

THE TWITTER EXPERIENCE:
THE ROLE OF TWITTER IN THE FORMATION AND MAINTENANCE OF PERSONAL
LEARNING NETWORKS

By

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Abstract

This qualitative phenomenological study involving in-depth interviews with seven educators in k-12 and higher education examines the role that the microblogging service Twitter plays in the formation and development of Personal Learning Networks (PLN) among educators. A double hermeneutic data analysis shows that Twitter plays a role in the formation and development of PLNs by allowing educators to; engage in consistent and sustained dialogue with their PLN, access the collective knowledge of their PLN, amplify and promote more complex thoughts and ideas to a large audience, and expand their PLN using features unique to Twitter. This research also examines the nature of a PLN and shows that participants believe their PLN extends beyond their Twitter network to encompass both face-to-face and other ICT mediated relationships. Secondary research questions examine how Twitter differs from other social networking tools in mediating relationships within a PLN, what motivates an educator to develop a PLN, how trust is established in a PLN, what the expectations of reciprocity are within a PLN, and what is the nature of informal learning within a PLN.

Keywords: Twitter, microblogging, Personal Learning Network, PLN, informal learning

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The Twitter Experience:

The role of Twitter in the formation and maintenance of Personal Learning Networks

Chapter 1: Background

In this thesis I investigate the role that the social networking web service Twitter plays in the formation and maintenance of Personal Learning Networks among educators. For the purpose of this thesis, I have defined an educator as any person who teaches or instructs within a formal primary, secondary or post-secondary educational institution.

Twitter is a free web service that allows users to send and receive short, 140 character messages. In recent years, Twitter has become increasingly popular with educators. Twitter adoption among higher education faculty is estimated at between 13% (Moran, Seaman, & Tinti-Kane, 2011) and 35.2% (Magna Publications, 2010). While large scale surveys such as these have yet to be done on Twitter adoption among K-12 educators (Demski, 2010), a small scale survey of K-12 educators conducted during the 2010 Consortium for School Networking seems to indicate a similar trend among K-12 educators, with 22% of respondents reporting that they use Twitter (Embury, 2010, para. 4).

For educators in both K-12 and higher education, one of the primary ways in which they use Twitter is as a tool to connect and exchange information with colleagues and peers (Embury, 2010; Magna Publications, 2010, p. 5; Moran et al., 2011). Many educators refer to this type of informal learning network as a Personal Learning Network, or PLN (Couros, 2008; Sakamoto, 2009; Warlick, 2009). A PLN is a network of people you connect with for the specific purpose of learning (Tobin, 1998). Both Twitter and PLN are defined in more detail in the literature review in chapter two of this thesis.

This research project is grounded in the theme of informal learning and the role that information and communication technologies (ICT) play in facilitating informal learning

networks. Therefore, in addition to relevant information on Twitter and PLNs, chapter two also includes a review of relevant literature on the topic of informal learning in order to frame the PLN as a construct where informal learning can occur.

To understand the role Twitter plays in the formation and maintenance of a PLN, I conducted a phenomenological research study involving educators from both k-12 and higher education who use Twitter within the construct of a PLN. My reasoning for why I believe a phenomenological approach is the best methodology for this study is outlined in chapter three, which also includes a detailed outline on how I conducted this research. In chapter four, I present the findings of the study, and conclude this thesis in chapter five with a discussion of the findings and suggestions for further research in this area.

Research Question

The primary research question guiding this study is: What role does Twitter play in the formation and maintenance of PLNs among educators? While the primary research question focuses on the role of the microblogging tool Twitter, this research was conducted with a number of secondary research questions related to the concept of PLNs and the role PLNs may play in facilitating informal learning. As will be explained in chapter 3 on methodology, this research study was conducted using a phenomenological approach, which requires flexibility on the part of the researcher as the nature of phenomenological research allows participants tell their own stories and experiences about the phenomenon under investigation (J. A. Smith, Flowers, & Larkin, 2009). Therefore, questions outside of the primary research question may or may not be addressed by the participants. However, as Smith et al. (2009) note:

Quite often it is useful to have a few more refined or theory-driven questions, but treat these as ‘secondary’ – because they can only be answered at the more interpretive stage,

and because, given the open nature of qualitative data collection, you can't be certain that you *will* be able to answer them. (J. A. Smith et al., 2009, p. 48)

As expanded on in chapter 4, the interviews conducted for this project did generate enough data to provide answers to these secondary research questions. These secondary questions are;

1. What motivates an educator to develop and maintain a PLN?
2. How is Twitter different than other web-based social networking technologies with respect to developing and maintaining a PLN?
3. What are the expectations of reciprocity among educators who engage in a PLN?
4. How is trust established and maintained between an educator and their PLN?
5. What is the nature of informal learning, both intentional and incidental, that may occur when Twitter is used in a PLN?

Chapter 2: Literature Review

The literature review focuses on three key areas of interest in this research project; informal learning, PLNs, and Twitter. This research project frames a PLN as an informal learning construct, therefore it is important to both define and understand the nature of informal learning if we are to begin to understand the nature of PLNs and the role that a PLN plays in facilitating informal learning. Since this research is interested in the specific role of Twitter in facilitating these informal learning networks, the literature review on Twitter is focused primarily on Twitter as a tool to facilitate informal learning. However, some general research on Twitter is included to better describe the nature of the service.

Informal Learning

Informal learning is well documented in educational literature as a vital component of education for adult learners (Livingstone, 2001; M. K. Smith, 1997). However, as well documented as informal learning may be, our understanding of the nature of informal learning remains vague (Roberts et al., 2005, p. 9). Informal learning has been referred to as being like “an iceberg – mostly invisible on the surface and immense” (Livingstone, 1999, p. 2). But with the number of people engaged in informal learning activities estimated at anywhere between 65% (Rubenson, 2007) to 90% (Conlon, 2004), it is obvious informal learning plays a major role in how we acquire knowledge.

Contemporary research into the area of informal learning has been somewhat hampered for a number of reasons, not the least of which is coming to a common consensus on what exactly informal learning is. An analysis of informal learning in the 21st century workplace conducted by Dunn (2009) concluded that “Informal learning is a broad concept and hard to define” (2009, p. 124). Selwyn and Gorard (2004) support this notion that informal learning “remains a poorly defined and nebulous concept throughout much of academic literature” (2004,

p. 294). For others, informal learning is difficult to understand because it is difficult to measure (Conlon, 2004). Rubenson (2007) suggests that in order to do better research on the nature of informal learning, more work needs to be done developing both theories and methodologies for researching informal learning.

However, Marsick and Watkins (2002) have a slightly different perspective on the nebulous nature of informal learning, and suggest that if we look beyond the term *informal learning* and examine conceptually related concepts such as self-directed learning, transformative learning, situated cognition, and communities of practice, there exists a large body of knowledge about the nature of informal learning (Marsick & Watkins, 2002, p. 26). Marsick & Watkins (2002) define informal learning by contrasting it to formal learning, stating that informal learning “is not typically classroom-based or highly structured, and control of learning rests primarily in the hands of the learner” (2002, p. 25). Livingstone (2001) defines informal learning as “any activity involving the pursuit of understanding, knowledge or skill which occurs without the presence of externally imposed curricular criteria” (Livingstone, 2001, para. 51). This lack of external curriculum control with the locus of control resting firmly in the hands of the learner is one of the defining characteristics of informal learning. It is also one of the defining properties of a learning network (Downes, 2007; Kester & Sloep, 2009). Downes (2007) presents autonomy as one of four defining properties of a learning network stating that in a learning network “each entity operates independently of the others. This does not mean that it operates without input, but rather it means that it operates according to an individual and internal set of principles and values” (Downes, 2007, p. 26).

Downes (2007) observation that learner autonomy does not mean the learner operates “without input” is expanded on by Marsick & Volpe (1999) who assert that informal learning is

“linked to the learning of others” (1999, p. 5). Livingstone (2000) also supports this notion that informal learning is both social and autonomous when he states that;

The basic terms of informal learning (e.g., objectives, content, means and processes of acquisition, duration, evaluation of outcomes, applications) are determined by the individuals and groups that choose to engage in it. Informal learning is undertaken on one's own, either individually or collectively, without either externally imposed criteria or the presence of an institutionally authorized instructor. (Livingstone, 2000, para. 4)

Brookfield (1995) also believed that the social context of informal learning, and the role that social networks and peer support groups play in providing “emotional sustenance and educational guidance” (1995, p. 2) to self-directed learners, is one which “we need to know more about” (1995, p. 2). In his early research on informal learning, Brookfield (1984) highlighted the importance of informal learning networks to self-directed learners.

