a night elf priest: An anthropological account of World of Warcraft* University of Michigan Press. doi:10.3998/toi.8008655.0001.001

Nolan, M., Hanson, E., Magnusson, L., & Andersson, B. (2003). Gauging quality in constructivist research: The äldre väst sjuhärad model revisited. *Quality in Ageing and Older Adults, 4*(2), 22-27. doi:10.1108/14717794200300010

Nonnecke, B., & Preece, J. (2000). Lurker demographics: Counting the silent. Paper presented at the *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems,* 73-80.

O'Brien, J., & Jones, K. (2014). *Professional learning or professional development? Or continuing professional learning and development? Changing terminology, policy and practice,*

OECD. (2009). *Creating effective teaching and learning environments: First results from TALIS* Organisation for Economic Co-operation and Development.

Oldenburg, R. (1989). *The great good place: Cafes, coffee shops, bookstores, bars, hair salons, and how they get you through the day* (1st ed.) Paragon House Publishers.

Oliver, P. (2008). *Writing your thesis* (2nd ed.) Sage.

Olmsted-Hawala, E. L., Murphy, E. D., Hawala, S., & Ashenfelter, K. T. (2010). Think-aloud protocols: A comparison of three think-aloud protocols for use in testing data-dissemination web sites for usability. Paper presented at the *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems,* 2381-2390.

Opfer, V. D., & Pedder, D. (2011). Conceptualizing teacher professional learning. *Review of Educational Research, 81*(3), 376-407. doi:10.3102/0034654311413609

O'Reilly, K. (2009). Key informants and gatekeepers. *Key concepts in ethnography* (pp. 132-137). London: SAGE Publications Ltd. doi:10.4135/9781446268308

O'Reilly, K. (2012). *Ethnographic methods* Routledge.

Orlikowski, W. J., & Scott, S. V. (2008). Sociomateriality: Challenging the separation of technology, work and organization. *The Academy of Management Annals, 2*(1), 433-474. doi:10.5465/19416520802211644

Padfield, T. (2010). *Copyright for archivists and records managers* (4th ed.). London: Facet Publishing.

Parganas, P., Anagnostopoulos, C., & Chadwick, S. (2015). 'You'll never tweet alone': Managing sports brands through social media. *Journal of Brand Management, 22*(7), 551-568. doi:10.1057/bm.2015.32

Payne, G., & Payne, J. (2004). *Key informants. Key concepts in social research* (pp. 135-138). London: SAGE Publications, Ltd. doi:10.4135/9781849209397

Pear Analytics. (2009). *Twitter study.* San Antonio, TX: Pear Analytics. Retrieved from http://www.pearanalytics.com/blog/wp-content/uploads/2010/05/Twitter-Study-August-2009.pdf

Pedder, D., James, M., & MacBeath, J. (2005). How teachers value and practise professional learning. *Research Papers in Education, 20*(3), 209-243. doi:10.1080/02671520500192985

Pedder, D., Storey, A., & Opfer, V. D. (2008). Schools and continuing professional development (CPD) in England–State of the nation research project. *Cambridge University, Open University and TDA,*

Postill, J., & Pink, S. (2012). Social media ethnography: The digital researcher in a messy web. Media International Australia, 145(1), 123-134. doi:10.1177/1329878X1214500114

Preissle, J., LeCompte, M. D., & Tesch, R. (1993). *Ethnography and qualitative design in educational research* (2nd ed.). San Diego: Academic Press.

Reason, M. (2010). Working paper #16: Mind maps, presentational knowledge and the dissemination of qualitative research. Retrieved from http://eprints.ncrm.ac.uk/1577/

Rehm, M., Preussler, A., Kerres, M., & Notten, A. (2014). (2014). Pebble-in-the-pond?! Does a hashtag conversation on Twitter connect teachers? Paper presented at the *EARLI - SIG 14 (Learning and Professional Development),* Oslo, Norway.

Rehm, M., & Notten, A. (2016). Twitter as an informal learning space for teachers!? The role of social capital in Twitter conversations among teachers. *Teaching and Teacher Education, 60*, 215-223. doi:10.1016/j.tate.2016.08.015

Reichelt, L. (2007). Ambient intimacy. Retrieved from http://www.disambiguity.com/ambient-intimacy/

Rheingold, H. (1993). *The virtual community: Homesteading on the electronic frontier* (1st ed.). Boston, MA: Addison-Wesley.

Richardson, L. (2000). Evaluating ethnography. *Qualitative Inquiry, 6*(2), 253-255. doi:10.1177/107780040000600207

Rimpiläinen, S. (2015). Multiple enactments of method, divergent hinterlands and production of multiple realities in educational research. *International Journal of Qualitative Studies in Education, 28*(2), 137-150. doi:10.1080/09518398.2013.855341

Rizk, J., & Birioukov, A. (2017). Following the flâneur: The methodological possibilities and applications of flânerie in new urban spaces. *The Qualitative Report, 22*(12), 3268-3285. Retrieved from https://nsuworks.nova.edu/tqr/vol22/iss12/12

Rodesiler, L., & Pace, B. G. (2015). English teachers' online participation as professional development: A narrative study. *English Education, 47*(4), 347-378. Retrieved from http://www.ncte.org/library/NCTEFiles/Resources/Journals/EE/0474-jul2015/EE0474English.pdf

Rodríguez, H., & Restrepo, L. F. (2015). Skills and the use of Twitter by higher education students. *Sophia, 11*(1), 44-52. Retrieved from http://revistas.ugca.edu.co/index.php/sophia/article/download/298/767

Rogers, R. (2013). Debanalizing Twitter: The transformation of an object of study. In K. Weller, A. Bruns, J. E. Burgess, M. Mahrt & C. Puschmann (Eds.), *Twitter and society* (pp. ix-xxvi). New York: Peter Lang.

Rose, J., & Reynolds, D. (2006). Teachers' continuing professional development: A new approach. Paper presented at the *20th Annual World International Congress for Effectiveness and Improvement,* Slovenia.

Rosell-Aguilar, F. (2018). Twitter: A professional development and community of practice tool for teachers. *Journal of Interactive Media in Education, 2018*(1), 1-12. doi:10.5334/jime.452

Rosman, K. (2013). On Twitter, more 'favoriting'; why more people are pushing the "favorite" button. *Wall Street Journal* Retrieved from https://www.wsj.com/articles/SB10001424127887324564704578626070775502176

Ross, C. R., Maninger, R. M., LaPrairie, K. N., & Sullivan, S. (2015). The use of Twitter in the creation of educational professional learning opportunities. *Administrative Issues Journal: Education, Practice, and Research, 5*(1), 55-76. Retrieved from https://dc.swosu.edu/aij/vol5/iss1/6

Ruppert, E. (2016). A baroque sensibility for big data visualisations. In J. Law, & E. Ruppert (Eds.), *Modes of knowing: Resources from the baroque* (pp. 136-164). Manchester: Mattering Press. Retrieved from https://www.matteringpress.org/books/modes-of-knowing

Rusaw, A. C. (1995). Learning by association: Professional associations as learning agents. *Human Resource Development Quarterly, 6*(2), 215-226. doi:10.1002/hrdq.3920060209

Sachs, J. (2011). Skilling or emancipating? Metaphors for continuing teacher professional development. In N. Mockler, & J. Sachs (Eds.), *Rethinking educational practice through reflexive inquiry* (pp. 153-167) Springer.

Sajuria, J., vanHeerde-Hudson, J., Hudson, D., Dasandi, N., & Theocharis, Y. (2015). Tweeting alone? An analysis of bridging and bonding social capital in online networks. *American Politics Research, 43*(4), 708-738. doi:10.1177/1532673X14557942

Saldaña, J. (2013). *The coding manual for qualitative researchers* (2nd ed.). Los Angeles, Calif.; London: SAGE.

Sambrook, S. (2005). *Factors influencing the context and process of work-related learning: Synthesizing findings from two research projects* doi:10.1080/1367886052000342591

Sauers, N. J., & Richardson, J. W. (2015). Leading by following an analysis of how K-12 school leaders use Twitter. *NASSP Bulletin, 99*(2), 127-146. doi:10.1177/0192636515583869

Schensul, S. L., Schensul, J. J., & LeCompte, M. D. (1999). *Essential ethnographic methods: Observations, interviews, and questionnaires* Rowman Altamira.

Scher, L., & O'Reilly, F. (2009). Professional development for K–12 math and science teachers: What do we really know? *Journal of Research on Educational Effectiveness, 2*(3), 209-249. doi:10.1080/19345740802641527

Schutt, S. (2017). Rewriting the book of the city: On old signs, new technologies, and reinventing adelaide. *Urban Geography, 38*(1), 47-65. doi:10.1080/02723638.2016.1139878

Sfard, A. (1998). On two metaphors for learning and the dangers of choosing just one. *Educational Researcher, 27*(2), 4-13. doi:10.3102/0013189X027002004

Simpson, G., & Cooner, T. (2016). Making the most of Twitter: A step-by-step guide for academics. *Social Work Education, 35*(3), 372-373. doi:10.1080/02615479.2016.1175062

Singleton, V., & Michael, M. (1993). Actor-networks and ambivalence: General practitioners in the UK cervical screening programme. *Social Studies of Science, 23*(2), 227-264. doi:10.1177/030631293023002001

Sinnappan, S., & Zutshi, S. (2011). Using microblogging to facilitate community of inquiry: An australian tertiary experience. *Proceedings of ASCILITE 2011,* 1123-1135.

Skees, M. (2010). Digital flânerie: Illustrative seeing in the digital age. *Critical Horizons, 11*(2), 265-287. doi:10.1558/crit.v11i2.265

Skyring, C. (2014). Professional learning in 140 characters. Paper presented at the *Conference Proceedings of the Australian Computers in Education Conference 2014,* 422-429.

Sloane, D. J. (2009). Visualizing qualitative information. *Qualitative Report, 14*(3), 489-497. Retrieved from https://nsuworks.nova.edu/tqr/vol14/iss3/8/

Smith Risser, H. (2013). Virtual induction: A novice teacher's use of Twitter to form an informal mentoring network. *Teaching and Teacher Education, 35*, 25-33. doi:10.1016/j.tate.2013.05.001

Smith, B., & McGannon, K. R. (2017). Developing rigor in qualitative research: Problems and opportunities within sport and exercise psychology. *International Review of Sport and Exercise Psychology,* 1-21. doi:10.1080/1750984X.2017.1317357

Smith, J. K., & Hodkinson, P. (2009). Challenging neorealism: A response to Hammersley. *Qualitative Inquiry, 15*(1), 30-39. doi:10.1177/1077800408325416

Social Research Association. (2003). *Ethical guidelines.*

Solmaz, O. (2016). # Beyond140: Helping pre-service teachers construct a community of inquiry on Twitter. *TOJET: The Turkish Online Journal of Educational Technology, 15*(4), 1-15. Retrieved from http://www.tojet.net/articles/v15i4/1541.pdf

Soluk, L., & Buddle, C. M. (2015). Tweets from the forest: Using Twitter to increase student engagement in an undergraduate field biology course. *F1000Research, 4*, 82. doi:10.12688/f1000research.6272.1 [doi]

Sørensen, E. (2009). *The materiality of learning: Technology and knowledge in educational practice* Cambridge University Press.

Sparkes, A. C., & Smith, B. (2009). Judging the quality of qualitative inquiry: Criteriology and relativism in action. *Psychology of Sport & Exercise, 10*(5), 491-497. doi:10.1016/j.psychsport.2009.02.006

Spencer, L., Ritchie, J., Lewis, J., & Dillon, L. (2012). *Quality in qualitative evaluation: A framework for assessing research evidence.* London: Cabinet Office.

Spradley, J. P. (1979). *The ethnographic interview.* New York: Holt, Rinehart and Winston.

Spradley, J. (1980). *Participant observation* Wadsworth Publishing Co.

Star, S. L. (2010). This is not a boundary object: Reflections on the origin of a concept. *Science, Technology, & Human Values, 35*(5), 601-617. doi:10.1177/0162243910377624

Stewart, B. (2017). Twitter as method: Using Twitter as a tool to conduct research. In L. Sloan, & A. Quan-Haase (Eds.), *The SAGE handbook of social media research methods* (pp. 251-265) Sage.

Sunstein, C. R. (2001). *Echo chambers: Bush v. Gore, impeachment, and beyond.* Princeton, N.J.: Princeton University Press.

Taguchi, H. L. (2012). A diffractive and Deleuzian approach to analysing interview data. *Feminist Theory, 13*(3), 265-281. doi:10.1177/1464700112456001

Taussig, M. (2018). *Palma africana* University of Chicago Press.

Tester, K. (1994). *The flâneur* Psychology Press.

Thompson, I. (2000). Is the national numeracy strategy evidence-based? *Mathematics Teaching,* (171), 23-27.

Thompson, T. L. (2016). Digital doings: Curating work-learning practices and ecologies. *Learning, Media and Technology, 41*(3), 480-500. doi:10.1080/17439884.2015.1064957

Thompson, T. L., & Adams, C. (2013). Speaking with things: Encoded researchers, social data, and other posthuman concoctions. *Distinktion: Scandinavian Journal of Social Theory, 14*(3), 342-361. doi:10.1080/1600910X.2013.838182

Thompson, T. L., & Rimpiläinen, S. (2012). (2012). Unravelling knowledge practices: The assistances and resistances of ANT. Paper presented at the *ProPEL (Professional Practice, Education and Learning) Conference 2012,* Stirling, Scotland. Retrieved from http://www.academia.edu/download/13542527/Paper085_Thompson_Rimpilainen.pdf

Timperley, H. (2011). From professional development to professional learning. *Realizing the power of professional learning* (pp. 1-24) McGraw-Hill Education (UK).

