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The Importance of Twitter in the Professional Development of Digitally-Engaged Head Teachers

Tim Jefferis and Tom Bisschoff

Abstract: *In this paper the authors developed a model for understanding the professional development of digitally engaged head teachers. They did this by synthesising the work of Gronn, Puentedura and Dixon, whilst focusing on Twitter as a tool for professional development. Three research questions were used to explore the link between Twitter and professional development for 21 head teacher participants: Why are certain head teachers using Twitter?; How deep and broad are the networks of the sampled head teachers?; What are the ways in which Twitter has contributed to head teachers' professional development and career progression? In the model, head teachers are seen to interact online with differing levels of depth and sophistication as their careers progress. Findings suggest that the most engaged at each stage stand to gain the most from their involvement and Twitter was used to: connect with other professionals and expand their professional networks; seek out the opinion, counsel and support of others; get professional news early, and in an easily-digestible format; expand their knowledge, influence and connections through serendipitous online meetings.*

Keywords: Twitter, professional development, head teachers

Introduction

According to Elias (2012: 30), it is 'only natural' that social media networks have begun to provide an alternative structure for the 'personal and professional growth of school leaders'. Increasingly, school leaders are voicing their enthusiasm online. This passage from the blog of a London head teacher extolling the virtues of Twitter, is typical of the genre:

I've 'met' some great fellow educators on my phone and iPad and I've met some in real life too. I've read fascinating papers and articles, and been guided to books that have changed the way I teach and learn. It encouraged me to start blogging. It's allowed me to enter into feisty and enlightening debate... I've even been offered a job. Do it. And recommend it to others. (Sherrington 2013)

The community Sherrington describes holds all the characteristics of the ‘personal learning network’ (PLN) that Deyamport (2013) identified as a defining feature of many teachers’ Twitter use. According to Elias (2012), a broad and effective PLN is something many teachers on Twitter (commonly referred to as ‘tweeps’ or ‘tweachers’) have gone to great efforts to construct.

It is not just on Twitter itself that the usefulness of the medium is championed – more traditional forms of peer-reviewed publication also point to Twitter’s usefulness for leaders in schools. Dixon (2012) cites Twitter as an essential tool for head teachers and draws attention to its power to transform the way some of the traditional functions of leaders are carried out (see Table 1)

Table 1: Some of the Ways in which Twitter has Changed the Way School Leaders Go about their Tasks (Dixon 2012: 48)

Task or Goal	Traditional Method	Using Twitter
Directly reaching out to a local celebrity	You would call the celebrity’s office, write him or her a letter or work your network to try to get his or her attention.	You can use the celebrity’s @username tag to make direct contact with him or her on Twitter.
Reminding students and families about a school event	You would send a newsletter home, make phone calls, or post the event to your school website.	You can post the reminder on your Twitter account.
Finding great articles to read on your topic of interest	You would scan the table of contents of education magazines or websites.	You can use keywords on search.Twitter.com to discover articles recommended by people you trust.

The sort of professional development offered by social networking sites like Twitter is seen by its champions as more democratic, more collaborative, more easily accessible and, of course, totally free (Elias 2012). In this respect social networking stands in stark contrast to more traditional forms of professional development which can be ‘fleeting in duration, narrow in focus and top-down in [their] creation and delivery’ (Rutherford 2010: 61).

In light of its burgeoning importance then, this study explores the use of Twitter by head teachers in schools. It attempts to uncover the extent to which Twitter use is impacting upon their professional lives.

Literature Review

Various strands of research already published in the field of social networking amongst school leaders are introduced here. Before embarking on these discussions, however, we define the many specialist terms that are associated with social networks and with Twitter in particular.

Social network sites are defined by Boyd and Ellison (2007: 211) as internet services that allow individuals to:

- construct a public or semi-public profile within a bounded system
- articulate a list of other users with whom they share a connection
- view and traverse their list of connections and those made by others within the system

Boyd and Ellison (2007) acknowledge that the nomenclature used by the various providers for each of these facets of social networking varies. Twitter uses the following terms for each of Boyd and Ellison's criteria:

- a user's profile page (with associated avatar usually, but not always a picture of the user's face)
- a list of followers (people the user has a connection with)
- tweets, retweets (RTs) and direct messages (DMs) and hashtags (#) (ways of making connections and/or traversing their list of connections)

Thus Twitter has all the attributes that Boyd and Ellison (2007) regard as constituting a social network. In addition, Twitter, in common with most other social networks, has associated with it a host of specialist terms (see Table 2).

Table 2: Key Terms Associated with Twitter Use

Term	Explanation
Edchat (or #Edchat)	An Edchat is a Twitter-driven discussion using a hashtag (cf). Educators typically gather together online at a set time to discuss a range of agreed topics.
Twitter handle	This is a user's username, and always starts with an @ sign e.g. @tjjteacher.
Tweacher	A moniker sometimes used for teachers on Twitter.
Twitterati	A term widely in use to describe those on Twitter with large followings who are seen as thought leaders in their particular field of expertise.
Tweep	A person who is on Twitter – who may or may not be a teacher or leader.
Tweet	Anything written or published on Twitter up to a maximum of 140 characters. Tweets can also include links to other parts of the internet and pictures or videos.

Follow	A person wishing to receive tweets from another Twitter user needs to follow them. Anyone can follow anyone else, without having to ask for permission.
Follower	A follower is someone who has elected to receive your tweets direct to their Twitter stream (qv).
Follow back	The unwritten convention on Twitter is that someone who is followed by a particular user follows them back so that each receives each other's tweets.
@reply	This occurs when you want to mention a specific user on Twitter using their @username Twitter handle. Mentioning a user in your tweet in this way alerts them in their Twitter account under mentions even if you do not follow that person.
Direct message (DM)	A direct message is similar to an e-mail, when you direct message someone only they can see your message. This is the only type of communication on Twitter that is private. It is not possible to direct message someone who is not following you.
Hashtag (#)	If you are tweeting about a particular topic or event and you want to allow other Twitter users to find all the tweets about that topic in one place you need to use a hashtag. Using a hashtag before a word or phrase makes it into a hyperlink that can then be clicked on to reveal all the other tweets on Twitter containing the same word or phrase.
Modified tweet (MT)	The prefix MT stands for 'modified tweet' and signifies that a user has reposted something belonging to another user on Twitter with subtle modifications.
Twitter stream	Everything you tweet on Twitter, together with all the tweets of the people you follow, appears on your Twitter stream. This is similar to an e-mail inbox in that it lists all the communications that are going on between you and your followers.
Retweet (RT)	Users who find another user's tweet particularly interesting can retweet it. This has a similar effect to forwarding on an e-mail. A user who retweets a tweet sends the communication on to all their followers.
Twitter lists	As users begin to follow more and more people, their Twitter stream (qv) can become crowded. By creating a list, a user can restrict the tweets seen to only those from certain people. For example, it is possible to set up a friends and family list, which would show only tweets from people who fell into this category. This allows users to get rid of the 'noise' on Twitter and home in on what interested them.

For many tweeps, Twitter is the first place they go to for news, for information and for real-time interaction with colleagues and acquaintances. Part of the attraction of Twitter is that

such networks and connections take no account of international borders; tweeps are able to freely converse with like-minded people from around the world.

Conversations take place around the clock with activity spiking at key times in various time zones. With everyone able to say whatever they want, whenever they want, some tweeps can start to feel overwhelmed by the volume of information that appears in their stream. Hashtag chats have developed to allow users to focus in on just the topic or event that interests them. Many tweeps find these chats a good way to get involved in real-time discussions with other educators on Twitter (see Table 3).