These networks served as information exchanges, provided evaluative indices in the form of peer assessment, and established settings for the activities of skill models and resource consultants. Instead of using libraries, cassettes or self-instructional textbooks, these working class adults chose to use peers, experts and fellow learners as sources of information and skill models. (1984, pp. 67-68)

Brookfield's description of informal learning networks, and the peer learning relationships which developed among the members of these networks, provide a solid connection between informal learning and the conceptual model of a PLN.

Personal Learning Network as informal learning network

An open online course by Stephen Downes, George Siemens and Dave Cormier that includes PLNs as a topic attracts over 1100 participants (Downes, 2010).¹ An online group called The Educator's PLN has over 8,000 members enrolled on their website.² As these numbers

¹ Offered in the Fall of 2010

² From <http://edupln.ning.com/profiles/members/> as of June 26, 2011

show, for many educators, the Personal Learning Network, or PLN, is a topic of significant interest and discourse. Yet for all of the conversation occurring among educators about PLNs, there has been surprisingly little academic research about PLNs (Couros, 2010, p. 123). With many educators using this term to describe their own informal learning habits, it is important for educational researchers to investigate exactly what this concept means to those who are using it as a term to describe a learning activity.

A Personal Learning Network (PLN) is a network of people you connect with for the specific purpose of learning (Tobin, 1998). These people may assist you in your learning by acting as a guide, direct you to learning opportunities, and assist you with finding answers to questions (Tobin, 1998). Digenti (1999) defines a PLN as "relationships between individuals where the goal is enhancement of mutual learning" which is "based on reciprocity and a level of trust that each party is actively seeking value-added information for the other" (1999, p. 53). Couros (2010) echoes Digenti's notion that a PLN is defined by the relationships among the individuals when he states that a PLN is "the sum of all social capital and connections that result in the development and facilitation of a personal learning environment" (2010, p. 125). In order to fully understand this definition, a distinction needs to be made between the Personal Learning Network (PLN) and the closely related term, the Personal Learning Environment (PLE) as the two terms are often used interchangeably when, in fact, they refer to two separate conceptual models. A Personal Learning Environment (PLE) can be thought of as the ecosystem that enables a PLN. A PLE represents "the tools, artefacts, processes, and physical connections that allow learners to control and manage their learning" (Couros, 2010, p. 125). In this respect, a PLE represents the ways and methods a person uses to connect to, and interact with, their PLN.

Using this distinction, Twitter can be seen as a tool of the PLE that is used to mediate interactions with a PLN.

In addition to acknowledging relationships by recognizing the importance of social capital in a PLN, Couros (2010) also notes that connections are an important aspect of a PLN and are required in order to create an environment where learning can occur. This emphasis on the importance of making connections for learning activities is supported by Siemens (2005) who states that, “Nurturing and maintaining connections is needed to facilitate continual learning” (2005, para. 24). The specificity in making these connections for the explicit purpose of learning, as suggested by both Tobin (1998) and Digenti (1999), is a key characteristic that differentiates a PLN from a social network. While PLNs and social networks share a similarity in that they are both networks comprised of nodes and links between these nodes to form a mesh (van Loon, 2006), the motivation for why people make these links or connections with another person differs. In a PLN, a person makes a connection with another person with the specific intent that some type of learning will occur because of that connection. The connection is seen by that person as a mechanism that enables the opportunity for learning. This is not necessarily the case in a social network where the intent of connecting to another does not have to be driven by a desire to learn from that person, but may instead be triggered by other motives.

PLNs also appear to differ from similar informal learning constructs, such as a Community of Practice (CoP) (Wenger, 2006) or a Network of Practice (NoP) (Brown & Duguid, 2000) in that both CoPs and NoPs are bound by a common practice, or specific domain of knowledge or interest. A PLN is not necessarily bound by a common practice and can, through membership, theoretically represent as many or as few of the interests of the person constructing the PLN. Additionally, an important aspect of a community is that “it represents a

collective intention – however tacit and distributed – to steward a domain of knowledge and to sustain learning about it” (Wenger, Trayner, & Laat, 2011, p. 9). This is different in a PLN.

While people may follow similar people within their PLN, the PLN is an autonomous construct that is uniquely created by each individual to serve their specific learning needs. Therefore, there is no collective intention driving the development of the PLN as there is with a community, but rather a personal intention on the part of the person constructing the PLN.

In the context of its use among educators, a PLN may share some characteristics with a Critical Friends Group, or CFG. CFGs are professional learning communities of 10 to 12 educators who meet with each other on a regular basis to improve their teaching and learning practice using structured protocols (Franzak, 2002). However, as there has been little research on the use of PLNs by educators, it is unclear as to whether the primary motivation for educators to create a PLN is to create a similar type of professional learning community as those found in a CFG. Additionally, a CFG uses a formalized set of protocols to conduct the learning within the group which differs from a PLN where there are no set protocols in place for learning. Finally a CFG is intentionally small in numbers with a limit of 10 to 12 educators participating while a PLN places no limits on the number of members a person may connect with. In this respect, a PLN may be well suited to take advantage of the network effect, which states that the value of a network increases with the more nodes that are added to the network (Hendler & Golbeck, 2008). In the context of a PLN, this may mean that a PLN becomes more valuable for the person using the PLN as more members are added to it.

While technology is not a requirement for the development of a PLN, there does appear to be a connection between those who actively develop a PLN and their use of information and communication technologies (ICT) (Klingensmith, 2009; Sakamoto, 2009). From his own

personal experience, Couros (2010) notes that Twitter “has proven for me to be the most responsive method for surveying the connective knowledge of those within my PLN.” (2010, p. 124). Informally, when practitioners of PLNs talk about ICT tools they feel are important to connect them to their PLN, Twitter is often noted as one of the primary tools.

Twitter Defined

Twitter (<http://twitter.com>) is a web-based service that has been described as a microblogging platform and a social network application (McNeil, 2009) which also exhibits characteristics of text messaging (Mischaud, 2007). Microblogging is a variant of traditional blogging in that users post messages or updates to the service (Reinhardt, Ebner, Günter Beham, Costa, & Luckmann, 2009). The primary difference between microblogging and traditional blogging is with the length of these messages. Unlike traditional blogging which imposes no restrictions on the length of a post, microblogging enforces a strict length limit of 140 characters, making it an extremely quick and efficient communication tool (Java, Song, Finin, & Tseng, 2007).

While there are many microblogging services available, Twitter is the largest and most well known. Twitter was launched on July 13, 2006 (Williams, 2006). As of February, 2011, there were close to 200 million registered Twitter users (Johansmeyer, 2011) posting 140 million messages, known as ‘tweets’, each day (Penner, 2011). These tweets can be composed directly on the Twitter website, via a mobile device or application, or using a third party desktop application. Tweets are not limited to text and can, for example, contain hyperlinks to other web resources. By default tweets are publicly viewable unless a user chooses to make their account private, in which case their tweets will only be available to approved users.

Twitter is also a social network in that users can choose to ‘follow’, or subscribe to, other users. Following another user means their tweets will appear on a page called the Home Timeline. The Home Timeline is an aggregate of the most current tweets from all the users a person follows, listed in reverse chronological order with the most recent tweets at the top of the page. By default, this subscription process is not reciprocal, and it is quite common for a user to follow another user who does not follow them back. Users can organize their followers into lists, which are special timeline pages that aggregates tweets only from members in that list. In this way, groups of users can be segmented based on criteria, such as a common subject area, or by the level of relationship with each (i.e., a Friends list, an Immediate Family list, a co-workers list, etc).

Twitter users can also add a 160-character biography to their account, and include a URL to another website. This is typically a blog or a profile page on another social network. This information is publically displayed unless the user makes their account private. It is this biographical information that I will use to contact possible research participants, which will be covered in detail in chapter 3.