Timperley, H., Wilson, A., Barrar, H., & Fung, I. (2007). *Teacher professional learning and development: Best evidence synthesis iteration.* (). Wellington, New Zealand: Ministry of Education, New Zealand.

Tracy, S. J. (2010). Qualitative quality: Eight "Big-tent" criteria for excellent qualitative research. *Qualitative Inquiry, 16*(10), 837-851. doi:10.1177/1077800410383121

Trust, T. (2012). Professional learning networks designed for teacher learning.(report). *Journal of Digital Learning in Teacher Education, 28*(4), 133-138. doi:10.1080/21532974.2012.10784693

van den Eynden, V., Corti, L., Woollard, M., Bishop, L., & Horton, L. (2014). *Managing and sharing research data: A guide to good practice* SAGE Publications Ltd.

van Dijck, J. (2013). *The culture of connectivity: A critical history of social media* Oxford University Press.

Van Someren, M., Barnard, Y., & Sandberg, J. (1994). *The think aloud method: A practical approach to modelling cognitive processes.* London: Academic Press.

van Teijlingen, E., & Hundley, V. (2001). The importance of pilot studies. *Social Research Update,* (35) Retrieved from http://sru.soc.surrey.ac.uk/SRU35.html

Veletsianos, G. (2012). Higher education scholars' participation and practices on Twitter. *Journal of Computer Assisted Learning, 28*(4), 336-349. doi:10.1111/j.1365-2729.2011.00449.x

Verran, H. (2009). On assemblage: Indigenous knowledge and digital media (2003–2006), and HMS investigator (1800–1805). *Journal of Cultural Economy, 2*(1-2), 169-182. doi:10.1080/17530350903064188

Visser, R. D., Evering, L. C., & Barrett, D. E. (2014). *#TwitterforTeachers: The implications of Twitter as a self-directed professional development tool for K–12 teachers.* Eugene, OR: doi:10.1080/15391523.2014.925694

Walther, J. B. (2002). Research ethics in internet-enabled research: Human subjects issues and methodological myopia. *Ethics and Information Technology, 4*(3), 205-216. doi:10.1023/A:1021368426115

Wayne, A. J., Yoon, K. S., Zhu, P., Cronen, S., & Garet, M. S. (2008). Experimenting with teacher professional development: Motives and methods. *Educational Researcher, 37*(8), 469-479. doi:10.3102/0013189X08327154

Webster-Wright, A. (2009). Reframing professional development through understanding authentic professional learning. *Review of Educational Research, 79*(2), 702-739. doi:10.3102/0034654308330970

Weinberger, S. (2011). Spies to use Twitter as crystal ball. *Nature, 478*(7369), 301-301. doi:10.1038/478301a

Wenger, E., Trayner, B., & De Laat, M. (2011). Promoting and assessing value creation in communities and networks: A conceptual framework. *Rapport,* (18)

Werquin, P. (2007). *Terms, concepts and models for analysing the value of recognition programmes.* (). Vienna: OECD.

Wesely, P. M. (2013). Investigating the community of practice of world language educators on Twitter. *Journal of Teacher Education, 64*(4), 305-318. doi:10.1177/0022487113489032

West, B., Moore, H., & Barry, B. (2015). Beyond the tweet: Using Twitter to enhance engagement, learning, and success among first-year students. *Journal of Marketing Education, 37*(3), 160-170. doi:10.1177/0273475315586061

White, E. (2001). *The flâneur: A stroll through the paradoxes of Paris.* London: Bloomsbury Publishing.

Whitehead, T. L. (2005). Basic classical ethnographic research methods. *Cultural Ecology of Health and Change, 1*, 1-29. Retrieved from http://www.cusag.umd.edu/documents/workingpapers/classicalethnomethods.pdf

Willet, K. B. S., Koehler, M. J., & Greenhalgh, S. P. (2017). A tweet by any other frame: Three approaches to studying educator interactions on Twitter. Paper presented at the *Society for Information Technology & Teacher Education International Conference,* 1823-1830.

Williams, M. L., Burnap, P., & Sloan, L. (2017). Towards an ethical framework for publishing Twitter data in social research: Taking into account users' views, online context and algorithmic estimation. *Sociology,*

Williams, S. A., Terras, M. M., & Warwick, C. (2013). What do people study when they study Twitter? Classifying Twitter related academic papers. *Journal of Documentation, 69*(3), 384-410. doi:10.1108/JD-03-2012-0027

Wilson, M. (2013). Twitter for schools and classes. Retrieved from https://blogs.glowscotland.org.uk/fa/ICTFalkirkPrimaries/twitter-for-schools-and-classes/

Wilson, S. M., & Berne, J. (1999). Teacher learning and the acquisition of professional knowledge: An examination of research on contemporary professional development. *Review of Research in Education, 24*(1), 173-209. doi:10.3102/0091732X024001173

Winsor, B. (2017). *Analysis: Why donald trump dominates on Twitter* Retrieved from https://www.sbs.com.au/news/analysis-why-donald-trump-dominates-on-twitter

Wolfe, C. R. (2017). *Seeing the better city: How to explore, observe, and improve urban space* Island Press.

Woolf, V. (1942). *The death of the moth: And other essays* Harcourt, Brace and Company.

Wright, N. (2010). Twittering in teacher education: Reflecting on practicum experiences. *Open Learning, 25*(3), 259-265. doi:10.1080/02680513.2010.512102

Xerri, D. (2013). Teachers' use of social networking sites for continuing professional development. In Ġ Mallia (Ed.), *The social classroom: Integrating social network use in education* (pp. 441-464) IGI Global.

Yoon, K. S., Duncan, T., Lee, S. W., Scarloss, B., & Shapley, K. L. (2007). Reviewing the evidence on how teacher professional development affects student achievement. issues & answers. REL 2007-no. 033. *Regional Educational Laboratory Southwest (NJ1),* Retrieved from http://files.eric.ed.gov/fulltext/ED498548.pdf

Zappavigna, M. (2011). Ambient affiliation: A linguistic perspective on Twitter. *New Media & Society, 13*(5), 788-806. doi:10.1177/1461444810385097

Zhao, D., & Rosson, M. B. (2009). How and why people Twitter: The role that micro-blogging plays in informal communication at work. Paper presented at the *Proceedings of the ACM 2009 International Conference on Supporting Group Work,* 243-252.

Zimmer, M., & Proferes, N. J. (2014). A topology of Twitter research: Disciplines, methods, and ethics. *Aslib Journal of Information Management, 66*(3), 250-261. doi:10.1108/AJIM-09-2013-0083

11 APPENDICES

A Twitter statistics

Worldwide active Twitter users

Number of monthly active Twitter users worldwide from 1st quarter 2010 to 4th quarter 2017 (in millions)

Quarter	Users
Q1 '10	30
Q2 '10	40
Q3 '10	49
Q4 '10	54
Q1 '11	68
Q2 '11	85
Q3 '11	101
Q4 '11	117
Q1 '12	138
Q2 '12	151
Q3 '12	167
Q4 '12	185
Q1 '13	204
Q2 '13	218
Q3 '13	232
Q4 '13	241
Q1 '14	255
Q2 '14	271
Q3 '14	284
Q4 '14	288
Q1 '15	302
Q2 '15	304
Q3 '15	307
Q4 '15	305
Q1 '16	310
Q2 '16	313
Q3 '16	317
Q4 '16	318
Q1 '17	327
Q2 '17	326
Q3 '17	330
Q4 '17	330
Q1 '18	336

Source: Twitter Quarterly Results (https://investor.twitterinc.com/results.cfm)

Twitter usage analysis
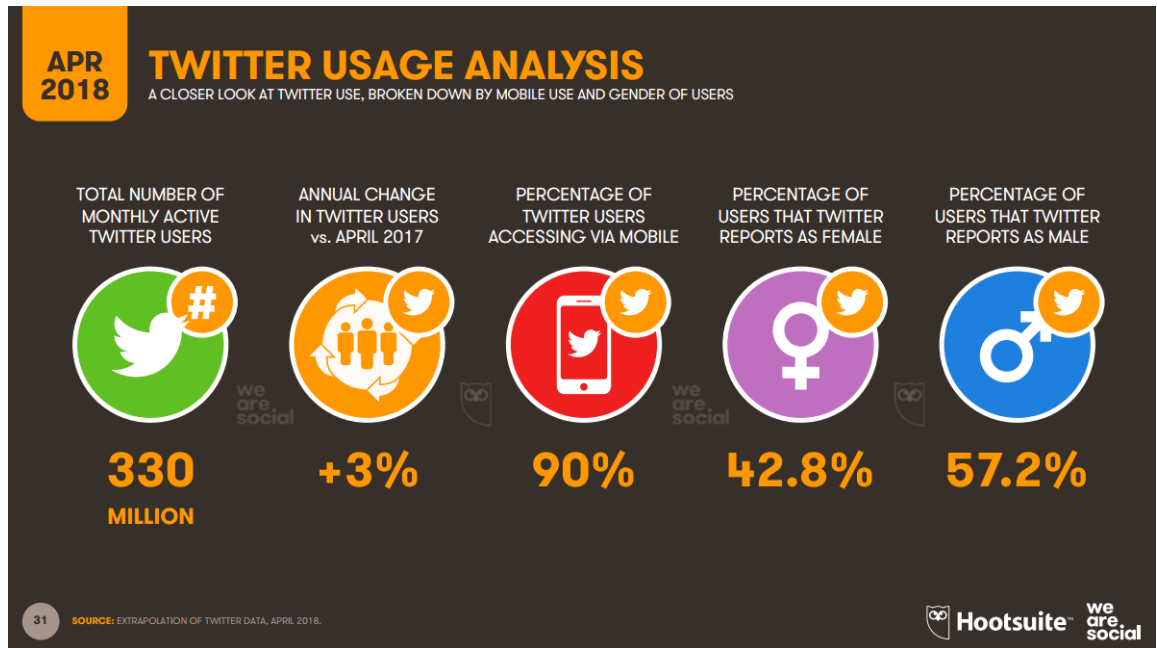
Source: Kemp (2018)

B Applications used

The following table lists the applications and software used during the study, in production of the thesis, and indicated in the text by the ™ superscript.

Name	URL	Function	How I used it
Audacity	https://www.audacityteam.org/	Editing sound files	Processing recorded interviews; simple editing and rendering into compressed files.
Bubbl.us	https://bubbl.us	Concept mapping	For brainstorming my thinking.
Cheetah Sync	http://www.jrtstudio.com/cheetah-sync-android-wireless-sync	Synchronising files	Maintaining coherent libraries of journal articles between desktop computer and tablet.
DataMiner	https://data-miner.io/	Scrapes' data from web pages	To pull down tweets (generally brief discussions) into a spreadsheet.
Diigo	https://www.diigo.com/	Social bookmarking	Storing and managing weblinks.
Dropbox	https://www.dropbox.com	Backing up desktop files to cloud storage	Backing up thesis and other PhD documents.
Duck Duck Go	https://duckduckgo.com/	Search engine	Searching for research data and literature.
Echofon	http://www.echofon.com/	Twitter client app	Viewing and authoring tweets on my tablet.
Feedly	https://feedly.com/	RSS reader	Aggregating and reading content from around the web.
Foxit Reader	https://www.foxitsoftware.com/pdf-reader/	Reads pdf documents	Reading and annotating academic papers and theses.
Free File Sync	https://www.freefilesync.org/	Backing up home desktop files to second hard drive	
Google	https://www.google.co.uk	Search engine	Searching for research data and literature.
Google Calendar	https://www.google.com/calendar	Calendar	For maintaining an appointments schedule and logging hours committed.
Google Docs	https://www.google.co.uk/docs/about/	Word processor	Mostly for drafting and notemaking, but also for situations where documents needed to be shared with others.

Google Drawings	https://docs.google.com/drawings/	Produce diagrams and visualisations	To produce some visualisations and preliminary diagrams.
Google Hangouts	https://hangouts.google.com/	Online conferencing	Interviewing research participants. Discussions with fellow researchers.
Google Mail	https://www.google.com/gmail/	Online email platform	University email provision.
Google Scholar	https://scholar.google.co.uk	Search engine	Searching and citing research articles.
Google Sheets	https://www.google.co.uk/sheets/about/	Spreadsheets	Storing and manipulating collections of tweets, and producing visualisations. Producing basic graphs from numerical data. Producing tables in which information might need filtering or re-ordering.
Google Slides	https://www.google.co.uk/slides/about/	Produce presentations	Supporting presentations at (and after) conferences. (A link to the slide deck was always provided for attendees to refer to later, should they choose).
Inkscape	https://inkscape.org/en/	Producing diagrams	Where a more sophisticated set of tools than those available in Google Drawings was needed.
Microsoft Excel	https://products.office.com/en-gb/excel	Spreadsheets	Backing up Google sheets for offline storage
Microsoft Word	https://products.office.com/en-gb/word	Word processor	Producing finished versions of documents which needed printing, or which were more lengthy and needed tables of contents. Backing up offline versions of Google Docs.
MindView	https://www.matchware.com/mind-mapping-software	Tracking the field	Producing a map of places visited during fieldwork but one which links back to those locations, and which also contains brief field notes and memos. Also produces overview in map, website and pdf formats.
MWSnap	https://mwsnap.en.softonic.com/	Graphic clipper	Grabbing screenshots.
NVivo	https://www.qsrinternational.com/nvivo/home	Qualitative Data Analysis package	To store and manage all the different data sources to which I had access. To read, annotate and memo those sources.