Table 3: UK Educational Chats (Tait 2014)

	Hashtag	Time	Content/description
Whole school issues	#ukedchat	Thursday 8pm	The most popular education chat for UK teachers
	#edchat	Tuesday 5pm	Go global by joining in the chat with teachers around the world
	#sltchat	Sunday 8pm	Senior leaders chat about the big issues in education
	#pedagoofriday	Friday all day	Teachers discuss their best moment of the week
Specialisms	#literacychat	Monday 8pm	Alternating with #engchatuk every other week
	#englessonchat	Every other Sunday 8pm	English teachers
	#mathscpdchat	Tuesday 7pm	Maths teachers
	#asechat	Monday 8pm	Science teachers
	#pechat	Monday 7pm	Physical Education teachers
	#dtchat	Wednesday 8pm	Technology teachers
	#Sendchat	Tuesday 8pm	Chat about all things special needs
	#ukgovchat	Sunday 8.45pm	School governors and governing body issues

In order to manage the torrent of information that fills a given user's stream, Twitter also has a built-in search functionality (so that tweets by a particular user, or about a particular topic, can be called up). Twitter also algorithmically suggests material that might be of interest to users under the #Discover tab. Here users are given further suggestions on who to follow and can view what activity has taken place amongst those in their circle of interest. In this way, their network, and the strength of the connections within it, grows.

The Passage to Headship

There have been numerous attempts over the years to delineate the lives of head teachers. Broadly these attempts fall into biographical, career-centric or a combination that can be labelled life and career. Biographical models emphasise the influence of childhood and on-going external influences on the career journeys of leaders. In contrast, career-centric models focus more closely on the machinations of the workplace. Life and career models, however, attempt to meld the key elements of the former two together. Each framework has different strengths in terms of its ability to accurately describe leaders’ career journeys. In this study, Gronn’s (1999) model (refer to Figure 1) – unashamedly biographical in its approach – was chosen as the lens through which to view leaders’ careers. Gronn identifies various stages that leaders go through on their career journeys, whilst emphasising the role that outside influences play in a given leader’s progress.

Figure 1: The Process of Leadership Formation (Gronn 1999: 35)



Often a number of factors conspire – many of them beyond the control of aspirant leaders themselves – to govern the speed and fluidity with which leaders climb their career ladders. Gronn (1999: 34) emphasises the role of ‘socialisation agencies’ and ‘reference groups’ as having a key role in leaders’ lives. Herein lies the rationale behind adopting Gronn’s model of leadership progression over the alternatives. Other models have been rejected on the basis that they:

- either fail to make such explicit, eloquent – almost prescient – reference to external influences such as ‘socialisation agencies’, ‘reference groups’ and even ‘followers’ (Gronn 1999: 31)
- and/or entail a form of evidence gathering over an extended period of time that is not suited to the time-bound nature of this study

Professional Development amongst Head Teachers

There is a considerable body of literature which deals with traditional approaches to professional development amongst school leaders. Change and improvement is frequent. Policy makers feel ‘compelled to develop and modify their national training strategies’ to equip head teachers and with the knowledge and skills that they need to perform their roles to the best of their ability (Bolam 2003: 74). Bolam (p. 74) outlines what he sees as the main characteristics of leadership development:

- an ongoing process of education, training, learning and support activities
- taking place in either external or work-based settings
- proactively engaged in by qualified, professional teachers, head teachers and other school leaders
- aimed primarily at promoting the learning and development of professionally appropriate knowledge, skills and values
- to help school leaders to decide on and implement valued changes in their leadership and management behaviour
- so that they can promote high quality education for their students more effectively
- thus achieving an agreed balance between individual, school and national needs

And although there are national variations, head teachers everywhere face difficulties because of ‘...the complexity of their roles and tasks; changing external pressures and demands [and] poor access to professional training, development and support, both before and after appointment’ (Bolam 2003: 77). Such difficulties are highlighted in other studies too, serving to underscore the importance of getting professional development for head teachers right. With ‘schools everywhere being asked to do more than ever before’ and where leaders face a ‘complex world and seemingly endless set of pressures’ (CERI 2001: 13), inadequate training and access to professional development opportunities is damaging.

Several studies have shown that senior leaders tend to express a preference for informal forms of professional development over more formal ones. Billett (2008), for example, views

professional learning as inextricably linked to the social elements of workplace encounters; whilst Ribbins and Gunter (2002: 388) argue that leadership development is best understood ‘through the gathering of professional experiences from within contextualised settings’. They emphasise the messy, organic nature in which most senior leaders further their training and experience. The informality of many senior leaders’ learning is reflected in Erlaut’s (1994) theory of professional development where unstructured acquisition of knowledge and expertise plays a significant role. Brundrett and Zhang (2010: 156), having interviewed 34 school leaders in various different contexts, found that: ‘An almost ubiquitous response from respondents indicated that leadership learning arose out of a variety of informal routes, such as group work, learning communities and collaborative work across schools.’ Leaders, it seems, prefer learning to be informal and to involve co-workers in a shared experience. It is no surprise that informal coaching and mentoring networks have become one of the cornerstones of the work carried out by the National College for Teaching and Leadership (NCTL) – networks whose very existence depends as heavily on socialisation in the virtual world as it does on socialisation in the physical one. Informal influences are a key feature of Gronn’s pre-Twitter conceptualisation of leaders’ career journeys (see Figure 1).

Research Design

Having discussed the relevant literature and laid out the rationale for this paper, this section focuses on the methods that were employed in this study to begin answering the research questions.

Method 1: Twitter Content Analysis (A Netnographic Method)

Twitter content analysis has much in common with the more traditional method of non-participant observation described by ethnographers like LeCompte, Millroy and Preissle (1993). A huge amount of data can be collected, particularly where the researcher is immersed in the context for some time, allowing for the generation of detailed descriptions. Such descriptions are data-rich and allow researchers to answer their research questions with a level of detail and confidence that would not attend more perfunctory data collection methods. Reliance on the researcher’s own inferences is kept to a minimum because so much first-hand evidence abounds.

Borrowing heavily from the method adopted by Elias (2012), 100 tweets were collected from each participant at random using a proprietary tool known as TwDocs. The process played out as follows:

1. Contact was made, via Twitter, with a selection of senior leaders in school. Twenty-one agreed to participate. These leaders were found using searches for terms like head teacher, leader and teacher. All the while a conscious effort was made to ensure that the sample included individuals representing a diversity of genders, cultures, years of experience and types of school. In this sense the sample was a stratified purposeful sample of the type envisaged by Creswell (2007).

2. A specific focus was made of the Twitter accounts of school leaders themselves, rather than those of their organisation. Users were found by searching for suitable biographies, twitter handles and avatars (head teacher/headmaster etc.) on Twitter and by scouring the followers of known school leaders.
3. Those school leaders with Twitter accounts were added to a 'list' in TweetDeck to allow for close communication between the researcher and participants for the duration of the study.
4. Prospective participants were followed and then @ messaged to gain their attention. They were sent an electronic copy of the informed consent form and asked to digitally sign and return it to indicate their willingness to participate.
5. Following the example of Risser (2013), a coding scheme was adopted for tweets and is shown in Table 4.
6. Additional data, such as number of followers and number of tweets/retweets were also recorded. Each tweet was categorised as being professional or personal in content.