Twitter users can choose to send four types of tweets;

1. Public, which appear in their public Twitter stream;
2. Replies, which are also public but directly targeted at other Twitter users;
3. Direct messages, which are private messages sent to other Twitter users and not visible in the public data stream;
4. Retweets, which are forwarded messages, allowing the user to amplify or rebroadcast a tweet from another user to their followers.

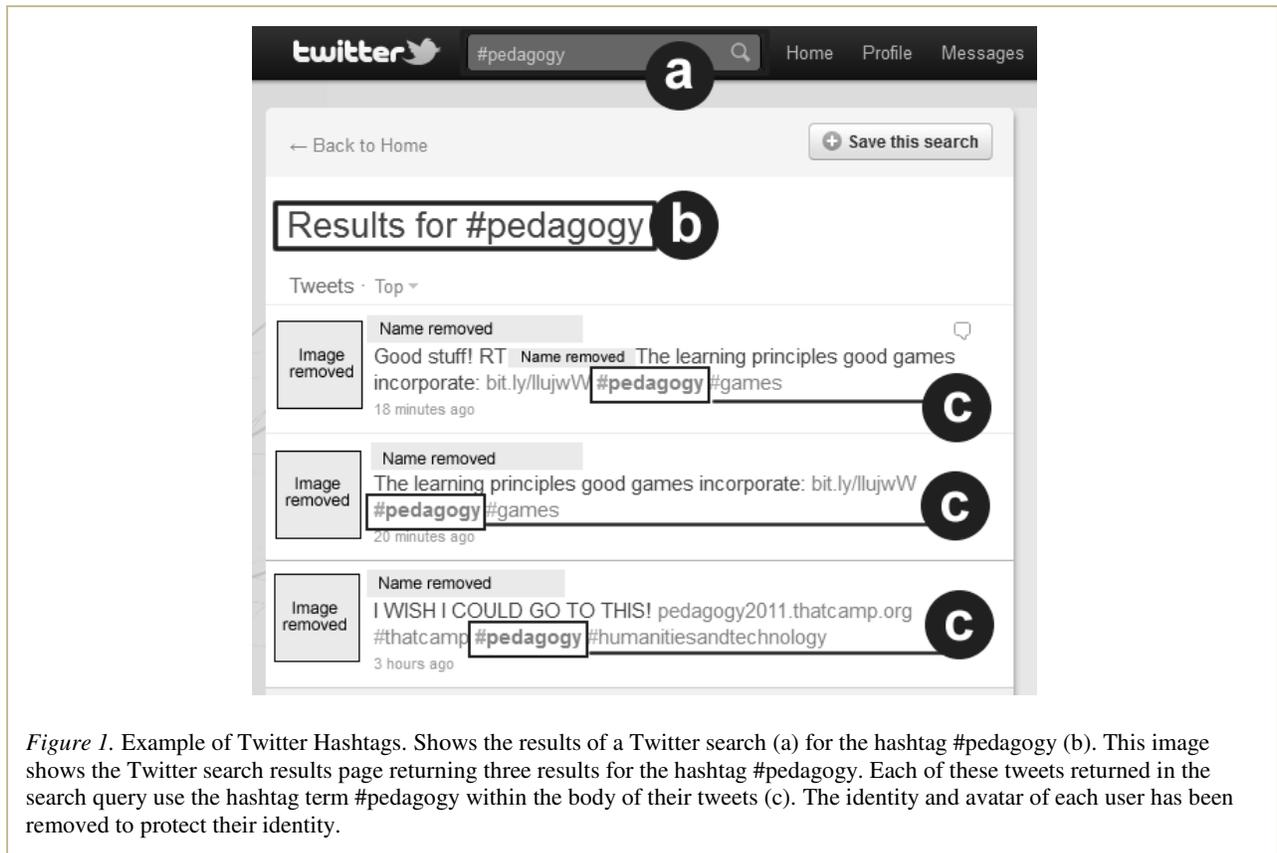
While these are functional descriptions of the types of tweets users can send, tweets have also been categorized based on their communicative role. Java, Song, Finin and Tseng (2007) developed a taxonomy of tweets, and categorized tweets into four broad categories; (a) daily chatter, (b) conversations, (c) sharing information and URL's (links to websites), and (d) reporting news. Using this taxonomy, Java et al. (2007) developed profiles of the three main categories of users on Twitter;

- Information Sources are users who post updates on a regular basis and has a large number of followers.
- Friends, a broad category that most users fall into
- Information Seekers are users who rarely post, but follow other users.

While these categories are useful starting points when discussing relationship on Twitter, it should be noted that this research was conducted in April/May of 2007 when Twitter was only months old and had well under 100,000 users. With close to 200 million users (Johansmeyer, 2011) and a significant maturing of the platform, this research, while foundational, needs to be considered through this lens.

Another relevant aspect of Twitter to this research is the ability for users to filter and organize messages based on *hashtags*. A hashtag is any text phrase preceded by the hash character (#). Including a hashtag in a phrase allows tweets to be searched and organized based on that tag (see Figure 1). A common use of hashtags are in a conference or workshop setting where participants use a pre-determined hashtag within the body of their tweets whenever they tweet something related to that conference or workshop. In this way, by searching for that hashtag on Twitter, all the tweets related to the conference can be compiled and viewed in a central location. In the case of a conference or workshop, the hashtag is often predetermined by

the conference or workshop organizers. However, this is not always the case in all situations where hashtags may be used on Twitter, and often hashtags emerge organically and spontaneously from the wider community where the act of creating a hashtag is negotiated among various users.



Lists are another Twitter mechanism which gives Twitter users the ability to organize their Twitter stream into smaller sub-streams. Lists are a relatively new feature of Twitter, introduced in October, 2009 (Stone, 2009). Lists are used by Twitter users as a way to divide the people they are following into groups of users based on user-defined criteria. From the Twitter interface, users can then click to view a list and see only the stream of tweets from the users on that list (see Figure 2).