Padlet	https://padlet.com	Pinboarding	Organising thoughts and comparing different possibilities.
PrintFriendly	https://www.printfriendly.com/	Produces print-friendly versions of web pages	Producing pdf versions of blog posts, both as reading matter and as research data sources.
Refworks	http://www.refworks.com	Reference manager	Storing, organisation and retrieval of references. Integration with Word for citations and reference lists.
Skype	https://www.skype.com/en/	Online conferencing	Interviewing research participants. Discussions with fellow researchers.
Storify	https://storify.com/	Archiving Twitter exchanges	No longer available.
TAGS	https://tags.hawksey.info/	Download tweets	A Google Sheets spreadsheet which pulls down a corpus of tweets based on a search term.
Treeverse	https://github.com/paulgb/Treeverse	Downloads tweet threads	When discussions on Twitter range widely, they often don't load on a single page, so can't be archived by DataMiner or TAGS. Treeverse does that, and in so doing, produces an html file, rather than spreadsheet. This has made Treeverse useful as an alternative, more visual, analytical tool.
Tumblr	https://www.tumblr.com	Blogging platform	For archiving (and briefly commenting on) snippets of information found on the web.
Tweetdeck	https://tweetdeck.twitter.com/	Twitter client	Monitoring different streams of tweets e.g. hashtags, search terms etc.
Twitter	https://twitter.com	Microblogging platform	Research site. Connecting with other researchers and academics.
Voicemeeter	https://www.vb-audio.com/Voicemeeter/index.htm	Audio mixing	Capturing both ends of a Skype conversation into a single audio file.
Voxer	https://www.voxer.com/	Walkie-talkie app	Connecting with, and recording research participants.
Wordpress	https://wordpress.org/	Blogging platform	Main research blog for longer, more reflective posts.
YouTube	https://www.youtube.com/	Video library	Accessing videos of recorded seminars by academics.

C Twitter Papers

The following table lists those papers that the search strategy outlined in Appendix D yielded (as of June 2018). These are specifically those which referred to K-12 teacher professional development/learning. Those studies involving pre-service teachers are shaded grey.

Title	Author(s)	Year	Topics
The End of Isolation	Alderton et al	2011	professional learning networks, conversations, how Twitter is used, benefits
The Tweet Smell of Success: Perceptions of Twitter as a CPD tool	Beadle	2014	PLN, personalisation
#PD: Examining the Intersection of Twitter and Professional Learning	Biddolph & Scott Curwood	2017	how & why English teachers use Twitter for PL, #ozengchat, self-directed
"Beyond the Four Walls of My Building": A Case Study of #Edchat as a Community of Practice	Britt & Paulus	2016	#edchats can be framed as a CoP, some benefits were identified
Engagement through microblogging	Carpenter & Krutka	2015	grassroots PD, benefits
How and Why Educators Use Twitter: A Survey of the Field	Carpenter & Krutka	2014	how and why educators use Twitter
Learning in 140 Characters	Carpenter & Krutka	2015	uses of Twitter, benefits

Preservice Teachers' Microblogging: Professional Development via Twitter	Carpenter	2015	Benefits
Administrators' professional learning via Twitter: the dissonance between beliefs and actions	Cho	2016	benefits of using Twitter, information shared, contributions to practice
Administrators' Use of Twitter for Professional Learning: A Structurational Perspective	Cho	2013	perspectives on & uses of Twitter. Enablers & constraints.
Teachers' perceptions of Twitter for professional development	Davis	2015	CoP/Connectivist. Benefits - sharing knowledge & resources, sense of belonging, reaching beyond immediate community
Grassroots Professional Development: How Teachers Use Twitter	Forte et al	2012	perception of network & audience, what info is received & processed, privacy & safety, policies & barriers.
28 Days Later: Twitter Hashtags as Just in Time Teacher Professional Development	Greenhalgh & Koehler	2016	just-in-time learning enabled by hashtags
Visualizing Teacher Tweets: Finding Professional Learning Networks in Topical Networks	Handel et al	2015	SNA - topical network formation. Allows share resources, support group identity formation, and help groups to mobilize.
Follow' Me: Networked Professional Learning for Teachers	Holmes et al	2013	benefits - connected to network of educators, personalised, martini, ownership & control
Participatory Learning Through Social Media: How and Why Social Studies Educators Use Twitter	Krutka & Carpenter	2016	participatory learning, positive, creative & emancipating space, global interactions, reduce isolation,

Tweeting for Teachers	McCulloch et al	2011	benefits - keeping up to date, timeliness, access to global community, sharing ideas & resources, reflecting on practice & discussing practice
Effect of Faculty Member's Use of Twitter as Informal Professional Development During a Preservice Teacher Internship	Mills	2014	benefits, how participation whilst on a course is sustained afterwards.
Pebble-in-the-Pond?! Does a Hashtag Conversation on Twitter connect Teachers?	Rehm et al	2014	NoP, SNA
Twitter as an informal learning space for teachers!? The role of social capital in Twitter conversations among teachers	Rehm & Notten	2016	social capital, #EDChatDE, SNA, informal learning.
English Teachers Online Participation as Professional Development: A Narrative Study	Rodesiler and Pace	2015	benefits & outcomes from participation.
Twitter: A professional development and community of practice tool for teachers	Rosell-Aguilar	2018	producing a CoP of language teachers by means of a hashtag.
Leading by Following: An Analysis of How K-12 School Leaders Use Twitter	Sauers and Richardson	2015	reduction in isolation, CoPs, PD, benefits for leaders.
Professional Learning in 140 Characters	Skyring	2014	PLN, CoI
Virtual induction: A novice teacher's use of Twitter to form an informal mentoring network	Smith Risser	2013	informal mentoring, network connections

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#Beyond140: Helping Pre-Service Teachers Construct a Community of Inquiry on Twitter	Solmaz	2016	CoI and pre-service language teachers
#Help: The Value of Bringing World Language Pre-Service Teachers into the Fold of Professional Learning Networks with Twitter	Tharrington	2017	value of Twitter PLNs for pre-service teachers
#TwitterforTeachers: The Implications of Twitter as a Self-Directed Professional Development Tool	Visser et al	2014	for PD, community/connections, relationship development
Investigating the Community of Practice of World Language Educators on Twitter	Wesely	2013	CoP, developing knowledge and practice, reduction of isolation
Twittering in teacher education: reflecting on practicum experiences	Wright	2010	self-reflection, contact with others, reduction in isolation.

D Search Strategy

This forms the record of the strategy I employed whilst conducting the initial review of the literature, and which kept me informed of studies which were subsequently published. (Preliminary thinking which preceded this search can be found in this post - https://cpdin140.wordpress.com/2015/11/20/search-strategy/)

My research questions:	• How does the Twitter social media platform support the professional learning of teachers? • What forms of professional learning do teachers undertake using Twitter? • How does professional learning extend beyond Twitter into the wider social media ecosystem and the 'real' world?		
Databases to search:	Sheffield Hallam University (SHU) Library Gateway, Web of Science, Scopus, BEI (British Education Index), Education Databases on Proquest, BASE (Bielefeld Academic Search Engine)		
Criteria for inclusion:	The search will aim to be inclusive, except where it returns too many results, and will therefore include: • all years • most publications (excluding news articles) • all countries of origin, but only publications in English • both theoretical and empirical studies • EXCEPT publications where the context is tertiary education.		
Database searched	**Date**	**Search terms**	**No. of results**	**Comments**
SHU Library Gateway	28/01/2016	("professional learning" OR "professional development" OR CPD) AND teacher AND (twitter OR microblog OR "social media") AND	0	Search string asking for too much?

		(“actor-network theory” OR sociomaterial OR ANT)		
SHU Library Gateway	28/01/2016	(“professional learning” OR “professional development” OR CPD) AND teacher AND (“actor-network theory” OR sociomaterial OR ANT)	15	15 results, but only 12 unique. 3 were particularly relevant and downloaded.
SHU Library Gateway	28/01/2016	(“actor-network theory” OR sociomaterial OR ANT) AND teacher AND (twitter OR microblog OR “social media”)	9	1 result repeated from previous search, 1 (downloaded) providing a different, useful ANT perspective, others too far off topic.
SHU Library Gateway	28/01/2016	(“professional learning” OR “professional development” OR CPD) AND teacher AND (twitter OR microblog OR “social media”)	117	15 pertinent articles downloaded. Most articles less relevant, drawing from academia, social media for other purposes, professionalism, different disciplines (medicine, librarians), and other social media. Will return to these if needed.
SHU Library Gateway	28/01/2016	(“professional learning” OR “professional development” OR CPD) AND teacher	35503	Terms too broad; included many ‘How to’ or improving practice style articles/books.
SHU Library Gateway	28/01/2016	(“professional learning” OR “professional development” OR CPD) AND teacher filtered for articles only	32163	Still too broad, so sorted for ‘Relevance.’ Even then the uppermost results were from small-scale, very specific (discipline, pedagogical approach, intervention) or from particular sectors.
SHU Library Gateway	28/01/2016	(twitter OR microblog OR “social media”) AND teacher	10842	Too broad once more (suspect search is including “social” rather than “social media.”

SHU Library Gateway	28/01/2016	(twitter OR microblog) AND teacher	231	Included some of the results already downloaded. Majority of results were of use of social media with students.
SHU Library Gateway	28/01/2016	"professional learning"	4209	Sorted by 'Relevance,' top 150 results checked. Included some of the results already downloaded.
Web of Science (All WoS searches filtered to 'Education' discipline only)	28/01/2016	("professional learning" OR "professional development" OR CPD) AND teacher AND (twitter OR microblog OR "social media") AND ("actor-network theory" OR sociomaterial OR ANT)	0	Too many criteria to satisfy?
Web of Science	28/01/2016	("professional learning" OR "professional development" OR CPD) AND teacher AND ("actor-network theory" OR sociomaterial OR ANT)	5	2 downloaded; others less relevant.
Web of Science	28/01/2016	("professional learning" OR "professional development" OR CPD) AND teacher AND (twitter OR microblog OR "social media")	36	3 downloaded 3 repeated from previous search
Web of Science	28/01/2016	("actor-network theory" OR sociomaterial OR ANT) AND teacher AND (twitter OR microblog OR "social media")	0	
Web of Science	28/01/2016	("professional learning" OR "professional development" OR CPD) AND teacher	6250	Criteria insufficiently discriminating.

Web of Science	28/01/2016	("professional learning" OR "professional development" OR CPD) AND teacher Refined to Education/Educational Research and to articles and proceeding	5053	Sorted by 'Most cited' From the top 100 most cited works, and following an inspection of the abstract for relevance, 7 were downloaded.
Scopus	28/01/2016	("professional learning" OR "professional development" OR CPD) AND teacher AND (twitter OR microblog OR "social media") AND ("actor-network theory" OR sociomaterial OR ANT)	0	Restricted to Social Sciences and Humanities
Scopus	28/01/2016	("professional learning" OR "professional development" OR CPD) AND teacher AND ("actor-network theory" OR sociomaterial OR ANT)	11	3 articles were repeated from earlier searches and therefore not downloaded. 1 new article downloaded.
Scopus	29/01/2016	("professional learning" OR "professional development" OR CPD) AND teacher AND (twitter OR microblog OR "social media")	35	4 articles were repeated from earlier searches and therefore not downloaded. 3 new articles downloaded (one was framed within CoPs, but thought it worth checking).
Scopus	29/01/2016	("actor-network theory" OR sociomaterial OR ANT) AND teacher AND (twitter OR microblog OR "social media")	0	
Scopus	29/01/2016	("professional learning" OR "professional development" OR CPD) AND teacher	9217	Even restricting this to 'Social Sciences' results, only reduced this to 8785. Sorted by 'Most cited'

				From the top 150 most cited works, and following an inspection of the abstract for relevance, 13 were articles I already had. 7 were new and therefore downloaded.
BEI	29/01/2016	("professional learning" OR "professional development" OR CPD) AND teacher AND (twitter OR microblog OR "social media") AND ("actor-network theory" OR sociomaterial OR ANT)	0	
BEI	29/01/2016	("professional learning" OR "professional development" OR CPD) AND teacher AND (twitter OR microblog OR "social media")	12	4 articles were repeated from earlier searches and therefore not downloaded. 1 new article downloaded.
BEI	29/01/2016	("professional learning" OR "professional development" OR CPD) AND teacher AND ("actor-network theory" OR sociomaterial OR ANT)	1	Same result as from a previous search.
BEI	29/01/2016	("actor-network theory" OR sociomaterial OR ANT) AND teacher AND (twitter OR microblog OR "social media")	0	
BEI	29/01/2016	("professional learning" OR "professional development" OR CPD) AND teacher	2934	Sorted in order of 'Relevance,' the top 100 results were inspected. 3 articles were sufficiently relevant to download.