Table 4: The Coding Scheme to be Used, Based on One Designed by Risser (2013)

Conversation code	Example tweet
Request for information	Does anyone know where I can get and ISI lesson obs proforma?
Sharing of news	Have you seen this: http://goo.gl/wrNKc ? #ukedchat
Sharing of resources	This might be useful for some of you: http://goo.gl/dnFt9 #teachingresource
Showing appreciation	Thanks – see you tomorrow
Showing displeasure	Michael Wilshaw doesn't know what he's talking about #whatanutter
Responding to others	@headguruteacher thanks for that RT

In order to ensure that the categories used for coding were discrete and returned data of heuristic value, the study was piloted over a short period first. This was done with a view that it would 'iron out any problems' (Cohen, Manion & Morrison 2000: 306) and so reinforce the validity of the study.

Studies of this kind often employ teams of people to code responses and thus run into issues of inter-rater reliability. Such problems were circumvented in this study as all the coding was carried out by the researchers themselves.

Method 2: Semi-Structured Interviews

The second method of data collection in this study involved the use of a semi-structured interview to elicit further information from the 21 participants about their Twitter use.

A pilot interview was conducted with a Twitter-using head teacher to establish whether the questions devised produced meaningful responses. The pilot interview identified omissions and showed where there were opportunities to extend or alter the questions posed. Following the pilot interview, the necessary adjustments were made to the interview prompts. Interviews were conducted face-to-face and usually lasted between 45 minutes and an hour. Audio files were recorded using Evernote™ and were then transcribed for closer analysis.

Sampling

Sampling was largely through self-selection – potential interviewees volunteered their services through Twitter and/or were directly approached. Fortuitously the sample included individuals from a range of different types of educational establishment. There were 21 participants (tweeps) in total.

Ethical Considerations

In recognition of the fact that observation is not a ‘morally neutral exercise’ (Cohen et al. 2000: 316), consideration was given to the ethical guidelines outlined by the British Educational Research Association (BERA 2011).

The BERA guidelines denote confidentiality and anonymity treatment of participants’ data as being normative. Therefore, in all the semi-structured interviews, participants were assured of the anonymity of their responses. Also in line with BERA guidelines, respondents were to be asked to complete an informed consent form. This consent form alerted participants of their right to:

- correct the written record
- withdraw at any stage
- maintain their confidentiality throughout

BERA guidelines make no mention of the suggested protocols for the mining of publicly available data from social networks like Twitter. Sitting and observing the action on Twitter from the side-lines could be viewed as a form of covert research which appears to fly in the face of the principles of informed consent. But Mitchell (1993) argues that there are some sources of knowledge that are legitimately in the public domain – Twitter, surely, falls into this category. Indeed, the data held on Twitter are more akin to secondary data than to the primary data that the BERA guidelines circumscribe. The most widely used primers on educational research methods – Cohen et al. (2000) or Denscombe (2003) – have nothing to say about the ethics of mining for data on social networks. There is a gap in the literature here. In an article on this very issue Zimmer (2010: np) argues that although tweets are in the public domain there is a reasonable expectation that:

... one's tweet stream will be practically obscure within the thousands (if not millions) of tweets similarly publically viewable. Yes, the subject has consented to making her tweets visible to those with the time and energy to seek her out.... But she did not automatically consent, I argue, to having her tweet stream systematically followed, harvested, archived and mined by researchers.

To err on the side of caution, participants in this study who have their accounts added to the research list in TweetDeck were @ messaged to inform them of their involvement in the study. Thus accusations of deception or covert surveillance were avoided. Additionally, respondents' Twitter handles were altered so as to make their contributions anonymous.

Findings

RQ1: Why Are Certain Head Teachers Using Twitter?

The analysis of respondents' tweets yielded a rich seam of numerical information concerning educators' use of Twitter. Several themes emerged about which there was agreement amongst respondents. These themes were reinforced by information gleaned from the Twitter timelines of respondents, from respondent blog posts and from other grey sources of literature. In this way a high degree of triangulation proved possible. In what follows, the themes that emerged are discussed.

Connectedness

Most head teachers use Twitter principally as a social tool – one for connecting with other educators and entering into discussions with them. In all but one case the single biggest tweet type for study participants was one that involved directly responding to others. On average, 59.8 per cent of head teachers' Tweets involved responding to others in some way – though the actual figure is higher than this because Tweets showing displeasure, appreciation or the sharing of news could often have been coded as responses to others too in many cases. In interviews, this strong emphasis on interaction was reinforced. In many cases respondents reported having made personal friendships through Twitter. One tweep, for example, reported that she'd made 'genuine friends' through Twitter. She continued: '...we go and stay over each other's houses our children know each other' (@mulholland).

Others related stories in which they had made personal connections with influential educators in a way that would not have been possible in the pre-Twitter age. In one powerful personal story, a tweep described connecting through Twitter with Mike Cladingbowl, the National Director of Inspection Reform at OFSTED. This tweep explained that not only did Twitter play a role in setting up a face-to-face meeting, but also in crowd-sourcing questions from governors that should be put to him:

[A] few months ago Mike Cladingbowl had tweeted that he would be arranging seminars in order to meet personally with people working in schools and exchange ideas/thoughts. I asked if governors could come along too and Mike replied that he was very happy to talk with governors and had done so in the past... Once the date

for the meeting had been confirmed, I asked governors on Twitter if there were any questions they wanted me to ask on their behalf. (@robb)

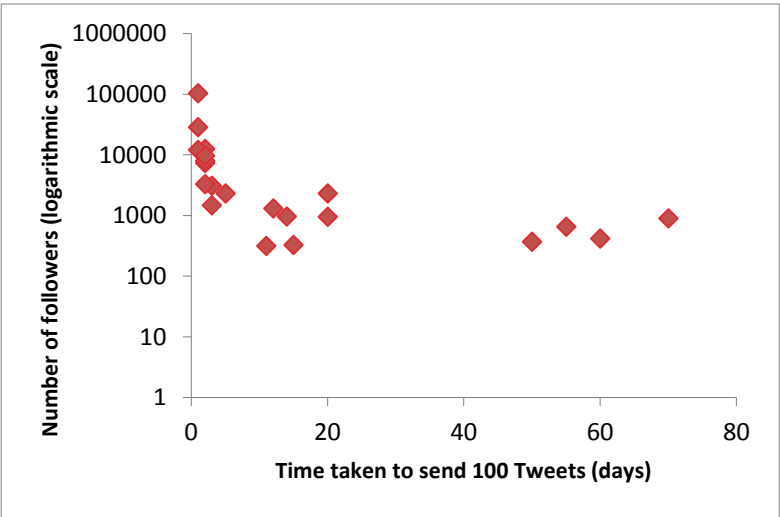
Time and again respondents related similar stories illustrating how Twitter had enabled them to connect with decision makers and thought leaders in education as well as with other educators carrying out similar roles.

One of the respondents explained how she was an OFSTED inspector as well as a head teacher. She reported finding out about new initiatives from OFSTED first via her Twitter feed, rather than via more conventional means. Twitter, she argued, gave her the edge over leaders not on the platform because breaking news in education was often discussed first there before it made its way into the more traditional forms of media. Like many of the respondents, she had got into the habit of checking her Twitter feed first thing in the morning so that she was up-to-date with the latest news before starting work for the day.