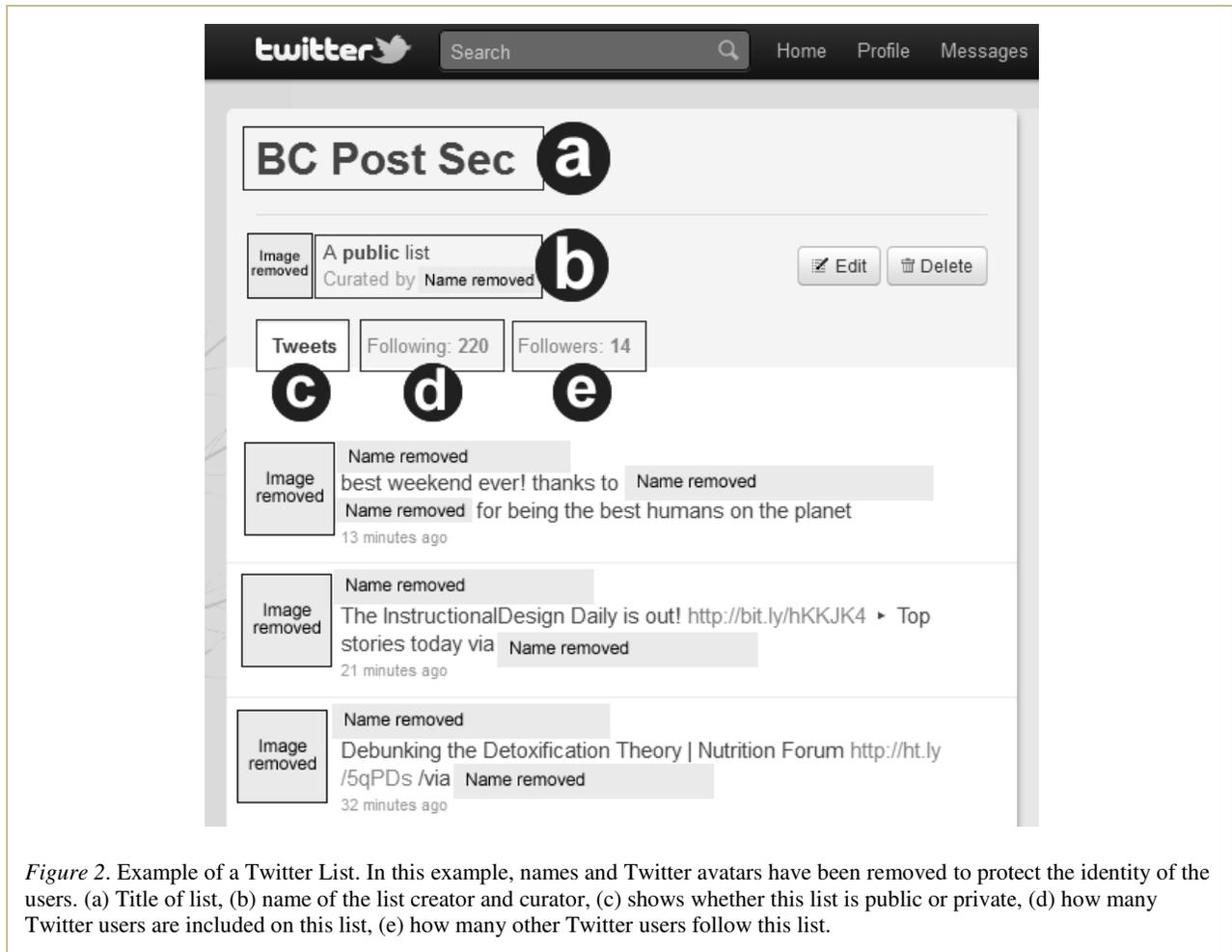


Figure 2. Example of a Twitter List. In this example, names and Twitter avatars have been removed to protect the identity of the users. (a) Title of list, (b) name of the list creator and curator, (c) shows whether this list is public or private, (d) how many Twitter users are included on this list, (e) how many other Twitter users follow this list.

Figure 2 shows a screenshot of a Twitter list entitled BC Post Sec (a). In this view, only the tweets that were created by the people included on this list are shown. Other information on this page includes who curates the list (b) and whether the list is public or private (b). Links to various views of the information in this list (c), (d) and (e) allow different information about the list to be viewed. The default tweets list view (c) is shown in this image. This list follows the tweets of 220 Twitter users (d). Clicking the Following: 220 link (d) will reveal the identities of those 220 users which this list follows. 14 other Twitter users are also following this list (e), meaning they also have a view similar to this on their Twitter list view page in which they can

see only the tweets from the users included on this list. Since this is a public list (b), other Twitter users can choose to follow this list and see the tweets of people on this list.

Twitter in Education

As early as 2007, with Twitter less than a year old, educators were already beginning to imagine how this unique combination of blogs, text messaging, and social networking could be used in education (EDUCAUSE Learning Initiative, 2007). Since then, educators have been experimenting with Twitter, using it in the classroom with students (Costa, Guetner Beham, Reinhardt, & Sillaots, 2008), as a tool for collecting research data for formative course evaluations (Stieger & Burger, 2009), and as a *backchannel* to facilitate real time conversations between participants at conferences (Reinhardt, Ebner, Beham, Costa, & Luckmann, 2009). This last example illustrates a growing phenomenon among educators; the use of Twitter as a tool for informal learning (Elliott, Craft, & Feldon, 2010).

While some of the literature on Twitter use in a learning context centres around the possibilities and potentials of the service (Grosbeck & Holotescu, 2008), there has been empirical research done on the use of Twitter in educational settings (Costa et al., 2008; Ebner & Schiefner, 2008; Elliott et al., 2010), including specific research examining the connection between microblogs and informal learning.

Ebner, Lienhardt, Rohs and Meyers (2010) studied the use of microblogging within a Masters level program at a University and concluded that “microblogging should be seen as a new form of communication that can support informal learning beyond the classroom” (Ebner et al., 2010, p. 92). However, most definitions of informal learning indicate that informal learning is learning that occurs outside of a formalized learning environment (Conlon, 2004) without externally imposed curriculum (Livingstone, 2001). The formal university program this research

was conducted in brings into question whether or not this was truly an informal learning environment. Additionally, the major indication of informal learning in this study was in the volume of messages sent by students using the microblogging service. Researchers concluded that this increased volume of messages was an indication of informal learning. However, the content of these messages were not examined. Without knowing the content, it is difficult to correlate an increase in the number of messages sent between participants as strong evidence of informal learning.

Costa, Beham, Reinhardt, and Silloats (2008) examined the use of Twitter by the participants of a weeklong professional development conference, which brought together PhD students and researchers involved in the areas of professional learning and training, and concluded that Twitter was “becoming serious in informal learning and networking” (2008, p. 1). Participants at the conference were asked to use Twitter during the week and post about their experience in the school. A content analysis of the tweets showed a relationship between frequently used words or phrases in tweets and the topics of the programme (Costa et al., 2008, p. 5), indicating that participants were using Twitter to continue discussions on the topics of the conference. In addition to a content analysis of the participant’s tweets, the researchers also conducted a participant survey two weeks after the conclusion of the school. When asked about their impressions of Twitter during the conference, participants felt that the ability to engage in immediate communication, and share information with other participants as the primary strengths of Twitter. While a few of the participants found Twitter distracting, the primary drawbacks cited by the participants were the limited length of the messages, and large volume of message generated (Costa et al., 2008, p. 8). Despite these drawbacks, the researchers found that “in general terms, Twitter was well accepted and regarded as a useful tool for spontaneous and

immediate communication” (Costa et al., 2008, p. 8). The researchers note the limitations of their study in that it was an unplanned study that organically grew out of their own participation in the conference, and that all the data collection and analysis strategies were derived after the fact and within a very short time frame.

A more detailed analysis of educators Twitter content was conducted by Elliot, Craft and Feldon (2010), who examined the use of Twitter as professional development tool by analysing tweets of K-12 faculty to identify the top 25 most frequently visited websites in a 14 month period. The researchers then analysed the content of these sites to determine if the material presented was grounded in, or cited, research. While the analysis overwhelming showed that content being shared on Twitter was not supported by research, the researchers did not discount the use of Twitter as a professional development tool as some of the websites contained resources that teachers may find valuable (Elliott et al., 2010, p. 447). The study noted that the lack of research based opinion on best practice on many of the sites visited by educators in the study underscores the importance of cultivating digital literacy among educators in order for them to discern the differences between research and opinion. However, the researchers conclude that the value in Twitter may not be in the resources shared, but rather in the interpersonal connections made to educators from around the world which;

...serve as a source of encouragement, idea generation and feedback, brainstorming and support, the importance of which should not be devalued. Future studies might examine such relationships and what it is that educators gain from participation in such groups. (Elliott et al., 2010, p. 448)

This conclusion that the greatest value Twitter may have for educators is in facilitating interpersonal connections among educators warrants closer examination; an examination this research project will conduct by closely examining Twitter mediated relationships through the

lens of the informal learning construct of a PLN in an attempt to better understand the role that Twitter plays in the formation and maintenance of PLNs.

Chapter 3: Methodology

I will begin this chapter by examining which of the two broad categories of research methodologies, qualitative or quantitative, is best suited to answering the research questions posed in this study. This will be followed by an examination of the specific strategy of inquiry I will be using for this research, and conclude with a detailed outline of the methods I will use to carry out this research.

Qualitative or Quantitative?

The primary research question guiding this project is what role does Twitter play in the formation and maintenance of Personal Learning Networks among educators? When approaching what methodological perspective would best answer this research question, it is useful to begin by examining which of the two broad methodological categories would be best suited to this research.

As someone who uses Twitter, connects and engages with others for the purpose of learning within a PLN, and is employed as an educational technologist within a post-secondary institution, this research project has emerged from my own professional and personal interests. As a result, I bring into the project knowledge and understanding of the phenomenon I wish to study. This intimate relationship between researcher and subject is one of the defining characteristics of qualitative research (Denzin & Lincoln, 1994). Palys and Atchison (2008) support this perspective as well, noting that this prior knowledge of the phenomenon under investigation is seen by qualitative researchers as an advantage, while quantitative researchers would express concerns that the researcher is too close to the phenomenon under investigation (Palys & Atchison, 2008).