Proquest	29/01/2016	("professional learning" OR "professional development" OR CPD) AND teacher AND (twitter OR microblog OR "social media") AND ("actor-network theory" OR sociomaterial OR ANT)	34	Seems a little high when compared with the other databases. Perhaps because Proquest includes theses and dissertations? 4 repeats from earlier searches. 2 documents downloaded.
Proquest	30/01/16	("professional learning" OR "professional development" OR CPD) AND teacher AND (twitter OR microblog OR "social media")	3285	Removed "OR microblog OR "social media"" terms, which reduced the returned results to 1945. Imposing a further restriction to 'Scholarly journals' brought that down to 748. Of these however, there were still a number of news articles and theses among the results. The top 100 results, ordered by 'Relevance' were inspected. 8 downloaded.
Proquest	30/01/2016	("professional learning" OR "professional development" OR CPD) AND teacher AND twitter	304	As above, but rather than filtered for scholarly journals, 'Dissertations and theses' were chosen. Only the first 2 of the top 50 results by 'Relevance' were downloaded; the remainder seemed to be increasingly niche and off-topic.
Proquest	30/01/2016	("professional learning" OR "professional development" OR CPD) AND teacher AND ("actor-network theory" OR sociomaterial OR ANT)	2045	The number of results was reduced to 466 when filtered for 'Scholarly journals.' Of the top 50 results, only 4 seemed relevant and all these had been previously downloaded.

Proquest	30/01/2016	("actor-network theory" OR sociomaterial OR ANT) AND teacher AND (twitter OR microblog OR "social media")	409	The number of results was reduced to 120 when filtered for 'Scholarly journals.' 1 new document found and downloaded; of the top 50 results, most were too niche.
BASE	30/01/2016	("professional learning" OR "professional development" OR CPD) AND teacher AND (twitter OR microblog OR "social media") AND ("actor-network theory" OR sociomaterial OR ANT)	0	
BASE	30/01/2016	("professional learning" OR "professional development" OR CPD) AND teacher AND ("actor-network theory" OR sociomaterial OR ANT)	18	4 results not English 3 results were relevant, but had already been downloaded.
BASE	30/01/2016	("professional learning" OR "professional development" OR CPD) AND teacher AND (twitter OR microblog OR "social media")	32	1 result not in English. 5 relevant results, but all accessed in previous searches.
BASE	30/01/2016	("actor-network theory" OR sociomaterial OR ANT) AND teacher AND (twitter OR microblog OR "social media")	1	Not relevant.
SHU Library Gateway	21/06/2016	(serendipitous OR informal OR incidental) AND teacher AND learning In 'Title' field only	35	Wide-ranging results across theoretical - empirical, different disciplines and educational sectors. 2 relevant results; documents downloaded. 1 for which SHU has no subscription.

				Alert created
Web of Science	21/06/2016	(serendipitous OR informal OR incidental) AND teacher AND learning In 'Title' field only	28	Similar type of results to SHU Gateway, but with little overlap.32 relevant results; documents downloaded. 1 for which SHU has no subscription. Alert created.
ERA	21/06/2016	(serendipitous OR informal OR incidental) AND teacher AND learning In 'Title' field only	30	Some overlap with previous searches, but also some fresh results. 2 documents downloaded. Some results don't appear to conform strictly to the search criteria?
BEI	21/06/2016	(serendipitous OR informal OR incidental) AND teacher AND learning In 'Title' field only	17	Mainly repetition from previous searches.
ProQuest Central	21/06/2016	(serendipitous OR informal OR incidental) AND teacher AND learning In 'Title' field only	26	Mainly repetition from previous searches, though … 1 thesis downloaded.
Scopus	21/06/2016	(serendipitous OR informal OR incidental) AND teacher AND learning In 'Title' field only		Scopus was generating an error, even when the search term was simplified to "learning" across all fields.
BASE	21/06/2016	(serendipitous OR informal OR incidental) AND teacher AND learning In 'Title' field only	26	Some overlap with previous searches, but around half the results were fresh. Of these: 2 documents downloaded (inc 1 thesis). 1 for which SHU has no subscription.

Google Scholar		(serendipitous OR informal OR incidental) AND teacher AND learning		A weekly alert has been set up with these criteria.

General comments:

In addition to the search terms used above, a snowballing technique from the discovered papers was also used to source additional literature. The shaded rows towards the foot of the table were searches conducted after I recognised that 'informal' learning might be area worth exploring.

In the above table, no restriction was imposed on dates or media type, except where specified.

- Articles were only downloaded following an assessment of the abstract for relevance to the research questions.
- All articles downloaded were also added to Refworks (under 'Search strategy results')
- After each successful search, an alert was created and saved within each database. These alerts provide information on papers being released since the initial and subsequent searches.

Reasons why articles **may have been** rejected:

- Related to other educational sectors, rather than primary/secondary i.e. HE/FE/work-based.
- Related to disciplines other than education e.g. medicine, library professionals.
- Professional**ism**, rather than professional learning.
- The context within which the study was conducted was too narrow e.g. professional learning of 6x Teachers of English from two schools in Melbourne implementing a reading strategy.
- The context within which the study was conducted was only loosely related to my research questions e.g. new teacher induction or ITE programme or technology integration as focus.

E My Twitter profile

The following data were produced as part of a module assignment I completed on the MRes Social Sciences course. How they were produced, together with a deeper discussion can be found in this post - https://cpdin140.wordpress.com/2017/01/23/opening-the-field/. This provides a sense of the accounts which generate the tweets I see in my timeline and therefore gives a crude snapshot of part of the 'field' into which I entered.

The data are compiled from a random sample of 152 accounts taken from the 3320 which I was following at the end of December 2017. This graphic illustrates the proportions which:

1. Follow me or don't.
2. Have public or private accounts.
3. Are teachers.
4. Are human (compared with institutional or parody accounts).
5. Are from the different educational phases (or are not).
6. Present with a particular gender.
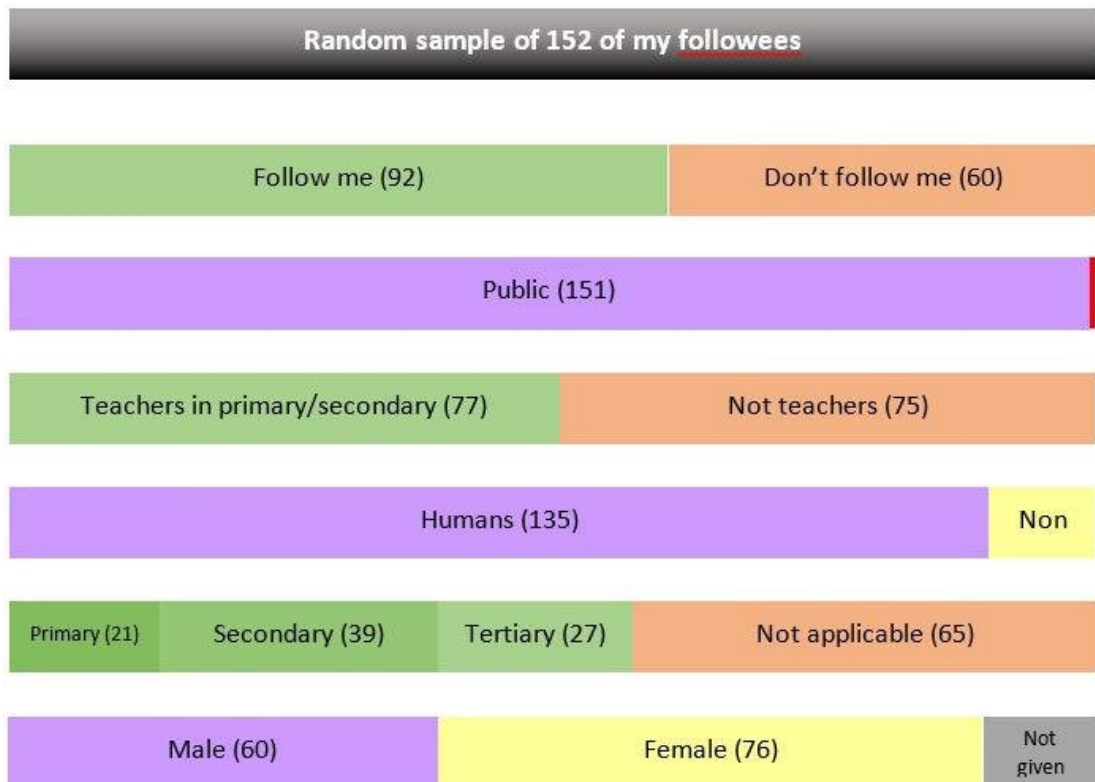
The following charts provide some of the data associated with the accounts in the sample, with the red bar in each case showing the category into which I fit. These show, in order: the number of tweets posted, the number of accounts followed, the number of followers they have, the number of Likes, the number of Lists created, and the geographical area they are located (where specified).

Number of tweets

How many accounts they are following

How many followers they have

Legend:
- 0 - 100
- 101 - 500
- 501 - 1000
- 1001 - 2000
- 2001 - 5000
- 5001 - 10 000
- 10 001 - 20 000
- >20 000

Number of Likes created

Legend:
- 0 - 100
- 101 - 500
- 501 - 1000
- 1001 - 2000
- 2001 - 5000
- 5001 - 10 000
- 10 001 - 20 000
- >20 000

307

Number of lists

Count of ID

Lists

Legend: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16, 17

Location

Count of ID

Total

Location

Categories: Asia, Europe, North America, Not provided, Oceania

F Pilot study methods

Following the pilot study I conducted I reflected on each of the methods employed. The following table summarises those reflections.

Method	Comments	Strengths	Weaknesses	Taking forward?	Rationale
Participant observation	Performed as three separate formal observation, sessions didn't work too well. Nor was the twitter.com interface amenable to this kind of work. These will need reconsidering before taking forward. My role as 'participant' will need clarification. The extent to which I'm 'participating' whilst observing will need careful negotiation.	Allows broad access to the 'field' and the scope to range more widely in following actors as they go about their business. Inherent flexibility. Helps identify potential participants for other data collection instruments. Makes materiality more apparent. Suggests avenues for exploration in interviews. Provides informal opportunities for asking questions of people engaged in the activity under study.	Difficult to manage the balance between participating and observing. Only ever provides a snapshot; this is not a fully immersive experience. What I attend to will depend on my prior experience and may not be the same as another researcher. A challenge to balance between openly ranging across the field and sticking to a predetermined observation protocol.	Yes	Participant observation allows ongoing direct access to the people and the behaviour in which I'm interested. In the Twitter context, the method is unobtrusive and allows those going about their business to be undisturbed. Enables naturalistic behaviour to be observed and reduces observer effects. Like the participants themselves, this method allows the researcher access to the field at times they can manage.

| Focused observation | Strictly speaking this wasn't observation. Real-time observation of a single individual in the context of their Twitter use is problematic, since their usage is likely to be ad hoc. Collecting their tweets provides a secondary method, but one where the context and sense of unfolding activity is lost. | Minimal effort for the researcher in terms of collecting the data. A consistent dataset would be captured even if the researchers were different. | Loss of context makes analysis more complex, and arguably less meaningful. May be a method more people feel less comfortable with. Much of this activity will have happened in the past, making it harder to follow up interesting areas. One month is perhaps too short a period for observation. Knowing they are being observed may influence the participant's behaviour. | No | The time needed to conduct a full case study and address the shortcomings of the method as executed in the pilot would be too onerous. This method might be appropriate if it was the only one being used with a small number of people. Recruiting participants is likely to be more difficult than other methods. This method would add little over and above the other methods being taken forward. |
| Semi-structured interview | Provide an opportunity to generate the rich data that an ethnography demands. Help to shed light on some of the issues which may have arisen in the other methods. | Synchronous and time-bound; the interviewee knows in advance what their commitment will be. As interviewer, I have a better sense of the | There is less time for the interviewee to reflect and perhaps refer back to evidence they might like to offer. There are greater technical challenges than managing | Yes | The interview provides a route to participants' views, attitudes and beliefs regarding their professional learning; things which can't be observed. Once the participants have been recruited and have committed, |

	Since interviewees could be anywhere on the globe, these are unlikely to be face-to-face interviews. This has both advantages and disadvantages for interviewer and interviewee. Offering the interviewee different media through which to conduct the interview introduces greater technical challenges.	interviewee's reactions, emotional and other. The interviewee can choose the time of the interview, and the place with which they are most comfortable. Conducted online, the 'interviewer effects' (gender, age, ethnicity) may be mitigated somewhat.	the single voice recorder that would often be used. In addition, there are two 'ends' for the interviewer to manage. More difficult for an interviewee to indicate they would like to terminate the interview.		the interviewer has far more opportunity to explore interesting avenues that the interviewees reveal. The interviewer is in more control and able to remain closer to the topics raised through the research questions.
Blog interview	Here we are extrapolating from naturalistic data. Participants have already expressed a particular view through the content of their blog post. The interview conducted through the blog comments provides an opportunity for the researcher to follow up	Transcription is not necessary. Interviewee has longer to reflect and can respond at a time convenient to them. Interviewee can provide intertextual links to additional information. The blog post itself provides an additional source of data.	The two different data sources perhaps require two different analytical approaches. Reduction in privacy for participants; the exchange is conducted in public (though as bloggers, this may not be an issue for them). Authors may not respond to the initial request, though	Yes	A lot of potential data already exists in the blog posts which have already been made. This has largely been ignored in online research thus far. Coupled with the capacity to probe the details with the authors, this offers a unique opportunity. This instrument aligns with, and follows on from the fieldwork in participant observation. It may

	interesting themes in the post, or seek clarification.		from a participant's perspective, this could be considered an advantage.		be that blog posts are referenced by tweets, so arguably constitute extensions of the field.
Focus group	Although this didn't unfold as originally planned, the data which emerged provided similar information regarding the efficacy of the method. What was missing was the opportunity to guide the group's discussion and keep it aligned with my research aims.	The data, as found, were more naturalistic than artificially generated by a researcher. Participants don't have to travel to particular location and are able to fit it around their routines. The structure and function of hashtag chats are becoming understood and familiar 'places' for discussions; participants are more likely to be 'at their ease.'	The 'found' data archive indicates that groups conducting hashtag chats may already have discussed professional learning through Twitter as a topic, and therefore might be reluctant to retread ground already covered. Some Twitter users consider the short form of the microblog unconducive to extended discussions. The researcher has much less control over a focus group of this nature than a face-to-face one (number of participants, staying on topic etc).	No	It is possible however, that hashtag chats may unfold during the year and become manifest through the course of fieldwork. Although not acting in the role of moderator and directing the discussion, it would still be possible to be involved as a participant and ask questions, as appropriate.