Equally, several respondents were keen to stress the way in which Twitter had allowed their networks to extend beyond national boundaries. One tweep related how she had organised a conference in New Zealand for antipodean geographers. In doing so she had connected with a series of British geography teachers who asked that she set up a hashtag for the conference to allow them to follow proceedings in real time. She explained how teachers from the UK were able to ask questions of eminent speakers remotely through their use of the conference hashtag (#).

Further analysis of the results extracted using TwDocs revealed that the number of followers each respondent has correlates closely with their level of engagement with the network. Perhaps unsurprisingly, the more users tweet, the more connections they make and the more people they are able to entice to follow them (see Figure 2).

Figure 2: Follower Count Correlated against Tweet Frequency



Twitter emerges as an important means by which head teachers communicate. Communication with fellow professionals, it seems, is the principal reason senior leaders sign up to the platform in the first place. Other studies have found the same. For example, Elias (2012: 54), quotes a respondent as saying:

If you believe that your job is to be the lead learner and to demonstrate that you have vitality when it comes to learning and staying informed, the social media is a place that makes that much more simple...

This study uncovered similar enthusiasm for making connections online amongst educators. So much so that some respondents reported that those teachers in their schools not on Twitter were starting to feel left out.

Challenge

Another theme that emerged from interviews, participant Twitter timelines and from associated blogs was that head teachers appreciate Twitter for its capacity to challenge and, on occasion, to affront.

Tweeps like to share their thoughts and many link to their blogs through their Twitter profiles. So it was that by reading participant blog posts we were able to put further flesh on the bones of things participants had told us in the process of being interviewed. One tweep articulated reasons for embracing the share-everything culture that Twitter facilitates on her blog:

- Clarify your thoughts. Nothing makes you think clearly like sharing your latest big idea with the world! It helps you to consider your solution from all angles and, hopefully, think about pitfalls before they happen. Luckily many teachers and educators around are very, very happy to share their experiences with you.
- Invite criticism. Strange one this one. I firmly believe that school leaders need to invite criticism; sharing decisions, thoughts and ideas will invite both supportive and, erm, not quite supportive comments. If it's not so constructive, then ignore it, but most of the conversation and comments that you will receive will be thought provoking and helpful. That's certainly my experience.
- Problem solved. There will be problems that you have not come across before. There will be ideas you have that you, or your colleagues, are not quite sure about! The very act of writing it down – along with options, ideas and so on will often help – but if not the chances are someone will have experienced something similar. (@edwards)

Her honesty here about Twitter's ability to stir up debate is instructive. Leaders value having their ideas picked apart by other tweeps with Twitter providing for many a useful sounding board before bringing their ideas into their respective places of work. Though there were some criticisms of Twitter in this regard, there were also many instances in which tweeps found Twitter an invaluable forum for refining their thinking about leadership issues.

In support of this line of reasoning, reference to hashtag chats appeared in the majority of respondent timelines. This exchange illustrates the sort of discussions that Twitter facilitates.

In this case, @lowry is responding to a discussion about whether head teachers should get involved in classroom teaching:

@SLTChat: Should all school leaders teach? #sltchat

@lowry: @SLTChat Not sure whether heads should? Do they have the time to do this well? But otherwise yes – role models. #sltchat

@SLTChat: @headteacher – interesting point. Should head teachers teach? #sltchat

@lowry: @SLTChat @bunter yes but not too much. Otherwise lack credibility. Too much and impacts on other responsibilities. #sltchat

As can be seen, others have the opportunity to agree or disagree, or offer their own caveats and solutions to the problem posed. In this way hashtag chats offer an opportunity for head teachers to share problems and suggest possible solutions. Whilst many respondents reported joining in with chats at the allotted time (in one case ‘religiously’), several did not. But these tweeps still felt they were able to get value out of the discussions. Several tweeps reported using the search functionality within Twitter to isolate hashtags that they were interested in to join the discussion asynchronously.

‘Serendipity’ was a word used by several of the respondents – in each case unprompted – to describe the nature of interactions on Twitter. The ability of users across the world to search, respond and interact with material appearing in their own feed means that some material resurfaces unexpectedly and so reaches a new audience.

Whilst many respondents reported enjoying having their views challenged on Twitter, most reported that they actively shied away from getting involved in heated debate. Only a tiny minority of tweets from any of the users were categorised as showing displeasure. Respondents tended to stress their awareness of the public profile they had cultivated for themselves on Twitter and generally went to great lengths to avoid controversy. Many reported being followed by parents and pupils and felt that they needed to moderate their output carefully in view of the potential audience for anything that they posted.

It might be assumed that the public nature of Twitter reduces its value, but respondents did not think so. Private messages, about sensitive operational issues, for example, could be sent using a direct message tweeps told us. Meanwhile, the open nature of everything else published on the network ensured that serendipitous connections with educators from all over the world were commonplace. One tweep described using Twitter mainly as a means of sharing links to blog posts. Nonetheless, he was clear about the way Twitter had moved his thinking forward – the traffic had very definitely not been all one way. He described instances in which his thinking and practice had changed as a result of discussions online:

Twitter has been transformative in terms of the way I access professional development. And my thinking has changed as a result of it too – let me give you an example. I used to be really into lesson grading – it was just something we’d always done. But in reading the tweets and blogs of people I’d connected to on Twitter my view completely changed. (@holloway)

Nor was he alone in articulating the transformative effect of Twitter on his professional development. For all their concerns about Twitter, respondents agreed that the positives outweigh the negatives; Twitter had exposed them to alternative viewpoints and, as a result, it had changed them for the better.

Social Validation

Gronn (1999) identifies a strong sense of self-worth as a pre-condition for successful educational leadership. It is significant, therefore, that many, if not all, of the interviewees reported Twitter as giving them a sense of self-worth. They enjoyed a frisson of excitement when something they had tweeted was commented upon, or retweeted. Twitter provided for them a form of social validation. Some even recognised in themselves an element of affirmation addiction. One tweep described having to switch off the notification settings on her iPad and phone during the day to avoid distraction and to shield herself from the strong desire she felt to check her notifications in real time.

Another tweep – with a Twitter following of over 90K at the time of the study – clearly felt a strong sense of pride at having such a large number of people interested in what he has to say. So much so, that his Twitter biography and the banner headline on his blog champions the fact:

The most followed teacher on Twitter in the UK. (@noad)

He described in interview the scientific way he approaches expanding his following. Despite getting between 500 and 1000 notifications every day, he related that he responds to over 90 per cent of them. This is all the more impressive for the fact that his Twitter account, in common with all the other interviewees, is managed entirely by himself. In his interview he described his life as a minor celebrity with people approaching him at conferences knowing who he was as a result of his online presence. He had used his Twitter presence to secure a change of employment for himself, openly advertising his services for hire on the internet. As he states on his blog:

I believe, Twitter and Blogging will help me find a new job without directly relying on the TES or Guardian Jobs – this is an audacious move for any teacher; albeit a senior teacher...

Can I also state – quite clearly – that I do not intend to enter any job through the back door. I am simply using this page as an advertising channel and an extra pair of eyes for job-alerts I may miss. I fully expect to take part in the application and interview process like any other teacher. I would be a fool to admit otherwise. (@noad)

Following his job search he did secure alternative employment. He was clear in interview that his employers had been attracted by the influence he commands in the Twittersphere. This conferred a form of social validation not just for himself but also for his new school. His new school would get spin-off benefits from his work in the online education community – spin-offs that his new employers were very happy to embrace.