While there are advantages for researchers who wish to investigate a phenomenon they are involved with (Maxwell, 2009; Palys & Atchison, 2008), there are also possible

disadvantages. These include the possibility that the researcher may find the project an overwhelmingly emotional experience, may experience role conflicts as the research blurs with the researchers life, and be unable to rise above their own embedded experiences and fully address all aspects of the research project (Palys & Atchison, 2008). To address these possible disadvantages, Maxwell (2009) suggests that qualitative researchers actively reflect on the research process, and employ “researcher identity memos”, which involves the researcher writing down notes related to relevant aspects of the research which can trigger unexpected insights and connections. During the course of this project, I wrote a series of researcher identity memos as I conducted the research.

In addition to acknowledging the intimate relationship between the researcher and the subject matter, Denzin and Lincoln (1994) also note that qualitative research stresses the socially constructed nature of reality. At the heart of this research is an examination of three socially constructed relationships. The first is the socially constructed relationship an educator has with the various members of their PLN. This relationship involves complex social processes which are reflected in the sub-research questions for this study regarding how trust gets established in a PLN. The second is the socially constructed relationship an educator has with the PLN as an object, reflected in the sub-research questions which examine the nature of participating in a PLN. The third socially constructed relationship is between the educator and a technological tool, in this case Twitter. This research project is sensitive to the view that information technologies are socially constructed through both complex design processes, and in the way the technology is actually used by users, which may be different from the ways in which it was originally envisioned by its designers (Introna, 2005). This view recognizes “an ongoing reciprocal relationship in which society and technology co-construct each other; they act through

and upon each other” (Introna, 2005, para. 6) and supports the notion that our relationship with technology constitutes a socially constructed reality. In order to fully examine these socially constructed relationships, a qualitative approach to this project is required.

A qualitative approach is also required to address the sub-research question examining the nature of informal learning within a PLN. As discussed in chapter two, the literature on informal learning makes a distinction between two types of informal learning that can occur; intentional informal learning, and incidental informal learning (Livingstone, 2001; Marsick & Watkins, 2002). Intentional informal learning is where the learner is aware that there is learning occurring, or actively seeks out to learn something. Incidental learning is learning that occurs at a subconscious level, or as a by-product of an event. With incidental learning, the only way that the learner realizes they actually learned something is through self-reflection after the event (Marsick & Watkins, 2002). Qualitative research emphasizes data collection techniques, such as interviews, which allow for this type of self-reflection on the part of the participants to occur and emerge (J. A. Smith et al., 2009).

Choosing a strategy of inquiry

As outlined above, both the research questions and the prior knowledge of the researcher require a qualitative approach to this research study. Within this qualitative category of research, there are numerous strategies of inquiry a researcher can employ to answer the research questions. A strategy of inquiry is a process that is used in order to “connect researchers to specific approaches and methods of collecting and analyzing empirical materials” (Denzin & Lincoln, 1994, p. 202). Denzin and Lincoln (1994) identify eight common strategies of inquiry for qualitative research, including (a) the case study, (b) ethnographic and participant observations, (c) phenomenology, ethnomethodology and interpretive practice (d) grounded

theory, (e) the biographical method, (f) the historical method, (g) applied and action research, and (h) clinical models. When deciding on which of these strategies is best suited to answering the research question, it is important to understand what it is I am trying to explore with my research question, and the context in which I will be operating.

The research question is an examination of the role that Twitter plays in the development and maintenance of Personal Learning Networks among educators. In order to understand the role that Twitter plays, we must understand how Twitter is used by educators. While it might be useful to examine what is they are tweeting, this will only give us a shallow view of how they are using it, and tells us nothing about their motives and reasons for using Twitter. Therefore, it is important to allow educators to speak directly about how and why they use Twitter. In this way, we can begin to understand the role that Twitter plays in developing and maintaining connections with their PLN.

Additionally, the research question asks what role Twitter plays in a specific context, that of a PLN. While a PLN is a social context in that it involves social relationships with other people, it is, at its core, a very personal and intimate context. Decision about whom an educator chooses to connect with on Twitter and include in their PLN are very personal decisions. In fact, the very nature of a PLN is that it is unique to an individual; the P in PLN stands for personal. No two PLNs will be the same as the decisions on who to include in that PLN are decisions that each educator will make individually. While the PLN may exist in the public space of the Internet, and the communication with members of that PLN may happen in open and public spaces on Twitter, the PLN is something that is constructed by individuals for very personal reasons. In order to better understand these reasons, a strategy of inquiry that is sensitive to the personal experiences of the participants is required. Phenomenology is a strategy of inquiry that

allows this personal perspective to be fully explored from the perspective of the participants involved. The purpose of phenomenology is to understand the phenomenon under investigating by understanding the lived experiences of the participants involved in that phenomenon (Laverty, 2003). In order to understand these lived experiences, phenomenological researchers strive for rich and complex description of these concrete experiences (Finlay, 2009). Therefore a phenomenological approach was used for this study.

It is important to note that there are many variations of phenomenological strategies of inquiry. While they all share the basic premise of understanding the lived experiences of people involved in a phenomenon, there are significant differences among phenomenological researchers in how phenomenological research should be conducted (Finlay, 2009). For a novice phenomenological researcher, these divisions can cause confusion and make the field of phenomenological research difficult for novices to enter (Finlay, 2009). Additionally, these divisions have led to a mixing of different methods and strategies, leading to a mix and match approach to phenomenological research. Because of this, Finlay (2009) believes that “researchers should be clear about which philosophical and/or research traditions they are following” (2009, p. 8) and that any phenomenological method is sound “if it links appropriately to some phenomenological philosophy or theory” (2009, p. 8). In the next few paragraphs, I will highlight two of the major differences in phenomenological approaches and outline which approach I will use for this research.

The first major division in phenomenological research is with regards to the subjectivity of the researcher. All phenomenological researchers agree on the importance of the researcher to be flexible in their thinking, and willingness to see the world in fresh, new and possibly unexpected ways through the eyes of the participants (Finlay, 2009). Universally,

phenomenological researchers acknowledge that the researcher enters into the research with preconceived ideas and experiences about the phenomenon under investigation (Giorgi, 1997; Moustakas, 1994; J. A. Smith et al., 2009). However, how this subjective view of the researcher is dealt with in the research divides phenomenological researchers (Finlay, 2009). Giorgi (1997) and Moustakas (1994) advocate the use of phenomenological reduction, a method in which the researcher sets aside their knowledge of the phenomenon under investigation in order to approach the phenomenon with fresh eyes. Other phenomenological researchers assert that it is impossible to fully set aside all knowledge and experience and achieve a state of naivety regarding the subject under investigation (Finlay, 2009). Instead, they advocate that researchers acknowledge their previous experiences, but rather than set them aside, they should be brought to the foreground and made explicit in the study (Finlay, 2009). Smith et al. (2009) in their Interpretative Phenomenological Analysis (IPA) advocate that researchers should remain open-minded during the data collection process in order to let the participants stories and experiences emerge “on their own terms” (J. A. Smith et al., 2009, p. 42), but then use the researchers previous experiences with the phenomenon during the analysis phase. This position makes sense to me considering my own personal experiences are quite detailed and involved with Twitter and PLNs. While it is important that I acknowledge my preconceptions and beliefs and set those aside when speaking to participants, I do believe I have a perspective on the phenomenon in question that could prove useful in this project. Therefore, the IPA approach of Smith et al. (2009) is what will be used for this project.

The IPA approach also provides a natural solution that fits with this research with regards to the second major division within phenomenology, which is whether or not the researcher interprets the data, referred to a hermeneutic phenomenology, or leaves the experiential accounts

of the participants as strictly descriptive accounts, known as the Husserlian method (Finlay, 2009). Hermeneutics is the theory of interpretation (J. A. Smith et al., 2009). IPA employs a double hermeneutic approach which acknowledges that the researcher has a dual role in the research in that they are trying to make sense of the participant trying to make sense of the phenomenon. In this respect, my previous experience with the phenomenon could prove useful in helping interpret the experiences of the participants.

Research Methods

In this section, I will move from considerations on strategies of inquiry and outline the specific details of the research study, including a description of the participants, how they were sampled and contacted, how the data was collected, and address issues of confidentiality and validity.

Participant Selection.