G Twitter corpora

These are the Twitter #chats I followed closely, either near-synchronously or subsequently. In each case, the theme of the discussions was Twitter and/or professional development related. Each chat, once retweets and spam tweets had been removed, contained a few hundred tweets.

#chat	Date	Opening tweet url
#digitaledchat	24/10/2016	https://twitter.com/stuartkellynz/statuses/790462835944001536
#catholicedchat	29/10/2016	https://twitter.com/participate/status/792350051012083712
#NT2t	29/10/2016	https://twitter.com/shyj/statuses/792347937418293248
#BASDedchat	18/11/2016	https://twitter.com/ezundel/statuses/799401767628849152
#ksedchat	13/12/2016	https://twitter.com/DHEPrincipal/status/808491652130213888/
#PrimaryRocks	06/02/2017	https://twitter.com/JennaLucas81/statuses/828694766820864006
#satchatwc	18/02/2017	https://twitter.com/MsKraushaar/status/832975378197123077

In addition, several brief exchanges discussing Twitter and/or PD were followed and collected. Typically, they might begin with a question or request such as this:

They contain from a handful to a few tens of tweets. The following table catalogues those unplanned exchanges which were collected.

Date	Number of tweets	Opening tweet url
30/10/2016	18	https://twitter.com/HeyMissSmith/status/792326616408027136
06/11/2016	15	https://twitter.com/bridgethelms/status/794435922649456640
28/11/2016	61	https://twitter.com/jonesieboy/status/803237915388018688
27/02/2017	113	https://twitter.com/MrMclugash/status/835487191086288897
06/03/2017	44	https://twitter.com/tombennett71/status/838366590890561536
31/05/2017	102	https://twitter.com/gcouros/status/869581454086418432
20/06/2017	112	https://twitter.com/tombennett71/status/877166301306925056
25/06/2017	53	https://twitter.com/DeputyMitchell/status/878709489268121600

H Interview participants

Interviews from participants who agreed to have them posted online as podcasts can be found at http://www.edutalk.info/category/cpdin140/

The Twitter handle for each interviewee who expressed a preference for a pseudonym, has been omitted.

Initial approach	Name	Notes	Reasons/How recruited	Background
20161020	Deborah Netolicky @debsnet	Completed 20161111	Volunteered after a shout by Aaron Davis	Dean of Research and Pedagogy in an independent Australian Sec. school. Former Head of English in the same school.
20161120	Kevin Hodgson @dogtrax	Completed 20161111	Volunteered after a shout by Aaron Davis	Primary school teacher and participant in the National Writing Project, US.
20161204	John Johnston @johnjohnston	Completed 20170201.	Volunteered after interviewing me on Radio Edutalk	Primary school teacher in small Scottish, rural school. Former LA IT consultant.

20161205	Robin	Completed 20161213	Wrote a shoutout asking for reasons why teachers use Twitter for their PD.	Deputy Head at a Scottish Secondary School
20121208	Aaron Davis @mrkrndvs	Positive response; awaiting confirmation of date. Although no conventional interview was concluded, Aaron did participate using Voxer.	Has been interested in my research, and contributed to it.	Educational technology coach across a number of schools in Australia.
20161212	Stacey Ramm @TiffyBum	Completed 20170105	Followed up the interest Stacey had, as indicated in this tweet.	Primary school teacher, UK
20161220	Joe Dale @joedale	Completed 20161221.	Joe indicated interest by RTing a tweet referring to a previous interview.	Former secondary languages teacher; now freelance consultant.

20170109	Sarah Thomas @sarahdateechur	Completed 20170121	Sarah is a founder of #EduMatch, which is an interesting initiative, slightly different to the usual #chats	Regional technology co-ordinator in the US
20170119	Chris Bailey @mrchrisjbailey	Completed 20170131	Chris has used Twitter in different capacities.	Former primary teacher & asst. Head, UK
20170126	John Heffernan @johnmayo	Completed 20170203.	John is Irish, taught in his home country for a number of years, but is now teaching in Virginia.	Learning technologies integrator in a US school district, having been a History teacher and ITT tutor.
20170301	Kristian Still @kristianstill	Completed 20170309	As a result of a question I asked in a Twitter exchange, Kristian offered to participate. He has been interested in digital technologies and learning through social media for some while.	Headteacher in a UK secondary school
20170108	Charlotte Pezaro	Completed 20170301	Following a tweet to blog post Charlotte wrote, and a subsequent	Former primary teacher, now an ITE lecturer in an Australian Uni.

	@cpezaro		exchange on the post, I asked if Charlotte would grant an interview. Charlotte is no longer on Twitter, but has some strong opinions on it.	
20170306	Francis	Completed 20170331	I wanted to explore how Twitter contributed to the grassroots development that is Pedagoo.	Former secondary school Physics teacher (UK).

This was the information supplied to participants who were considering being involved as interviewees. Variations on this theme were created for those who might participate in Voxer or blog interviews. Copies of these can be found at https://cpdin140.wordpress.com under 'About.'

Sheffield Hallam University

Project Title - Teacher professional learning using Twitter

You are being invited to take part in a study exploring how teachers use social media, like Twitter, to support their professional learning. This is one part of a wider study, looking at the kinds of professional learning which occur in Twitter and any other connected places where this learning might develop.

This research is being conducted by Ian Guest at Sheffield Hallam University (UK) to contribute towards his studies for a PhD. This project has been approved by the University Research Degrees Sub-Committee and the Faculty Research Ethics Committee.

Here are some of the questions you might have, together with their answers:

Why have you asked me to take part?

As an educator who regularly uses Twitter, your insights and experience will be valuable.

What will I be required to do?

Talk about your experiences of using Twitter and other social media to support your professional learning. This will be during an interview with the researcher, Ian Guest (@IaninSheffield).

Where will this take place?

We will arrange a time convenient to you. This will be using an online communication channel like Skype or Google Hangouts.

How often will I have to take part and for how long?

There will be just one interview which will last between 30 minutes and an hour. When the interview has been fully transcribed, you will be sent a copy so you can say whether it accurately represents what you said.

Will I be recorded?

The interview will be recorded (sound only) so that all the information you provide is accurately captured. Only the research team members will have access to this recording. However what you have to say may be of interest to the wider education community. If you give permission, the interview will be saved and published through Edutalk, an online podcasting channel (http://edutalk.cc/). If you do give permission, you may of course be identified from the recording.

You are of course free to choose not to have your recording published online.

Do I have copyright of the recording?

The copyright of the recording rests with the person making it, in this case Ian Guest. However, you nevertheless retain authorship rights over the words you contributed. Where participants agree to the recording being posted online, in the spirit of openly sharing, it is proposed to release it under a Creative Commons, Attribution - NonCommercial - ShareAlike 4.0 license. Further details about this license can be found at https://creativecommons.org/licenses/by-nc-sa/4.0/

When will I have the opportunity to discuss my participation?

Immediately after the interview, you will have the chance to ask any questions. If you think of anything later, Ian Guest's contact details can be found at the end of this sheet.

Who will have access to the information I provide?

During the study, this will just be the researcher, Ian Guest, together with the study supervisors: Dr Mark Boylan, Prof. Guy Merchant and Dr Emily Perry.

What will happen to the information when this study is over?

The recordings and the written versions will be kept for at least ten years in the University archives. More information is available at (http://research.shu.ac.uk/rdm/index.html). If you give permission for the interview to be published online, then it may be available for longer.

How will you use what you find out?

To produce a thesis (a report) which will be kept in the University Library and published through the University's online platform Sheffield Hallam University Research Archive (http://shura.shu.ac.uk/). This is open to the public, so if you wish to read about the research findings when they are complete, you will be able to do so there.

The findings might be also be published in articles in academic journals, or presented during conferences.

Will anyone be able to connect me with what is recorded and reported?

All the information which might identify you personally will be kept strictly confidential. You will not be identified in any published reports or articles. However, **if you give permission** for your recording to be posted online, then whatever details you specify will accompany the recording.

How long is the whole study likely to last?

Three years from the start date 1st October, 2015.

What if I do not wish to take part?

You are completely free to choose to take part or not.

What if I change my mind during the study?

Even if you do choose to take part at the beginning, you can change your mind at any point until the anticipated completion of the study at the end of September 2018. You do not have to give a reason. This can be before or during the interview. If you change your mind later, the interview recording and any notes made from it can be destroyed. If you gave permission for the recording to be posted online, at any point up until the

end of the project, the recording can be unpublished, however please be aware that whilst the recording is online, other people may have downloaded it or made copies.

If you have any other questions please contact Ian Guest (iguest@my.shu.ac.uk or @IaninSheffield).

If you have any concerns about any part of this study, please contact either Ian Guest or Dr Mark Boylan (https://www.shu.ac.uk/about-us/our-people/staff-profiles/mark-boylan)

J Participant Consent Form

Given that participants were almost exclusively geographically distant, consent was obtained using an online form:

Sheffield Hallam University

Twitter Research: Consent Form
* Required

Project Title - Teacher professional learning using Twitter

You should have been provided with an information sheet which provides detailed information about this study.

If you are happy to participate, please answer the following questions by ticking the response that applies:

I have read the Information Sheet for this study and have had details of the study explained to me. *

○ Yes
○ No

My questions about the study have been answered to my satisfaction and I understand that I may ask further questions at any point. *

○ Yes
○ No

I understand that I am free to withdraw from the study within the time limits outlined in the Information Sheet, without giving a reason for my withdrawal or to decline to answer any particular questions in the study without any consequences to my future treatment by the researcher. *

○ Yes
○ No

I agree to provide information to the researchers under the conditions of confidentiality set out in the Information Sheet.

○ Yes
○ No

I wish to participate in the study under the conditions set out in the Information Sheet. *

○ Yes
○ No

I consent to the information collected for the purposes of this research study, once anonymised (so that I cannot be identified), to be used for any other research purposes. *

○ Yes
○ No

I wish to participate in: *

☐ An interview
☐ Making a recording of my Twitter activity

I consent to an audio recording being made. *

○ Yes
○ No

I consent to the recorded interview being posted on an online podcast channel. *

○ Yes
○ No

Personal details

First name:

[ ]

Family name: *

[ ]

Email address: *
(This will only be used for communications related to this study)

[ ]

Contact information:

Researcher: Ian Guest
Email: iguest@my.shu.ac.uk
Address: Graduate School
Unit 7 Science Park, City Campus, Sheffield Hallam University, Howard Street, Sheffield S1 1WB
Tel: 0114 224 6069

[Submit]

Never submit passwords through Google Forms.

K Interview Guide

The following provided the outline I used for most interviews however, this was adjusted slightly for each candidate, to take account of their educational context.

Date: ………………

Interviewee name: …………………….

Rapport building – briefly provide some of my professional history, Twitter usage, the drivers which brought me to this research.

Introductory Protocol

To help my note-taking, I would like to record our conversations today. Can you confirm that you are still happy for that to take place, as indicated when you completed the consent form? For your information, only I and my supervision team will have access to the recording, which will be deleted at the end of the project. I have planned this interview to last no longer than one hour. Thank you for your agreeing to participate.

My research study is seeking to explore the ways in which teachers use Twitter to support their professional learning. You have been selected to speak with me today because you have been identified as someone who has shown an interest in using Twitter for this purpose. My study will not aim to evaluate your experiences, but learn about the ways you use Twitter and other social media and the extent to which that might address professional needs.

Question areas

Question/Probes	Notes
1 Could you briefly describe your role in education?	
Have you always done that? What roles did you have before?	
2 Tell me about how you got started using Twitter.	
How long have you been using the platform? How were you introduced to it? What were your first impressions? What did you think of Twitter before you started using it?	

Do you use any other forms of social networking site? Which?	
3 What kinds of things do you do on Twitter?	
Do you only do these kinds of things on Twitter, or elsewhere too? Would you say these all represent the same kind of activity, or can they be classified in some way? To what extent is what you do planned and/or adhoc?	
4 How do you access Twitter?	
When (time of day, week, school year), where (locations), with what (devices, applications)	
You were invited to participate in this research because you use Twitter to support your professional learning. Tell me about the ways Twitter works for you in this regard.	
Were you using social media or other online resources before you started using Twitter? What and how?	
5 Could you tell me about how Twitter fits with with your 'normal' life?	
Describe a 'normal' day or week's use of Twitter. Some teachers have remarked to me that they couldn't possibly find the time to be involved in Twitter. How do you respond to that?	
6 I'd like to talk now about professional development or professional learning. What do those terms mean to you?	
Are there any other terms you use or associate with this kind of activity? Do you distinguish between them? In what ways? Can you give some examples of the PD/PL you've experienced? Only formal examples?	
Can you describe your school's approach to PD/PL?	
Is there clearly articulated structure/programme? What does it include?	