Several other respondents reported using their Twitter presence to further their careers. There was clear evidence of them trying to position themselves as experts in their field. One tweep reported delivering several seminars at conferences on the back of connections he had made through Twitter. His Twitter handle itself was a deliberate attempt to position himself as a thought leader on Twitter for the British independent sector; it had opened up international opportunities for him too. At the time we interviewed him he had just accepted a new headship in Dubai. In a similar vein, another respondent described how important her Twitter feed had been in cementing her influence within the community of Australian teachers in which she worked. As she explained:

I try to make sure that the stuff that appears in my timeline is useful to people. I don't Tweet that I'm going out to have a latte. It's not about me, it's about geography. I try to lead by example. I've developed a high profile within New South Wales through the work I've done at a national level and through my Twitter profile. If people read my stream they'll soon realise that I know what I'm talking about. (@cranston)

Another tweep related how she had become a regular invitee to conferences as a result of her sizeable Twitter following. She described how she had been asked to author a book in recognition of the influence she had built up on Twitter. This book had used Twitter to crowd-source teaching and leadership advice from teachers she had connected with on Twitter. As such it arose directly from her social media engagement. In the introduction to her book, she writes:

A book of top tips written by brilliant and inspiring teachers, educators and leaders from all over the country, many of whom are experts in their field and shining examples of pedagogical excellence. A massive thank you is owed to everybody who has contributed to this book – their generosity is huge. Please do follow the contributors on Twitter, and share your own practice and ideas with the wider education community. (@mulholland)

Thus by taking the time to connect with influential tweeps, and then by asking them to contribute to her book, she has positioned herself as a socially influential British educator, able to connect and curate the work of fellow commentators. Her influence has grown exponentially. She was clear that it was Twitter that made authorship of this book possible in the first place and was thrilled – and not a little surprised – by the recognition and influence it afforded her.

By tweeting and blogging regularly, the majority of respondents were deliberately cultivating a strong digital presence, one that would be useful to them in furthering their careers and extending their influence. Many recognised that the digital space was one in which they ought to be making their mark and defining themselves as leaders. As one tweep explained:

At first I didn't really get Twitter; I had an anonymous account. But I moved to a school where people were really forward thinking and so I started tweeting as myself. I've made a lot of professional links through it and have been able to market myself in my second career [as a photographer] too. (@bowd)

Concerns and Inconsistencies

A handful of users reported having encountered unpleasantness on Twitter. Usually – but by no means always – this unpleasantness was connected to their use of Twitter as a channel for their personal lives rather than for their professional ones. In mixing the private with the professional – something which Twitter facilitates – one respondent recorded unease about the ‘unresolved tension’ (@lambkin) surrounding the purpose of his account. Three respondents reported having to block other users from their timelines to stop abusive comments. Using emotive language, one respondent articulates some of the concerns interviewees raised about the arguing that can arise on Twitter when people with strongly held views come to blows:

I think what makes it really powerful is when you share your stuff and put yourself up for a bit of scrutiny. And then take it on the chin if it’s crap or if someone else has done it better or whatever... But engage properly in those debates and not in just the kinda petty – you know crap – arguing that goes on. There are people who are like really good and who – you know – who I really respect who literally spend hours and hours a week defending their pedagogy. And I’m like you know what I just let them crack on. People like @imagineinquiry I really rate their stuff and I think they’re great but they just get embroiled in this like crap... Anyway so I’ve been blocked by people. There was this one guy who was kind of a dick and he blocked me. I think he only followed me out of courtesy and then I found when I tried to follow him that I couldn’t. I think he only followed me out of courtesy. I think people must feel that they have to have balance. (@mulholland)

This sort of experience was the exception rather than the rule though. One tweep, for example, told us ‘...if I’ve been trolled I’ve missed it’ (@lambkin). He recognised that conversing with people from behind the safety of a computer screen could invite unpleasantness, but he’d never experienced it. More of an issue was that the 140-character limit to tweets meant that it was hard to communicate nuance in a discussion and so statements could appear curt or rude when in fact they were meant to be nothing of the sort. Several respondents reported having been caught out by what had appeared to be a dismissive tweet, but which further discussion revealed was actually meant in a more accommodating spirit.

Several tweeps felt that because Twitter allows users to surround themselves with like-minded individuals, there can be both positive and negative consequences. A significant number of tweeps made mention of ‘confirmation bias’. One saw in himself a tendency to gravitate towards tweeps of a similar socio-cultural outlook. These tweeps served only to reinforce his world view. His observation mirrors the findings of Aral and Walker (2012: 338) and their identification of the ‘homophile’ bias that social networks are vulnerable to.

Specific mention was made by several respondents of the polarised nature of the progressive versus traditional teachers on Twitter. Teachers with a more progressive outlook were seen as clustering around a few influential champions, whilst the same clustering occurred amongst the traditionalists. Fierce debates were described by respondents, in which neither

side was willing to back down. As one tweep wrote on his blog, and reinforced in interview, this could lead to myopia amongst educators unless they consciously sought out alternative views:

Some Republicans were amazed Obama was re-elected... Why? They read only the Republican media. It is really important to read views that are different from one's own. Social media is not a good forum for proper debate: people coalesce into interest groups; Devil's Advocates struggle; gunslingers and snipers shut down discussion. (@lambkin)

Thus amongst the majority of respondents there were concerns that Twitter, if not used sensitively and responsibly, could foster unhelpful group-think. It could close down rather than open up thoughtful debate about education. The tendency of users to surround themselves with people whose views they agree with is referred to in Twitter circles as the 'echo chamber' (although one tweep used the alternative term 'filter bubble' in his interview). Indeed, the term echo chamber has such significance in the lexicon of edu-Tweeters that an influential blog has adopted the name. The Echo Chamber, overseen by @oldandrew, himself a teacher, makes a point of curating blogs that run counter to what he sees as the unstintingly progressive reporting of education issues in the mainstream press. As he explains:

The Echo Chamber grew out of a realisation that there were a good number of teacher bloggers who were blogging to express opinions that simply didn't fit in with the opinions the media attributed to teachers but did seem to fit in with those views I heard regularly in the staffroom from classroom teachers. (Old 2014: online)

Here is clear recognition that both long-form pieces and micro-blogs (like Twitter) run the risk of exposing readers to a very one-sided debate, sometimes deliberately so. In this sense they are extremely vulnerable to the confounding effects that Aral and Walker (2012) identify in their paper on the issue.

Twitter feeds the echo chamber tendency because of the algorithms that the platform uses to serve users with content and users to follow. Twitter tends to offer users material they will like, or that is similar to material they are already seeing. It steers clear of novel, controversial or contradictory material. In this way there is danger, recognised by a significant number of the respondents, that unless a determined effort is made to engage with users holding alternative views the Twitter experience can become insular and detached. It might not cause offence, content will be pleasing to the user, but neither will it serve up the multiplicity of resources, views and opinions that most senior leaders reported wanting it to. In short there is a real risk that a distorted view of the wider world of education might emerge.

RQ 2: How Deep and Broad Are the Networks of the Sampled Head Teachers?

The breadth and depth of each respondent's Twitter network was analysed in a number of ways. Firstly, using the information generated by TwDocs, it was possible to analyse the number of times other individuals were mentioned in each respondent's Twitter timeline (see

Figure 3). These figures act as a proxy for connectedness, in the sense that they show the extent to which respondents were using their tweets to interact with others – the results appear in Table 5.