Participants for this research were chosen using a combination of both probability and nonprobability sampling. Since the nature of this research is to examine the experiences of a specific group of people engaged in a specific social activity using a specific piece of technology, participants were selected using nonprobability sampling as they hold important information needed for this research (Maxwell, 2009, p. 221). Henry (2009) defines probability sampling as sampling which “uses random processes rather than human judgement to select the individuals or other units for the study” (2009, p. 78). Nonprobability sampling is defined as sampling that “allows human judgement, either purposefully or unintentionally, to influence which individuals or units are selected for a study” (Henry, 2009, p. 78).

Stage 1: Nonprobability Sampling. Setting the Criteria.

For the purpose of this research, I have defined four criteria potential participants in this study must meet before being considered for the study. These are;

- They are educators.
- They have a conceptual understanding of a PLN, and consider themselves engaged in the practice of using a PLN.
- They use Twitter.
- They have completed their public profile on Twitter with enough information that I can contact them by using this information.

Because these criteria must be met in order to meet the goals of the study, nonprobability sampling will be used to determine eligibility for the special population (Palys & Atchison, 2008, p. 124). Since phenomenological research is aimed at understanding the experiences of the participants, it is crucial that the participants in this study have some level of experience with the phenomenon under investigation (Laverty, 2003, p. 18). These four criteria were used to provide evidence that the special population had experienced the phenomenon under investigation. From this nonprobability sampling, a probability sample was then chosen.

A group of people who meet many of these criteria exists in the form of The Educators PLN (<http://edupln.ning.com/>). The Educators PLN is an online community consisting of over 8,000 members. While the title and associated tagline “the personal learning network for educators” give a strong indication that members of this group fit the first two criteria. The third criterion that must be satisfied is that study participants must use Twitter. One of the activities coordinated by members of the Educators PLN is a weekly Twitter based activity known as EdChat. EdChat is an ongoing distributed conversation that occurs among educators on Twitter.

Educators participate in the conversation by posting tweets to their Twitter account, and insert the hashtag phrase *#edchat* in those tweets. The ‘#’ is a special character on Twitter that denotes the phrase or letters that immediately following it is a hashtag. Anyone interested in following the conversation can then use a number of software tools to search Twitter for tweets that contain this hashtag. In this way, they can follow the conversation.

It is important to note that, while the Educators PLN are the coordinators of EdChat, participants do not have to be members of the Educators PLN to take part. Because of the open and distributed nature of Twitter, anyone with a Twitter account can contribute to the conversation by inserting the hashtag *#edchat* into their tweet. However, this does not preclude using this hashtag as a source for potential study participants as the interest of this research study is not to study the dynamics of participation in either the Educators PLN group or the participants of the EdChat discussion. Rather, the choice to use this particular group was to ensure participants in the study meet the required criteria, as is common practice in purposive sampling. However, it was manually verified by the researcher that participants who took part in the study indeed met the criteria of this study prior to data being collected.

Transcripts of all the EdChat conversations are publically archived and searchable on a website called Twapper Keeper (<http://twapperkeeper.com>). All posts on Twitter that use the hashtag *#edchat* are available for download in a csv (comma separated value) file format and available for analysis. The data captured by Twapper Keeper includes:

- Contents of each tweet.
- A recipient user ID (if the message was sent to someone as a public reply. Direct private messages are not archived.)
- The sender’s user name and user id.

- A Twitter ID number, which uniquely identifies each tweet.
- The language of the tweet.
- What platform was used to send the tweet.
- The geo-location coordinates the tweet originated from (if the user has enabled geo-location).
- Date and time the tweet was created.

For the purposes of this study, four 1-week samples of EdChat archives were randomly selected from a one year archive period running from September 2009 to September 2010. The random selection was done using Research Randomizer (<http://www.randomizer.org>), a web-based tool developed by the Social Psychology Network to aide researchers with the task of accurately generating random samples. The four weeks chosen were;

- February 2 to 8, 2010 (3,874 tweets)
- March 9-15, 2010 (3,241 tweets)
- May 18-24, 2010 (5,859 tweets)
- June 15 – 21, 2010 (5,878 tweets)

The four randomly selected weeks were extracted from Twapper Keeper and merged into a single file using Microsoft Excel to make up the sampling frame. Since many participants posted multiple tweets over the course of the randomly selected weeks, the sample frame needed to be cleaned to remove duplicate posts and ensure that the username of the person who posted multiple tweets occurred once in the sampling frame. Without cleaning the sampling frame, any user who posted multiple times to EdChat would be listed multiple times in the sample, increasing the possibility that they would be pulled from the sampling frame. Therefore, duplicate posts were deleted from the sampling frame prior to a random sample being drawn.

The cleaned data contained 2,818 unique Twitter users. This list of Twitter users formed the basis for the next stage of sampling.

Stage 2: Probability sampling. Finding the participants.

With 2,818 educators available, I then began to task of finding the participants that met the remaining criteria. The first criteria that needed to be met was that the participants needed to be contactable, meaning I would have to examine each of their Twitter accounts to see if there was contact information in order to send an invitation to participate in the research. It was not logistically feasible to manually examine 2,818 Twitter accounts in the short amount of time I had for the research project. In addition, the data for this research was to be collected using a long form interviews and if I was to send out invitations to 2,818 participants, I may have ended up in a situation where I had more interest than I could possibly collect data from. Therefore, I needed to devise a system that would help me narrow down the 2,818 potential participants into smaller units so that I could more effectively and efficiently target my efforts.

To achieve this, I extracted all the Twitter usernames from the Twapper Keeper extract, created a Microsoft Excel spreadsheet, and imported the usernames of the 2,818 potential participants into the Excel spreadsheet so each participant occupied a line number. I then randomly generated 20 numbers from one to 2,818 using Research Randomizer and matched the random numbers to the line numbers in Excel. I used this subsection of 20 participants as the first group I contacted to participate. I manually examined the Twitter profiles of these 20 participants to determine if they had included biographical and contact information as part of their Twitter biography. If their biography stated that they were an educator and contained contact information, I sent an email asking for their participation in the study (see Appendix A). If they agreed, I sent them a study consent form (Appendix B) and set up a time and method to conduct

the interview. If there was no response from the recipient to the initial email within three days, a second email was sent to follow up (Appendix C). If there was no reply to the second email, I assumed the participant was not interested in participating in the study and they were dropped from the pool.

In order to secure the seven participants for the study, I repeated this process of randomly pulling sub-samples of 20 participants from the larger sampling frame five times, as shown in Table 1.

Table 1

Number of Participants Selected From Each Round of Sampling

| | Round 1 | Round 2 | Round 3 | Round 4 | Round 5 |
|----------------------------------|---------|---------|---------|---------|---------|
| Participants who failed criteria | 17 | 16 | 15 | 16 | 15 |
| Participants who met criteria | 3 | 4 | 5 | 4 | 5 |
| Participants secured for study | 0 | 2 | 1 | 3 | 1 |

Note: each round consisted of 20 possible participants. Criteria at this stage of participant selection meant that they must visibly identify themselves as an educator in their Twitter bio, and having a means of contacting them visible. This means of contact was either an email address, or a link back to a website which contained contact information.

After completing five rounds of sampling, I had conducted seven interviews. While phenomenological research does not specify an exact number of participants required for the subject, it does suggest that researchers continue to gather data until they believe they have reached a point where further interviews will yield no more understanding of the experience (Groenewald, 2004, p. 11; Lavery, 2003, p. 18). After conducting seven interviews, I believed I had reached this point.

Data Collection

One of the central premises of phenomenological research is to arrive at an understanding of concrete experiences through the participant's rich and complex descriptions (Finlay, 2009).

In keeping with this phenomenological focus on rich and complex descriptions, data was collected using in-depth interviews with participants about their experiences using Twitter within a PLN. Interviews are considered to be the normal method of data collection in phenomenological research (Moustakas, 1994, p. 114), and, in general, are the “favourite methodological tool” (Denzin & Lincoln, 1994, p. 353) for gathering data for qualitative researchers. For phenomenological research, it is generally accepted that semi-structured interviews with open ended questions provide the best opportunity to fully explore the experiences under investigation by allowing the researcher and participant to explore topics and concepts that may emerge during the course of the conversation. For the purpose of this research, a semi-structured interview guide (Appendix D) was prepared with a number of questions designed to answer the primary research question.