What say do you have in the PD you experience through school? How is it assessed/monitored? Without naming people, who has responsibility for PD/PL in your school?	
7 What would you say 'drives' your PD/PL?	
How much of an influence have they had on your practice? What impacts have they had. What have the outcomes been?	
8 Tell me about your most powerful or meaningful PD/PL experience.	
What made it so powerful/meaningful? What effects or outcomes did it have for you? Have you come across any of those aspects in other PD/PL contexts?	
9 In your opinion, what should be the purpose of PD/PL?	
To what extent have your experiences reflected that? Would you say those views are shared by colleagues? Why? What evidence would you point to? In some countries and US states, teacher professional development is mandated and specified. What do you think about that?	
10 In the final section, I'd like to explore in more detail some of the linked themes between PL and Twitter. Which aspects of the design of Twitter do you find especially helpful in supporting your PL?	
How do you decide whether or not to follow someone? Are there any hashtags which you find significant or useful with regard to PL?	
What does the term PLN mean to you?	
Where does your PLN extend? What function does it serve? What part does Twitter play?	
11 What do you think people need in order to derive benefit from Twitter for PD/PL?	

Intrinsic - attitudes, approaches, behaviours, dispositions? Extrinsic - technology, time?	
12 Can you tell me about any other forms of PL you've been involved in or are aware of which are similarly self-organised or have been initiated from the ground up?	
What did it/they involve? Where does Twitter fit in with that mix?	
14 If Twitter 'went away,' what would you do?	
What part do specific platforms play?	
That's all the questions I would like to ask. Thank you for your patience and responses. Are there any questions you would like to ask me, either about the topic or about the research project?	

Post Interview Comments and/or Observations

Thank you for giving up your time and providing such interesting and thoughtful answers.

Remark on the positive aspects of the interview

Debriefing

As mentioned before, this interview forms part of a doctoral research study. When complete, the findings will be published in the form of a thesis which will be publicly available through the Sheffield Hallam Research Archive which can be found online. The findings may also be used in published papers and presentations. Progress can be followed through the posts on my research blog at http://cpdin140.wordpress.com.

If you think of any questions, or have any concerns which arise later, you can contact me using the information found on the Participant Information Sheet.

L Methods Matrix

This table provides a discussion of ethics applied to each of the proposed methods. [PIS = Participant Information Sheet]

The 'greyed' rows contain methods which were not taken forward from the pilot into the main study.

Proposed method	Private/public space - nature and norms	Human subject/ authored text	Researcher disclosure	Degree of interaction	Distance	Need for consent	Obtaining consent
Twitterstream immersion	Twitter is a public platform as described by its Terms of Service. The 'community' under study would be expected to be aware that posting there will be visible to all and any posts could be repurposed in multiple ways.	Both perspectives are possible. It is highly unlikely that tweets would be used in their raw rather than aggregate form, but if they were, they would be anonymised.	The stance here is one of 'overhearer' or passive observer, so presence will not be visible. My status as researcher has been visible through my profile and regular blog postings over the past 6 months.	There will be no interaction with participants.	Distance between researcher and participants is high, but between participants and the data they produce is relatively close.	Consent not needed.	N/A
Focused observation	Although Twitter is public, it would be unusual to be closely monitored over an extended period of time. This will undoubtedly be seen as an invasion of	The focus of attention is a single individual and what they say and do. This could be viewed as particularly intrusive.	Full disclosure would be needed at the outset, with permission sought from the potential participant.	After permission is obtained, interaction would be negligible however, a full debriefing would be wise, with reminders of the	Distance between researcher and participant changes during different phases of the study Distance between participant and	Consent needed, both for the study itself and to potentially use anonymised, quoted information.	This person would need to be chosen sensitively; perhaps someone with whom I already have a good degree of trust. A direct

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	privacy.	Data would need to be anonymised.		nature of the study and option to withdraw.	their data is close.		approach. PIS provided and online consent form completed.
Automated collection of tweets	Reusing and repurposing tweets is common practice, both through the retweet function and through other curation tools like Storify.	This will constitute a corpus of data, from which themes will be developed. This will not be linked to individuals, and will only be published in aggregated form.	Since it cannot be know in advance who potential participants/authors might be disclosure would be difficult, other than the general way described earlier.	There will be no interaction with participants.	Distance between researcher and participants is high, as is that between participants and any aggregated findings which might be published.	Consent not needed.	N/A
SNA of hashtag	The focus here is on a topic or theme in a public space; not the behaviour of individuals within that space.	This is a study of interactions and links between people, not of the people themselves. Nor of the texts they produce.	Since the focus is turned away from individuals, this begs the question of disclosure to whom, other than in general.	There will be no interaction with participants.	Distance between researcher and participants is high, as is that between participants and any aggregated findings which might be published.	Consent not needed.	N/A
Twitterchat focus group	This form of public discussion is common, often weekly. Using one as a research study	This is clearly an interview situation in which people will be encouraged to express their	Full disclosure from the outset, but given the fluid nature of the environment,	The researcher will be interacting directly with the participants individually and as	Distance between researcher and participants is low, as is that between participants and	Permission, rather than consent would be sought however, a PIS would be	The initial approach would be through a gatekeeper, but permission would

	however, is not.	opinions.	participants may join the chat who were not present at the start.	a group.	the information they provide.	provided. A debriefing would be offered.	be sought from potential participants prior to and after the chat. The option to withdraw would be highlighted.
Open dialogue	The standard ethnographic practice of following leads in public conversations. Twitter is public and being asked questions is common practice.	This is focused interaction with a person, though their responses could be considered authored texts in a similar way to interviews in newspapers.	Full disclosure prior to any questions being asked. e.g. "I'm conducting research into the topic you mentioned; could I ask you a few questions?"	Direct interaction with individuals.	Distance between researcher and participants is low, as is that between participants and the information they provide.	Consent needed, both for the interaction itself and to potentially use anonymised, quoted information. A PIS would be provided and debriefing offered.	Consent would be sought as part of the initial approach. After reading the PIS, an online consent form would be completed.
Blog 'interviews'	A(n open) blog is a performative, discursive public space which invites comment.	This is focused interaction with a person, but as a result of an authored text they have produced.	Full disclosure prior to any questions being asked. e.g. "I'm conducting research into the topic you mentioned; could I ask you a few questions?"	Direct interaction with individuals.	Distance between researcher and participants is low, as is that between participants and their replies.	Consent needed, both for the interaction itself and to potentially use anonymised, quoted information. A PIS would be provided and debriefing offered.	Consent would be sought as part of the initial approach. After reading the PIS, an online consent form would be completed.
Semi-structured	These will be 1-on-1 semi-structured interviews with	This is focused interaction with a	Full disclosure in advance.	Direct interaction with individuals.	Distance between researcher and participants is low,	Consent needed, both for the interview itself, to	Consent would be sought as part of the initial

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interviews	people chosen purposively from those who are significant to the topic.	person.			as is that between participants and their replies.	publish the interview as a podcast and to publish any quoted data. A PIS would be provided and debriefing offered.	approach. After reading the PIS, an online consent form would be completed, providing consent to all the aforementioned.

Sheffield Hallam University

Our Ref   AM/RKT/D&S-213
22 June 2016

INTERNAL

Ian Guest
Sheffield Institute of Education
Sheffield Hallam University
Howard Street
Sheffield
S1 1WB

Dear Ian,

Request for Ethical Approval of Research Project

Your research project entitled "**Professional development … in 140 characters? Twitter and teacher learning - process and progress**" has been submitted for ethical review to the Faculty's rapporteurs and I am pleased to confirm that they have approved your project.

I wish you every success with your research project.

Yours sincerely

Professor A Macaskill
Chair
Faculty Research Ethics Committee

N Decision flow chart for publication of Tweets
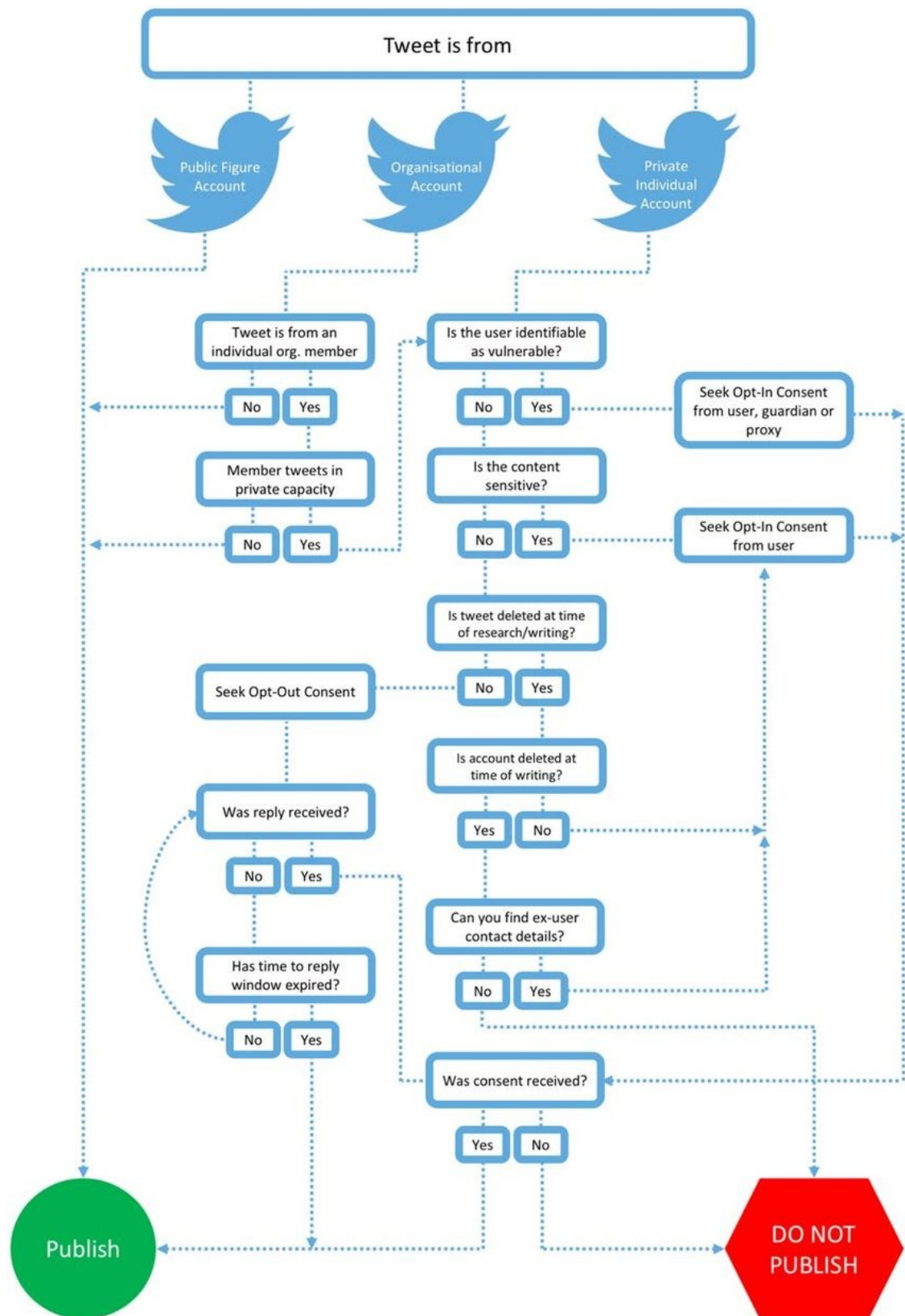
(Williams, Burnap and Sloan, 2017)

O Risks-Benefits for Participants

Once participants' identities are no longer disguised, both potential risks and benefits become more significant. This table summarises possible risks and benefits:

Risks	Benefits
Loss of privacy which could lead to exposure to ridicule and/or embarrassment.	Direct: Increase in participant agency, moving beyond the notion of participants merely as sources from which researchers abstract data.
Change in future circumstances which renders what participants originally said to be viewed in a less-positive light.	Direct: Makes provision for participants to amend or extend what they said in the original interview.
	Indirect: Increasing the awareness and understanding of the wider community of issues associated with professional learning and social media.
Increased attention through increased exposure. This could be perceived as either a risk or benefit and would depend on the participant's preferred online behaviours.	

Mitigation

As with conventional approaches, to make an informed decision, the participant information sheet helped potential participants become aware of:

1. Purpose and potential consequences of the research.
2. Possible benefits and harms.
3. The right to withdraw.
4. Anticipated uses of the data.
5. How the data will be stored and secured and preserved for the longer term.

With items 4 and 5 the circumstances were different depending on whether participants acceded to their interview recording being released. This distinction was made clear at the

outset so participants were able to decide whether to be involved at all and whether they wanted to take that additional step.

At the start of interviews, participants who agreed to the interviews being posted through the consent form were reminded of the above once more, and their verbal consent captured in the recording. In the debriefing after the interview was completed, participants were asked whether they wished to change their minds, and reminded that should they do so subsequently, how they could make those views known.