Table 5: Mentions in the Timelines of the Study Respondents

	Twitter handle	Number of mentions of other individuals
1	@noad	215
2	@watson	100
3	@nancini	146
4	@hollingsworth	170
5	@renwick	206
6	@mulholland	134
7	@morris	180
8	@coventry	105
9	@evans	203
10	@hicklin	112
11	@jones	105
12	@bowd	100
13	@johnson	100
14	@lowry	174
15	@derbridge	152
16	@cranston	143
17	@robb	180
18	@lambkin	100
19	@parry	155
20	@edwards	149
21	@holloway	159

Within each sample of 100 tweets for each respondent there were no instances of respondents making less than 100 mentions of other discrete individuals. This is not to suggest that every tweet analysed contained reference to another Twitter user because it is possible to mention more than one user in any given tweet. Nonetheless, what is clear is that the leaders studied are all – to varying degrees – active in including others in their online conversations. Twitter is inherently social.

Secondly, using NodeXL, it was possible to analyse and visualise the size and breadth of the networks associated with each respondent. For each respondent, the last 100 tweets on Twitter mentioning their Twitter handle were analysed. The clustering coefficient generated for each Twitter user by NodeXL gives a measure of the tightness of their networks. Users with a high clustering coefficient have lots of friends who know friends – their network contains many links within it. By contrast, users with a low clustering coefficient may have a lot of connections on Twitter but their connections interact less with each other, suggesting that their network is more disparate. The average clustering coefficient of any given network is always a number between 0 and 1, where 0 is extremely disparate and 1 is maximally clustered. The average clustering coefficients of all the respondents in this study are shown in Table 6.

Table 6: The Average Clustering Coefficient for Each of the Tweeps in the Study

	Twitter handle	Average clustering coefficient		Twitter handle	Average clustering coefficient
1	@noad	0.425	12	@bowd	0.188
2	@watson	0.667	13	@johnson	0.478
3	@nancini	N/A	14	@lowry	0.266
4	@hollingsworth	0.494	15	@derbridge	N/A
5	@renwick	0.309	16	@cranston	0.255
6	@mulholland	0.314	17	@robb	0.280
7	@morris	0.425	18	@lambkin	0.056
8	@coventry	0.334	19	@parry	0.434
9	@evans	0.339	20	@edwards	0.429
10	@hicklin	0.126	21	@holloway	0.422
11	@jones	0.190			

These figures represent the clustering coefficients for 100 randomly selected tweets from each user. As such they offer only a snapshot of users’ Twitter activity. Nonetheless, they serve as a useful measure of the breadth of users’ connections. It is immediately apparent that the Twitter networks of school leaders are broad – they are not populated only by individuals who know each other (as would be the case had users had network coefficients closer to 1).

The highest network coefficient was generated by @watson’s timeline suggesting that his network of Twitter connections is tighter than is typical. This suggests that many people in his network also know each other. There is a simple reason for this: @watson’s Twitter account is used more for broadcasting than it is for connecting. He has the lowest percentage of tweets

in which a conversation is engaged in (just 21 per cent compared to an average across all the respondents of 59.8 per cent) suggesting that most traffic is one way – from him to his followers with little interaction in the other direction. In this sense his use of Twitter is atypical amongst the leaders in this study.

The evidence suggests that head teachers tend to make connections across a broad spectrum of people, many of whom will not know of each other and who are therefore only connected vicariously through their link with the individual known to both of them.

RQ3: What Are the Ways in which Twitter Has Contributed to Head Teachers' Professional Development and Career Progression?

Tweeps spoke warmly of the enormous contributions they felt Twitter had made to their own professional journeys. In one case a tweep related how Twitter had helped him as he progressed from deputy headship to headship. This tweep had faced the twin hurdles, on taking up his first headship, of moving into a new job whilst also of changing sector (from independent to maintained). As he explained:

I found Twitter incredibly useful when I first started. For example, one of my first tasks here was to set up a performance related pay policy. I had no idea what to do, but I connected with @johntomsett and @headguruteacher through Twitter who had posted their own policies publically for people to share. Having discussed these with them I felt knowledgeable about something that not long before I'd been totally ignorant about. (@lambkin)

Here is very clear evidence of a head teacher using Twitter constructively in what Gronn (1999: 33) would describe as his transition from 'formation' to 'accession'.

In a similar vein, a respondent who had recently taken up a position as a head teacher was keen to relate the help and support she felt she had derived from the fellow head teachers she had met on Twitter. She felt she had tweeps to go to when faced with a new problem. Twitter provided a useful antidote to the sense of isolation she experienced as the most senior member of staff in her school.

Table 7 shows the extent to which the senior leaders in this study use Twitter to share resources and expertise. The low number of 'requests for information' might lead to the conclusion that leaders do not use the network for obtaining specific answers to specific questions. Interview responses suggested otherwise, however, with many respondents describing their use of the direct message facility in Twitter to converse with members of their network about sensitive topics. This explanation from a tweep was typical:

I tend to DM [direct message] people when I need really specific help. It doesn't look good to be always asking for help in the public sphere. (@parry)

It is reticence about being seen to need help – with all the issues about confidence in leadership that might entail – that explains the low number of public requests for information. The

majority of leaders spoke warmly and enthusiastically about the ability of their Twitter networks to provide them with the information and help that they needed.

On tweep was effusive about the use of Twitter amongst the staff and pupils in her school. Departmental heads, teachers and pupils were actively encouraged to use Twitter to connect and engage with the wider world of education. In the case of teachers, this meant that they were exposed to the latest debates and resources in education. In the case of pupils, children in her school were encouraged to use Twitter to gain access to UCAS information, revision materials and topical subject news. The school's VLE and campus-wide plasma screens had, until recently, displayed the school's Twitter feed. Much to her disappointment, recent concerns about the radicalisation of teenagers had resulted in a decision to remove the feeds and revoke access to Twitter across the school's network. This decision was to be reviewed again shortly, however.

Numerous tweeps reported actively encouraging teachers and departments to open Twitter accounts and get active on the network. Two tweeps related how they had created an expectation in their schools that academic departments would maintain active Twitter accounts. One tweep wondered whether in the future his school would need to insist on more consistency of message from these accounts. He related how much of the output went unmonitored at present in his school.

One respondent explained how he had initiated, back in January 2013, a scheme called Bring a Teacher to Twitter (BATTTUK). On the BATTTUK website he explains the rationale behind the idea:

So, what is BATTTUK? Well, if you're a Twitter user, you already know how powerful it is, how useful it can be? A digital staffroom, where someone, somewhere will have an answer for you. You can go to Twitter to vent your frustrations; to ask for help; to make someone smile; to have someone make you smile. A place where you can be as open or as anonymous as you like.... Fancy the challenge? Think you can convince a member or members of your staff to join the Twitter train? [Sign up \[HERE\]](#) and you will be helping them, helping us. Unlike our school, this staffroom is unlimited in size, our doors are open – let's welcome you in. (@evans)

He, and others, related countless stories of help, encouragement and a sense of shared purpose that arose from being on Twitter. Several interviewees explained how they had attended Twitter-inspired 'TeachMeets' in which educators meet face-to-face and share best practice. It is routine at such gatherings for Twitter to serve as a 'back channel' on which delegates tweet their thoughts and share their experiences with the community beyond those physically in attendance. One respondent invited us to participate vicariously in #TMLondon, following tweets online and monitoring the level of engagement amongst delegates. The nature of the tweets and the blogs that such a meeting generates bolsters the sense that Twitter is a valuable resource for leaders in education. As one tweep explained on his blog following the event:

I was reminded last week on the power of Twitter which brought together 250 education professionals to London for #TMLondon. Selfies, trending, hashtag, learning and sharing all took place and not only were there 250 teachers there, there were more than 200 viewing online at the same time too. It was phenomenal. It got me thinking again about the power of Twitter. (@evans)

Twitter has provided the platform for a great deal more connection between teachers that was ever possible before (see Table 7).