As detailed in Table 2, interviews were conducted between December 9, 2010 and January 10, 2011. Phenomenological research is interested in rich descriptive accounts of lived experiences (J. A. Smith et al., 2009) and, as a result, all seven interviews ranged in length from one hour and three minutes to one hour and twenty-six minutes. These lengths fall within the 60 to 90 minute recommended length for phenomenological participant interviews (J. A. Smith et al., 2009).

Due to the diversity of geographical locations of each participant, I was unable to interview any of the participants in person. Interviews were conducted using Skype, a software application that allows users to make audio or video calls over the Internet. All participants indicated they had used Skype and felt comfortable using Skype. Recording each interview was important because of the semi-structured nature of a phenomenological interview, which requires active listening and a readiness to actively follow the participants lead in the conversation (J. A.

Smith et al., 2009). In order for this to happen, the interviewer must be able to fully devote his attention to the participant, so recording each interview is required. Interviews were recorded using the software package CallGraph (<http://callgraph.biz/>).

Once all seven interviews had been recorded, the recorded audio was manually transcribed using the open source audio editing program Audacity and Microsoft Word. These transcriptions were sent for review to each participant to ensure they accurately represented their views and memory of the interview. Participants were also invited to add additional comments regarding the interview at this point, which have been incorporated into the analysis.

The Participants

All participants were assured anonymity as part of this research, and a pseudonym has been assigned to each participant. All personally identifiable information that may identify the participants, such as institutional affiliation, has been removed.

Of the seven participants in this study, four were male and three were female. Three identified themselves as educators in the K-12 system and four identified themselves as educators in post-secondary institutions. However, of the four in post-secondary, three also indicated that they had previously worked in the K-12 system as educators. Table 2 shows a summary of each participants Twitter activity, including the number of followers each participant had on Twitter at the time of the interview, the number of people they were following, the number of tweets they have sent, and when they began using Twitter. All participants had been using Twitter for at least 18 months prior to their interview.

Table 2*Summary of Research Participants*

| | Kris | RJ | Robin | Kelsey | Shawna | Todd | Anna |
|-----------------------|--------------|--------------|--------------|---------------|--------------|--------------|---------------|
| Gender | M | M | M | F | F | M | F |
| Location ^a | US | US | US | Japan | US | Canada | Germany |
| Sector ^b | Higher Ed | Higher Ed | Higher Ed | K-12 | Higher Ed | K-12 | K-12 |
| Interview Date | Dec 9, 2010 | Jan 11, 2011 | Jan 5, 2011 | Jan 6, 2011 | Jan 10, 2011 | Dec 16, 2010 | Dec 12, 2010 |
| Duration (h:mm) | 1:23 | 1:08 | 1:04 | 1:21 | 1:03 | 1:13 | 1:26 |
| On Twitter since | Jan 26, 2008 | Oct 29, 2008 | Nov 22, 2008 | April 7, 2007 | Oct 12, 2008 | Jan 12, 2008 | April 8, 2009 |
| Followers | 1,564 | 743 | 1,815 | 5,155 | 1,363 | 4,338 | 9,856 |
| Following | 585 | 699 | 710 | 4,645 | 1,250 | 970 | 3,589 |
| Tweets Sent | 4,911 | 4,428 | 9,944 | 6,398 | 7,934 | 10,564 | 41,160 |

Note. Number of Followers, Following, and Tweets Sent are as of the interview date.

^a While this research was not specifically designed to be international in scope, participants in this study came from four countries. The participants from Germany and Japan indicated they were originally from the United States and were working in education overseas at the time of the interview.

^b What level of the education system (K-12 or Higher Education) was the participant working in at the time of the interview. It should be noted that three of the four Higher Education educators also indicated they had previously worked as an educator in the K-12 system.

Data Analysis

Data analysis was done using a double hermeneutic approach in keeping with the Interpretative Phenomenological Analysis used for this research study. This approach acknowledges that the researcher has a dual role in the research in that they are trying to make sense of the participant trying to make sense of the phenomenon (J. A. Smith et al., 2009). IPA analysis is both interpretative and ideographic, relying on the analyst to enter the participant's world in an attempt to understand and interpret their experiences. While the research analysis for this project does bring together common themes from all seven interviews, it also reflects the

ideographic nature of IPA research by drawing attention to unique perspectives of specific individuals as interpreted by the analyst.

While I did make notes during the course of each interview, these were not reviewed until after each interview had been transcribed and was being analyzed. This was intentional as I wanted to capture thoughts as they occurred during the interviews, but did not want those thoughts to colour my perception until I began data analysis. I followed a similar process during the transcription phase as I listened back to the interviews and transcribed them into Word. As I transcribed, I made rough notes of anything I found interesting about the interview, and bracketed these off until I entered into the data analysis phase. Once I began data analysis, I reviewed my notes from the interview and transcription sessions and began to incorporate those thoughts into my analysis.

Data analysis began once I completed transcribing the audio interviews. The transcripts were imported into the qualitative data analysis software package Atlas.ti, which was the primary tool used for analyzing the data. The transcripts formed my primary documents around which I began to conduct my analysis. Initial analysis took the form of a close and thorough reading of the transcripts. I began open coding the transcripts using the coding feature of Atlas.ti. I also used the Atlas.ti memo feature and added memos to specific passages where participants described significant events or moments. I paid particular attention to the language being used by the participants to describe their experiences; the metaphors they employed and adjectives they used to describe what they were experiencing as they used Twitter to participate in a PLN. I also began selecting significant quotations that I thought either reinforced emerging themes common to all participants, or which highlighted a unique perspective not found among the other participants.

The initial detailed reading and coding of the transcripts was followed by a review of my original interview and transcription notes. At this stage, I began to identify emergent themes across both the interview transcript data set and my initial notes. I then returned to the interviews, paying attention to the coded material and the memos I made of the interviews. At this stage I began to group codes that I felt naturally fit together and began to examine my memos to see if those reinforced some of the emergent themes that I was beginning to see in the data. From this point, the process became more iterative as I moved between my notes, the interview transcripts, and my initial draft and put together the narrative analysis in the results section to answer my research question.

Chapter 4: Results

Overview

In this chapter, I present the results of my research. To begin, I discuss the general findings on how participants perceive the boundaries of their PLNs, and whether or not they believe that Twitter is the exclusive conduit through which interactions with their PLN flow. I will also address general findings regarding the use of other ICT's among these participants as these findings are relevant to answering the primary research question.

Defining the boundaries of the PLN.

In order to understand the role that Twitter plays the formation and maintenance of PLNs, it is important for this research to better understand how the participants view the boundaries of their PLN in two distinct ways. The first boundary is an examination of the diversity of fields and domains that are represented in the participant's PLN; do participants limit membership in their PLN to educators, or do they include people who represent other fields and interests? The second boundary examines whether the participants view the boundaries of their PLN synonymously with the connections they make on Twitter, or do they perceive that membership in their PLN extend beyond the boundaries of Twitter and encompass relationships that occur using other ICT tools and modes of interaction?

Diversity of fields represented in a PLN.

Participants perceptions of the first boundary of their PLN regarding the diversity of fields and interests represented in their PLN show that, while all participants do have a diversity of fields and interests beyond education represented in their PLN, the primary makeup of their PLN are people involved in education, and their perception is that their PLN consists primarily of other educators.

When asked to define the term PLN, Todd was explicit that the PLN was made up of educators when he responded that his definition of a PLN was, “the people that you interact with on a regular basis to further your own knowledge and understanding of things around education.” Later, Todd was asked to expand on the specificity of his use of the term “educators” in his definition of PLN, and to clarify if he considered his PLN as something that was specifically professional.

When I say Personal Learning Network, for me my Personal Learning Network is focused around educational issues. And I think most people in education who are using the term PLN, they’re using it around their own professional learning. That’s my understanding of the way the term is being used.

When asked if he had people from outside of education in his PLN, Todd indicated he did, but that he considers their number “relatively small compared” to the number of educators he has in his PLN.

However, while participants in this study see their PLN as primarily consisting of other educators with a relatively small minority of connections representing other fields and interests, Anna considers this “relatively small” minority of connections with other fields important as the views and opinions of this small group of people has the potential to inform her practice as an educator.