Procedures

As in the pilot study, potential participants were provided with a participant information sheet, but one extended to include the additional considerations. The form through which they provided their consent was amended to offer options for the different levels of involvement (see Appendix J) and whether they were prepared to allow the recording to be released under a Creative Commons license (see next section).

Given the small number of interviewees, I felt that coping with different levels of involvement should be manageable.

Copyright and Intellectual Property

> …*for data collected via interviews that are recorded and/or transcribed, the researcher holds the copyright of recordings and transcripts but each speaker is an author of his or her recorded words in the interview.*

(Padfield, 2010).

Rather than seeking formal copyright release from participants, it was proposed that the interview recordings will be released with Creative Commons, Attribution – NonCommercial – ShareAlike 4.0 International licensing. Participants were asked at the point of providing consent to state whether they agreed to that release; if they didn't, then the recording would not be released. Once more, potential participants were likely to be familiar with the principles of CC licensing; many of them release their own materials under these licenses. van den Eynden, Corti,, Woollard, Bishop & Horton (2014) recommend the use of Open Data Commons licenses for data released through research, however this licensing system is more appropriate where data is stored in databases and the database itself need licensing separately from the content. CC licensing was chosen since the content will not be wrapped within a database; at least not one which the public will be able to manipulate (copy, remix, redistribute).

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IGuest PhD Data Management Plan

Data collection

What data will be produced?

The methods will include the following:

Method	Associated data
Participant observation	• Field notes - document format • Tweets - collected manually and stored within a Google sheet (but therefore exportable in a more open format) • Analytical notes - document format
Content analysis of blog posts	• Data arising from web crawling - xml/txt files • Blog posts - txt/docx • Analytical notes - document format
Social network analysis of relationships on Twitter	• Files possibly in a proprietary format depending on the SNA package used. e.g. NVivo, but could consider alternatives like Gephi, Meerkat, NodeXL • Tweets - automatically collected using Twitter APIs • Analytical notes - document format
Interviews	• Audio recordings in mp3 format • Transcriptions in document format • Analytical notes - document format

In order to provide more detail to inform the sections above, it is intended to undertake a pilot project, prior to data collection proper. This will inform how and where the data will be stored, the most effective ways to name the files produced and how much space is likely to be required in order to store them.
The intention is that data will be managed and analysed using NVivo. This will also form part of the pilot project.

Data documentation

How will your data be documented and described?

Study-level documentation
A readme text file will be produced to accompany the data files. This will include:

- the context of data collection: project history, aims, objectives and hypotheses

- data collection methods: data collection protocols, sampling design, instruments used, hardware and software used, data scale and resolution, temporal coverage and geographic coverage, and digitisation or transcription methods

- structure of data files, number of cases, records, variables and relationships between files

- data sources used and provenance of materials, eg for transcribed or derived data

- data validation, checking, proofing, cleaning and other quality assurance procedures carried out, such as checking for equipment and transcription errors, data capture resolution and repetitions, or editing, proofing or quality control of materials

- modifications made to data over time since their original creation and identification of different versions of datasets

- information on data confidentiality, access and use conditions, where applicable

Data-level documentation
This will include:

- names, labels and descriptions for variables, records and their values

- explanation of codes and classification schemes used

- codes of, and reasons for, missing values

- data list describing cases, individuals or items studied, for example for logging qualitative interviews

Data storage

How will your data be structured, stored and backed up?

My file naming convention will be systematic, based on the following criteria:
method/respondentidentifier/YYYYMMDD (all lower case).
e.g. interview/respondent07/20151116
Versioning will be twofold:

- where the document format allows for history tracking, this will be enabled.

- where multiple versions exist, an extension will be appended to the file name, e.g. v2 etc.

My directory structure will be arranged hierarchically according to data collection method, then participant/location, however sub-structure will be determined when the actual methods are more clearly established.
Data will be stored in a SHU Research Store (Q drive), to which only I and my supervisors will have access. Backup of this data will be undertaken according to SHU Research Store backup policy.
Data may be gathered 'in the field' in different ways: recorded f-2-f interviews on portable devices (e.g. tablet/phone); interviews through Skype; data extracted from Twitter/blogs from home computer. In all cases where the data cannot be saved directly into Q, the device on which it is stored will be secured according to the SHU Electronic Data Encryption Policy.

Data sharing

What are your plans for data sharing after submission of your thesis?

At the end of the project, data will be stored registered in SHURDA, as is encouraged by the University's Research Data Management Policy.

Future users may include students and researchers.
That data which can be shared will be made available through SHURDA, and in the case of the interviews (where respondents give consent), through an online podcasting platform. According to their Terms of Service, any corpus of data collected from Twitter may not be shared in its raw form. At the end of the project then, all Twitter data will be deleted and not shared through SHURDA.
During the process of gaining informed consent, potential respondents will be provided with details of how their responses are to be stored and shared in the future. During the time period within which the study is undertaken and prior to uploading to SHURDA, should any participant express the wish for their data to be withdrawn, then their data will be withdrawn from the dataset before it is added to SHURDA and the metadata appended to the dataset amended to reflect those wishes.
In addition to research shared through the usual channels (publications, conferences etc), any use of social social media (Twitter & blog posts) will refer back to SHURDA.

Data preservation

What are the plans for the long-term preservation of data supporting your research?

Following the SHU University Records Retention Schedule, which states that primary data generated by research — both on paper and in electronic form, should be kept for a period of:
expiry of "privileged access" / embargo period + 10 years
OR
last date on which access to the data was requested by a third party + 10 years

Q Field notes (Mindview)

Due to its size (*the full-sized version is 7x larger*), this image cannot be shown in full.

Each of the coloured blocks shows one month's obervations and exchanges on Twitter between October 2016 and May 2017.

Each node is a record of a tweet or blog post, the red ones being my tweet contributions or comments on blogs.

A zoomed in snapshot is presented in Figure 15 and discussed on page 89.
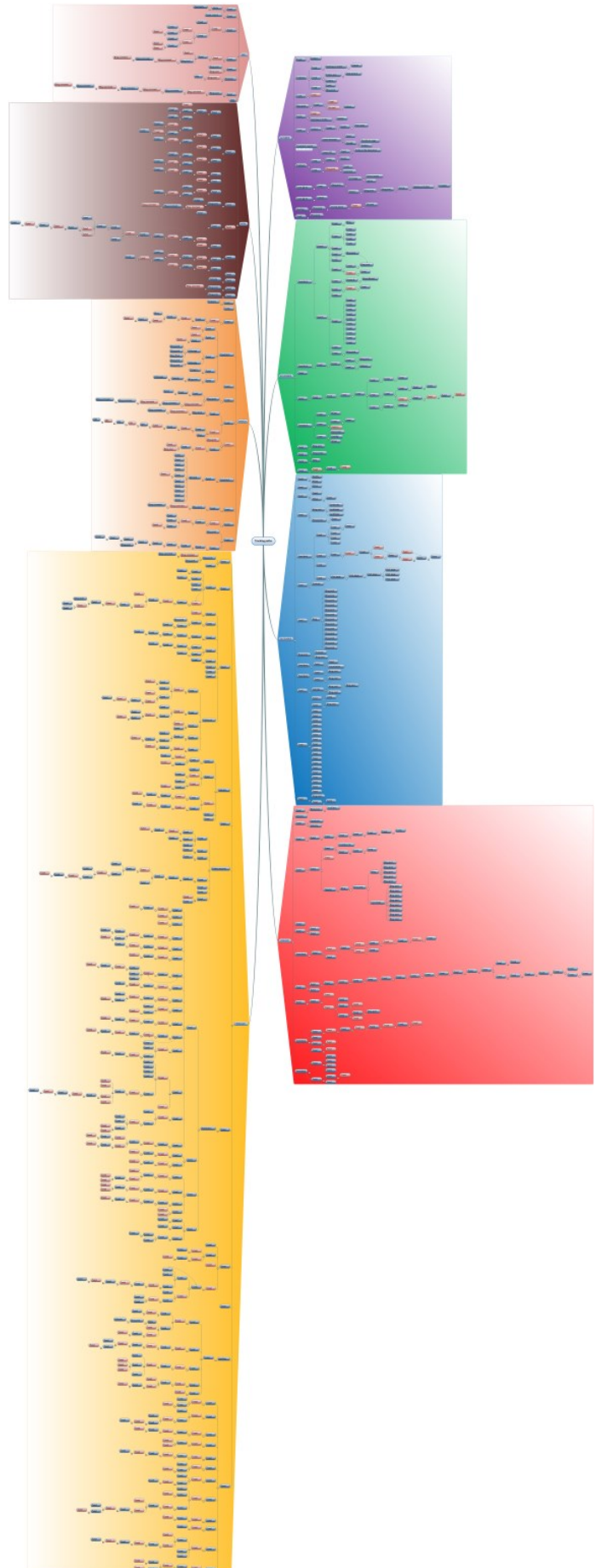
R Data stored in NVivo

The following screenshots provide a sense of how the data were stored within NVivo. Since conventional coding was not used, there are no records provided here for that. The green labels outline what the screenshot shows.

Research notes made during participant observation

FILE   HOME   CREATE   DATA   ANALYZE   QUERY   EXPLORE   LAYOUT   VIEW

Go   Refresh   Open   Properties   Edit   Paste   Cut   Copy   Merge   B I U   Reset Settings   PDF Selection   Text   Region   Find   Insert   Replace   Delete   Spelling

Workspace   Item   Clipboard   Format   Paragraph   Styles   Editing   Proofing

Sources

Look for   Search In   Posts   Find Now   Clear   Advanced Find   x

Posts

Name	Nodes	References	Created On	Created By	Modified On	Modified By
20150305 The Professional Power of Twitter by Tim_Jumpclarke		28	112	03-Jan-17 2:20 PM	IG	02-Oct-17 2:26 PM	I F
20160404 25 Pedagogical Ideas found by teachers using Twitter to support Profess		1	1	03-Jan-17 2:20 PM	IG	02-Oct-17 1:21 PM	I F
20160713 Birds of a feather tweet together by CambridgeMaths		16	32	03-Jan-17 2:20 PM	IG	02-Oct-17 1:25 PM	I F
20161008 Twitter in the Classroom		23	87	05-Jul-17 1:07 PM	IG	05-Jul-17 1:07 PM	IG
20161117 Twitter is not the best CPD_Doug Belshaw		0	0	15-Jul-17 9:36 AM	IG	29-Sep-17 12:35 PM	I F
20170328 Twitter Chats for Recertification		16	75	05-Dec-17 2:07 PM	I F	05-Dec-17 2:10 PM	I F
20170410 Social Online Networks in Teaching Professional Development_Stuart Ke		14	19	10-Apr-17 2:33 PM	IG	29-Sep-17 12:34 PM	I F
20170429 From Dewey Decimals To Hamstra Hashtags_4 Steps to Sharing Learnin		4	19	30-Sep-17 7:46 AM	IG	30-Sep-17 7:46 AM	IG
20170501 Twitter is dumb Or is it_Jaime Donally		22	40	16-Jul-17 8:03 PM	IG	29-Sep-17 12:33 PM	I F
20170601 But tweets are like poppies spread_JJohnston		0	0	24-Sep-17 8:31 PM	IG	24-Sep-17 8:31 PM	IG
20170712 Twitter Changed My (Teaching) Life		3	7	18-Jan-18 12:29 PM	I F	18-Jan-18 12:29 PM	I F
20170816 Too much of a good thing		3	4	18-Jan-18 10:02 AM	I F	18-Jan-18 10:02 AM	I F
20170914 Twitter for Professional Development_Nick Schumacher		26	45	14-Sep-17 1:58 PM	I F	14-Sep-17 1:58 PM	I F
20170914 Twitter I Think I Figured It Out_Blog post by Dave Mulder		27	49	14-Sep-17 1:12 PM	I F	14-Sep-17 1:12 PM	I F
20170920 Twitter Hugs_JJohnston		4	4	20-Sep-17 9:09 AM	I F	20-Sep-17 9:10 AM	I F
20171205 My OneSmallThing Growing and Connecting on Social Media_Nesloney		25	50	05-Dec-17 2:16 PM	I F	05-Dec-17 2:16 PM	I F
20171205 Twitter is full of things I dont understand slowchat SLTchat teacher5aday		15	21	05-Dec-17 2:17 PM	I F	05-Dec-17 2:17 PM	I F
20171212 Education hashtag chats_Ashman		13	51	12-Dec-17 9:54 PM	IG	12-Dec-17 9:54 PM	IG
20171212 Reflecting on education Twitter chats_Netolicky		25	58	12-Dec-17 9:53 PM	IG	12-Dec-17 9:53 PM	IG
20171212 Why I love Twitter and I hope it has a future_Netolicky		33	80	12-Dec-17 9:53 PM	IG	12-Dec-17 9:53 PM	IG
20180102 What Twitter Means to Me_Macmillan		20	24	03-Jan-18 11:57 AM	I F	03-Jan-18 2:49 PM	I F
staffrm.io-My tentative steps into Twitterland		17	34	04-Dec-17 1:59 PM	I F	04-Dec-17 1:59 PM	I F
staffrm.io-Tweaching		23	37	05-Dec-17 2:18 PM	I F	05-Dec-17 2:18 PM	I F
staffrm.io-Youre not doing it right Twitter and my CPD		14	19	24-Dec-17 7:37 AM	IG	24-Dec-17 7:37 AM	IG

Internals
  Fieldnotes
  Images
  Interviews
  Posts
    Commented posts
    RoCur
  Tweets
Externals
Memos
  Fieldnotes
  Interviews
  NVivo
  Posts
  Tweets
Framework Matrices

Sources
Nodes
Classifications
Collections
Queries
Reports
Maps
Folders

IG   24 Items

Blog posts captured as PDFs

Tweet corpora from chats and shorter exchanges.