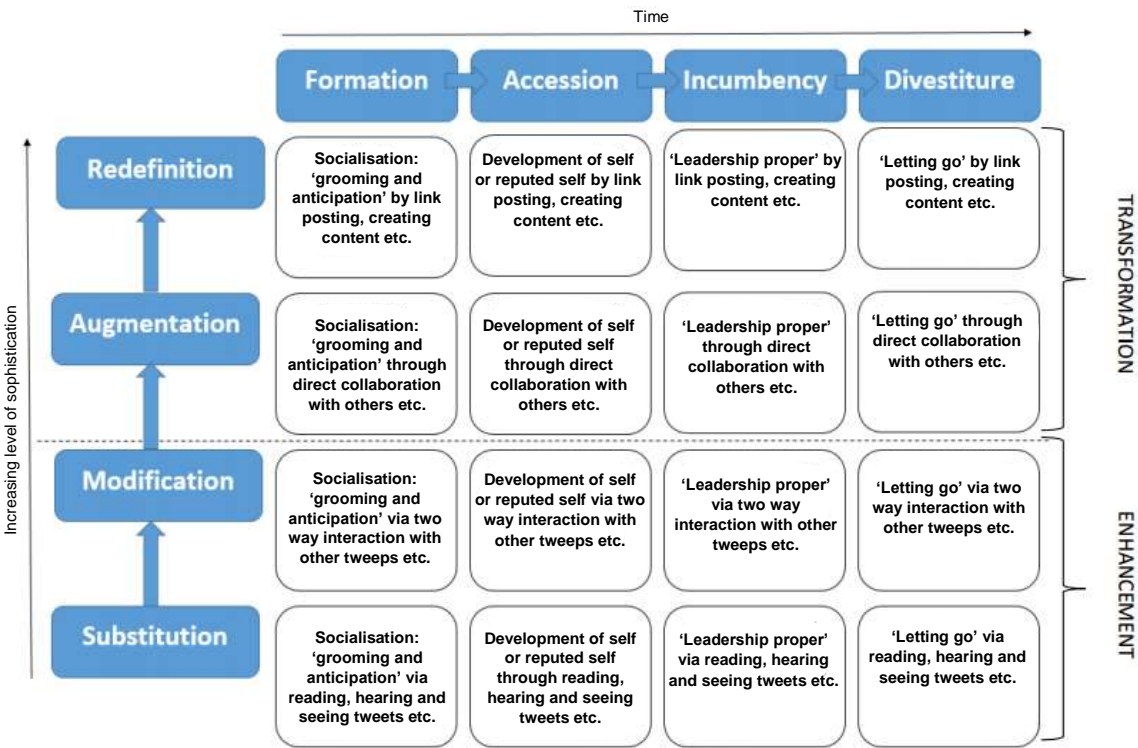
Table 7: A Breakdown of Tweet Type for of the Respondents

Conversation code	@noad	@watson	@mulholland	@nancini	@hollingsworth	@renwick	@evans	@coventry	@morris	@hicklin	@jones	@bowd	@johnson	@lowry	@derbridge	@cranston	@robb	@lambkin	@parry	@holloway
Request for information	1	2	3	0	3	0	1	0	0	3	6	0	0	1	1	0	1	1	3	3
Sharing of news	19	20	17	26	17	7	1	41	8	18	6	12	20	7	5	12	5	22	13	6
Sharing of resources	18	53	26	27	23	32	11	5	4	18	20	23	10	29	0	6	4	24	5	17
Showing appreciation	5	4	11	1	17	9	4	4	1	6	9	17	1	2	5	5	4	3	1	6
Showing displeasure	2	0	0	0	2	0	0	5	0	2	4	2	1	0	2	0	0	1	2	0
Responding to others	55	21	43	46	38	52	83	45	87	53	55	46	68	61	87	77	86	49	76	68

The Model

By combing the insights of three other authors – Gronn (1999), Puentedura (2010) and Dixon (2012) – a model was devised to conceptualise our findings (Figure 3).

Figure 3: Model for the Professional Development of a School Leader



Leaders are seen to engage with online communities with differing levels of depth and sophistication as their careers progress. Findings suggest that the most engaged at each stage stand to gain the most from their involvement. We found that those interviewed were using Twitter to:

- connect with other professionals and expand their professional networks
- seek out the opinion, counsel and support of others
- get professional news early, and in an easily-digestible format
- expand their knowledge, influence and connections through serendipitous online meetings

There was a strong sense that leaders valued Twitter for its ability to bolster their 'sense of self' – something identified by Grønn (1999: 68) as being important in leader formation and progression. The research led us to devise the following pieces of practical advice for those school leaders keen to join the conversation on Twitter:

1. **Do not worry too much about your audience.** Your followership will grow as you do. Leaders who restrict their voice too much can either sound parochial (just school

sports results) or self-aggrandising (a stream of bon mots on the latest educational issues). The beauty of Twitter is its ability to connect various audiences in new and unexpected ways. A tweet about a family cycle trip might spark a connection with a teacher cyclist in Chile, say, who sends you an interesting article on school finance...

2. **Do not chase followers.** Meaningful two-way conversations with fellow tweeps only occur with about 150 discrete individuals, no matter how large your followership. Chasing followers will not markedly increase the number of people you interact with on a day-to-day basis. Dunbar (2008) found that meaningful human relationships, whether mediated on or offline, have a relatively small upper limit. Let your account grow organically.
3. **Be yourself.** Leaders are naturally concerned that what they say online might come back to haunt them. Nonetheless, honesty and a willingness to show your true self invites reciprocation. A good rule of thumb is not to post anything you would not want your parents to see; beyond that, be your authentic self.
4. **Use lists.** Before long tweeps start to become overwhelmed with the volume of information streaming down their timelines and run the risk of missing the wood for the trees. A useful way around this is to use lists to compartmentalise the various categories of people you follow. If there are individuals you routinely find have useful or interesting things to say about a particularly topic, make a list for that topic. You will save an awful lot of time and be more efficient at surfacing useful material.
5. **Build up a stable of people you follow.** When you first join Twitter it is difficult to know where to begin. It is worth having a look at some other people's suggestions, but don't be too constrained by these. Searching Twitter for specific keywords, for example, can throw up people who fall outside the standard UK education Twitterati. Stick at it, your timeline will get more and more useful as it matures.
6. **Interact.** It can be tempting just to 'lurk' – and you can still get a lot out of Twitter by being entirely passive – but by giving as well as taking you will unlock a whole new level of utility. One way of getting involved in a safe and relatively structured way is to involve yourself in one of the numerous hashtag (#) chats that occur throughout the week on a range of topics to do with education.
7. **Always be gracious.** If you use Twitter to its full potential, it won't be long before you come across someone you disagree with. This can be a good thing – several respondents remarked how their thinking had changed on a given issue thanks to the persuasive arguments of others online. But it is easy to come across as dismissive or rude when constrained to just 140 characters. Go out of your way to be magnanimous and conciliatory, even towards people you profoundly disagree with. At the very least, agree to disagree and move on. Life is too short to do otherwise.
8. **Turn it off from time to time.** Many of the respondents were aware of the addictive nature of Twitter and its ability to disrupt the flow of their other work with constant mini-interruptions. Leaders need to develop their own systems to guard against this.

Perhaps try catching up with Twitter in concentrated bursts and discipline yourself not to check your timeline at other times.

Conclusion

This paper has attempted to unearth some of the ways in which head teachers in education use Twitter as a professional development tool. It has attempted to quantify Twitter's usefulness as a professional development tool for senior leaders. Twenty-one tweeps were interviewed. As a means of triangulation and further elucidation, these tweeps had their Twitter streams mined. Despite biographical differences between the tweeps who took part, all share the belief that Twitter is, by and large, a force for good in education.

In investigating the usefulness of Twitter as a professional development tool, three research questions were framed. A summary of the findings pertaining to each is presented here.

Why Are Certain Head Teachers Using Twitter?

The research identified several ways in which head teachers are making use of Twitter as a professional development tool. All the participants were effusive about the power of Twitter to augment – or in some cases replace – traditional sources of information and training for senior leaders. Twitter's flexibility and the breadth of connections it offers were valued by all the tweeps interviewed. The Twitter streams of the participants showed clear evidence of accounts being used to:

- gather or request information
- share resources
- provide encouragement
- collaborate on shared projects
- enter into debate about topical educational issues

In this sense the tweeps were admirably fulfilling all the personal elements of the six domains proposed by Deiser and Newton (2013) as being requisites of social-media-literate leadership. Tweeps were active, to varying degrees, in producing, distributing and receiving materials through the medium of Twitter and associated social media platforms on a personal level as individuals. Time and again, evidence emerged of enthusiastic engagement with Twitter for the purposes of personal improvement.

But Deiser and Newton (2013) identified organisational and strategic use of social media, where leaders perform the roles of advisors, architects and analysts as equally important. Here even the most active and experienced tweeps interviewed seemed still to be finding their way. The organisational and strategic facet of social media leadership was underdeveloped in almost every case, with only two respondents having had serious, board-level discussions about social media strategy. For most tweeps, there existed a creative tension over their use of Twitter. @lambkin's description of an 'unresolved tension' amongst leaders resonated with many of the head teachers in the study. The messy, democratising nature of Twitter – its

ability to short-circuit traditional power structures, to allow classroom teachers to converse with the world – is liberating and unsettling in equal measure.

Tweeps in this study have embraced social media for the way it can transform their professional development, but few have systematised social media engagement across their organisations. Social media engagement at an organisational level tends to be ad hoc. Rarely is there a clear strategy governing the use of organisation-wide social media in schools. As social media becomes ingrained in the fabric of schools and other educational institutions, there is space for the philosophy underpinning its use to be explored and for institutions to adopt a more co-ordinated approach to managing the social media accounts that operate under their auspices.

How Deep and Broad Are the Networks of the Sampled Head Teachers?

Twitter allows head teachers access to a far larger network of educators than was ever previously possible. Some tweeps went out of their way to cultivate relationships with educators overseas, to share ideas and to learn from different systems. However, the majority of tweeps still converse most regularly with people who are both geographically and ideologically close to themselves.

There is a clear distinction here to be made between tacit and explicit knowledge. The distinction between the two has been delineated by Daniel, Schwier and McCalla (2003) and is shown in Table 8.

Table 8: Tacit vs Explicit Knowledge (Daniel et al. 2003)

Tacit knowledge	Explicit knowledge
Drawn from experience and is the most powerful form of knowledge	Can become obsolete quickly
Difficult to articulate formally	Formal articulation possible, and can be processed and stored by automated means, or other media
Difficult to communicate and share	Easily communicated and shared
Includes privately held insights, feelings, culture and values	Formally articulated in public
Hard to steal or copy	Can be copied and imitated easily
Shared only when individuals are willing to engage in social interaction	Can be transmitted

Twitter is best at communicating explicit knowledge, whereas those interviewed still valued face-to-face communications for transferring tacit knowledge. Researchers in other fields point to the stubborn resistance of clustering effects to the growth of social media networks. Cities still attract actual people to them despite the fact that much of the work the attracted people do seems to be online and – on the face of things at least – could just as well be done

from home. Indeed, it seems the more internet-based the work, the stronger these clustering effects are – witness the tight concentration of workers in the financial sector in the city of London or of workers in the technology sector in Palo Alto, California. Workers, teachers included, collaborate most with those geographically close to them despite the opportunities services like Twitter offer for remote discussions. Thus there is likely to remain, for the foreseeable future, a need for physical meeting of leaders in geographic space even as the importance and frequency of these meetings begins to tail off. The comments made by @edwards capture the sentiments of many respondents on this topic:

People I've mostly connected with have been in the north-east United States. I tend to make deeper connections with people I have a realistic chance of meeting face-to-face.

The echo-chamber effect was a problem that each of the respondents mentioned in their interviews, albeit not always using that term. Respondents went to differing lengths to try and counter it. If the management of a PLN on Twitter is to become part of the course content on mainstream leadership courses, then strategies for avoiding the echo-chamber effect, or at least having a heightened awareness of it will be necessary. Equally links need to be made and properly cultivated between the various bodies responsible for leadership training across the world. There is no longer a need for the authorities involved in developing school leaders to operate solely within national borders. Cultivating online relationships with similar bodies elsewhere in the world will likely enrich the services they offer.

What Are the Ways in which Twitter Has Contributed to Head Teachers' Professional Development and Career Progression?

This study has unearthed significant evidence of head teachers' appreciation of Twitter as a medium through which they derive emotional and practical support in performing their duties. As has been shown, Twitter goes some way towards reducing the loneliness that can attend senior leadership. Head teachers value the ability of Twitter to serve them with answers to questions at a time and place that suits their working routine. In this sense the boundary between home and school life has been blurred, with leaders appreciating the flexibility Twitter gives them. Twitter's usefulness in this sense chimes with studies such as those carried out by Boerema (2011) and Smith (2007) which suggest that the most effective professional development is not the traditional, planned one-to-many model but a more informal one-to-one or group mentoring model.

It was less clear how Twitter had led to institutional improvement. Several educators related using their Twitter accounts for marketing purposes, but appreciated that in so doing they were limiting their audience. There was also concern amongst the leaders questioned as to the possibility for blurring or diluting the message they hoped would be communicated via their accounts. Most had adopted a model where their Twitter account spoke for them, and them alone (and in each case was operated by them in person) whilst other school accounts operated (marketing, departmental accounts etc.) under different auspices. The only connection between the organisation and the individual therefore was through @ mentioning

or retweeting. Little mention was made by any tweeps of the use of Twitter in classrooms or as a means of making meaningful connections between institutions. This, therefore, is an area ripe for further research.

It is clear that the one-to-many model of INSET delivery no longer has a monopoly in the marketplace. Head teachers – busy and geographically dispersed as they are – have a lot to gain from using Twitter as a channel through which to get the information and training that they need. Some national training bodies, like the NCTL, have already recognised this and are increasingly active on social media. But in many cases the Twitter accounts, run by marketeers not educationalists, are being used more as broadcast channels than as conduits for two-way discussion. Several tweeps bemoaned that the most senior players in the relevant organisations are largely silent on Twitter.

This research has identified several areas where the use of social media and the training connected to its use could be improved. These recommendations have implications for policy makers, senior leaders, and for those involved in leadership training.

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