Memos providing comments and observations for each data source.
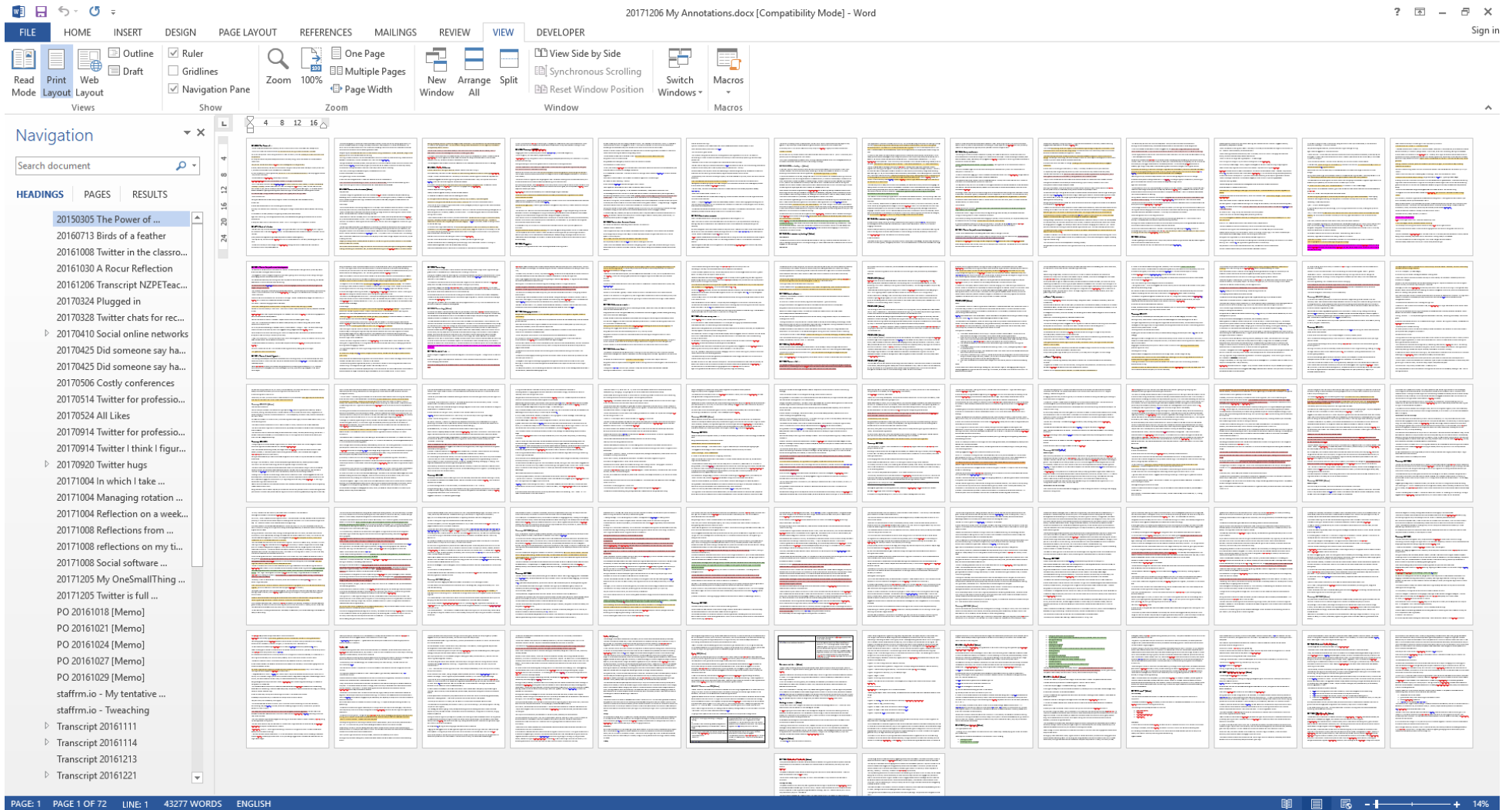
Snapshot of the single document into which all annotations and memos were assembled after exporting from NVivo.

S #Chat Calendar

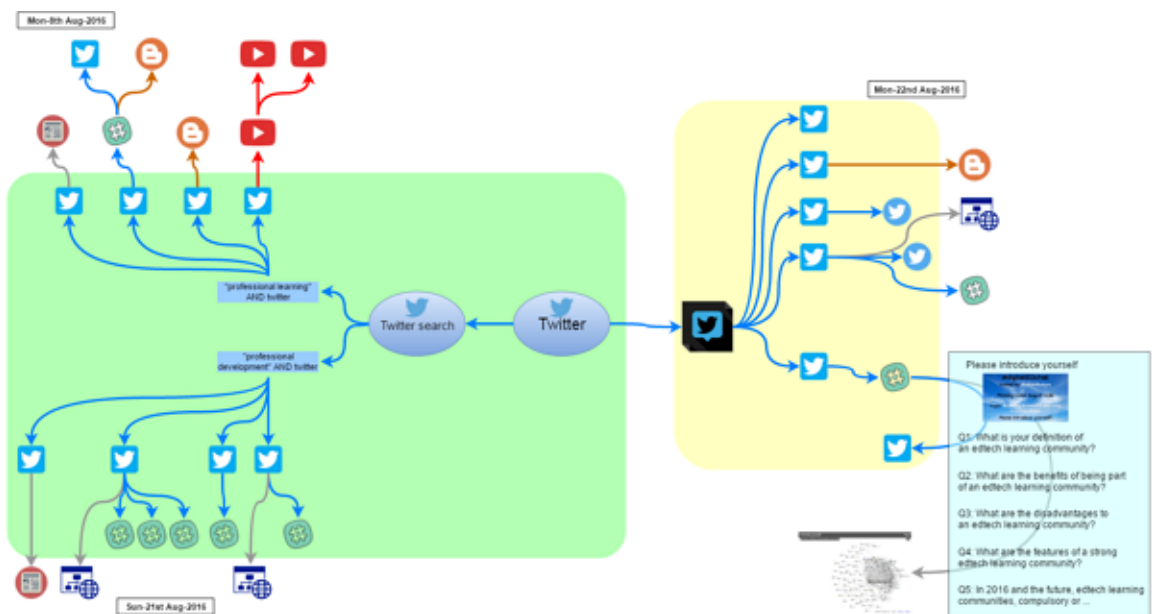This is a screenshot of a curated calendar showing educational hashtag chats for the month of May 2018:
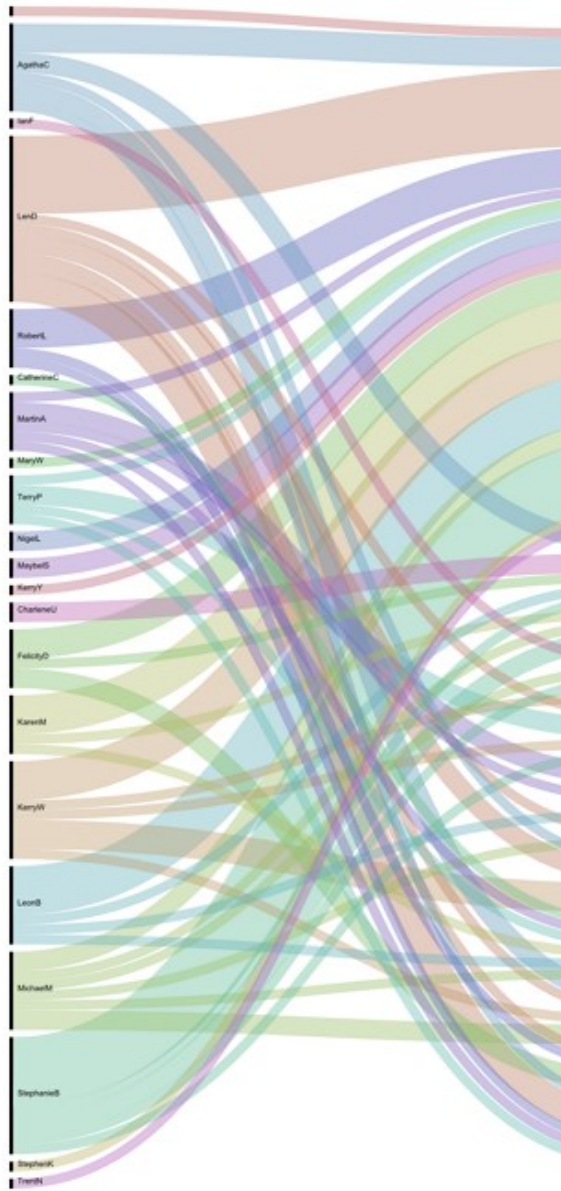
T Example visualisations

The following handful of visualisations provide a sense of the different forms which emerged whilst visualising activity.
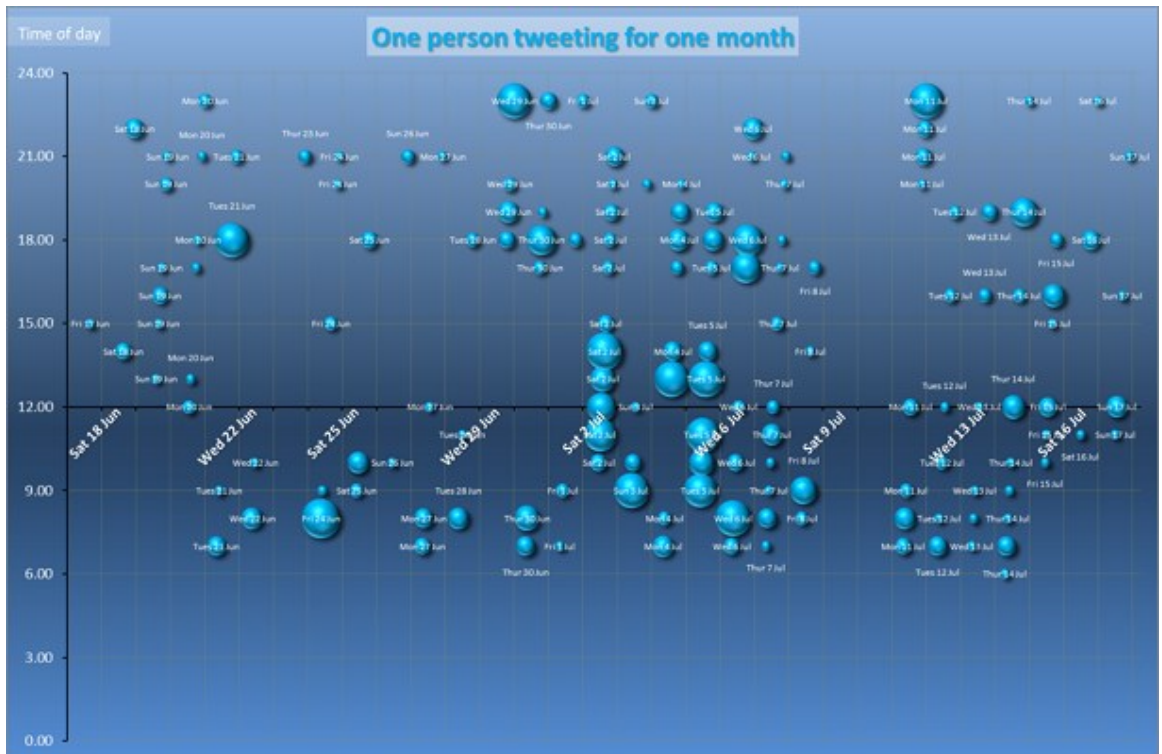
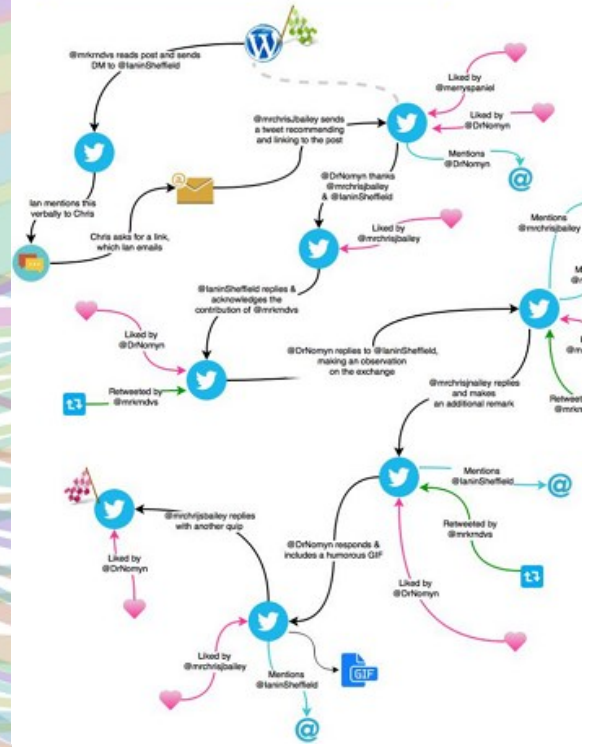One month's tweeting activity of a single tweacher (from the pilot study)

An early attempt at capturing and presenting Twitter observation sessions

Visualising who mentions whom during a hashtag chat.

A different way of capturing and presenting a brief Twitter exchange.