A PLN it consists of everyone that you connect with in that network that you grab information from, ideas, have conversations with - anything that helps for your professional development; your learning. And it doesn’t even have to be just educators. It could be anything. It could be news resources, it could be CNN, it could be, if you’re following the Olympics one day or the World Cup like I do, that’s all part of your personal learning network because it’s things that you digest. And also anything that you participate in online and in online social networks to develop yourself and add to your

knowledge bank on any subject would be part of your personal learning, and so all the people and things connected with that would also be part of that network in my opinion.

Of the seven participants in this study, only one, Shawna, did not explicitly say her PLN consisted primarily of educators. This can be attributed to the fact that, while all seven participants in the study identified themselves as educators, Shawna also identified herself with a number of other roles, including Doctoral student, career counsellor, and a professional role she has in student affairs. As a result, Shawna viewed her PLN with more facets that reflected her multiple professional roles, and defined her PLN slightly different than the others in the study.

It's a shared space where I connect and engage with a community of peers and these peers - since I am in various groups - can be students, can be instructors, can be faculty, can be professionals. So, it's the group that's kind of a scaffold for me that I can go to for resources and give a - have a little bit of a sounding board for what I'm doing and where I'm going.

However, even though the scope of Shawna's PLN is beyond educators, the members of her PLN still appear to be firmly rooted in realm of her professional life.

This idea that the PLN revolves primarily around their professional work, yet also contains a smaller group of members representing their other interests from outside the sphere of education is further evidenced when the participants were asked about the criteria they use when deciding if they will follow someone on Twitter. Of the seven participants, six noted that one of the prime considerations they have for following someone on Twitter is that they identified themselves as an educator within their Twitter biography. This suggests that, for all but one of the participants of this study (Shawna), their PLN consists primarily of other educators and that they perceive their PLN as a tool primarily for professional learning activities related to their role as an educator.

While the makeup of the PLN for these participants is primarily educators, there is evidence from the participants that they value a diversity of opinions among the educators that they follow. All seven participants noted that they either follow, or are willing to engage in conversations with, people who have directly opposing views to their own in an attempt to balance out the views in their PLN. The participants exhibit a keen awareness that the autonomy to choose who you wish to follow and connect with in a PLN needs to be balanced by dissenting voices for fear of the PLN becoming a limiting “echo chamber”. This view was clearly articulated by Robin when he referenced Andrew Keen’s book *Cult of the Amateur*. At the beginning of this quote, Robin synthesizes his thoughts on the book saying that, while people predicted that the Internet would “bring people together because we could all see each other’s ideas”, what Robin believes Keen was saying is that political blogs in the United States became more polarized as Republican bloggers tended to read and interact with other Republican bloggers and Democrat bloggers read and interacted only with other Democrat bloggers. For Robin, the possibility of creating a similar situation in a PLN with very limited or polarized views when using an ICT tool such as Twitter exists.

So, from a Personal Learning Network perspective, I can get on Twitter and I can find people who agree with all the stuff that I want to know about. So I might already think that technology is great in the classroom, and so when I get on Twitter I can find a whole bunch of other people who think technology is great in the classroom. Whereas if my professional learning network was limited to the people in my school building, to some extent I would have to interact with people who disagree with me, assuming there was somebody in the building who does disagree with me. Because of the small nature as well as the geographical nature like - because that person is in the room next to me, it’s highly likely that I’m going to enter into conversations with them. And those conversations are likely going to be about teaching and learning and things like that, and so if we disagree

I'm going to hear another perspective. Whereas what Twitter and blogs and things like that, it actually gives us an avenue to ignore viewpoints that we disagree with.

Later, Robin adds,

So it's kind of like everybody getting together in their small little group - it's actually a really big group - and agreeing with each other. And there's a lot of benefit in that, but there's also some limitations in that in that you are not getting those outside perspectives; those perspectives of people who maybe aren't part of this club.

Robin suggests that educators who use ICT tools such as Twitter with their PLN need to make a conscious effort to avoid having their PLN limit their views and become an *echo chamber* where dissenting views and opinions are shut out of the conversation by virtue of choosing not to follow those with dissenting or opposing views. Robin states that one of the things he does to help counter the echo chamber effect in his own PLN is to examine the topics potential members of his PLN are discussing on Twitter before following them, and deciding whether or not he is going to follow them based on his interest in the topic and not on which side of the argument about that topic they fall on.

What I look for in followers is not so much what they are saying, but the topics that they are, say, talking about. And so I'm happy to follow people who don't agree with me. I'm looking for people who are talking about things that I want to talk about, whether they agree with me or disagree with me.

While the danger of creating a PLN which shuts out dissenting views does exist, participants in this study reflect that they are keenly aware of the danger and express an appreciation for those in their PLN who hold and present dissenting views. They see these voices as an important part of their PLN as these are the members of their PLN who tend to "push" the participants to evaluate their thinking, as RJ articulates when he was asked if he ever followed someone he might disagree with.

Oh yeah, definitely. I think that's half the fun is to follow somebody that you can have conversations with that kind of push your thinking or, you know, there are a couple of educators on there that think about things, especially with regards to assessment, differently than me but I follow them because I want to know what they are talking about and what ideas that they have and it kind of pushes me to evaluate my own thinking about those things.

However, RJ notes that he does have some boundaries on how far he is willing to let those views stray from his own, and notes that if the discourse moves beyond this boundary, he is not adverse to unfollowing people, an act that would detach that person from his PLN.

But I will say that there have been a couple of people that I have followed that have very different ideas, especially politically, that I have unfollowed because I find them to be - I have found them to be - insensitive or inappropriate and so I think I would draw the line - I'm happy to engage in civil discourse when the disagreement is civil, but if I think that the person is, um, how should I say this? If the person's morals are substantially different than I am not likely to follow them.

Kris sees many similarities between a PLN and a Critical Friends Group (CFG). CFG's are professional learning communities of 10 to 12 educators who meet with each other on a regular basis to improve their teaching and learning practice using structured protocols (Franzak, 2002). In a CFG, constructive criticism among peers is encouraged and expected. Because Kris has these two conceptual models connected, he finds no difficulty in embracing critical views within his PLN since this was an expectation he had from his participation in a CFG. In this passage, Kris draws parallels between the PLN and CFG and answers yes when he was asked whether he followed someone he disagrees with on Twitter, describing the ability to follow people on Twitter who he disagrees with as "the beauty of it."

I'm not following a bunch of people who are right in line with my thinking, but also people who I've had disagreements with on Twitter and EdChat, um, or even at conferences that I've spoke with. And we've had disagreements. Or, I don't 100% agree

with what they're doing or what their thinking. But again, using Twitter gives you that option, you know? Yeah, I think that's the beauty of it. The fact that it's not this everyone's nodding their head in agreement in my PLN. I think it's because the PLN kind of evolved from the Critical Friends Group in which you don't want to - we're there to help each other, but agreement can happen but disagreements can also happen in the sense of constructive criticism and, you know, criticising to help each other out, not to knock each other down.

Robin's perception on finding dissenting voices for his PLN on Twitter is unique among the participants in this study. While he agrees that having a diversity of opinions is important in a PLN, he feels that he has no problem finding those dissenting voices on Twitter because he perceives his views on issues as being quite different from most of the other educators he sees who use Twitter. In essence, Robin sees himself as a dissenting voice with his peer group on most matters discussed on Twitter.

I have a lot of disagreements with people on Twitter. I'm kind of a - I don't want to self-proclaim what I do on Twitter too much, but I would say that people who know me best on Twitter would see me as a some people call me a pseudo-luddite where - and some people see me as just somebody who disagrees with people. ... And so I kind of provide a dissenting voice amongst the edtech community, I guess.

In Robin's case, he feels that he has no problem finding dissenting opinions that are opposite his views because he feels that his views actually represent a minority view among his professional group. Robin feels like he is a dissenting voice, and while he states that he does not "actively look for those dissenting voices", he feels he doesn't have to because, in his opinion, most of the educators on Twitter generally hold an opposing view to his with regards to an issue that he is passionate about; the use of technology in the classroom. In this passage, Robin describes an interaction he has had with a particular member of his PLN with whom he often disagrees with. However, rather than shut the person out of his PLN by unsubscribing or unfollowing them,

Robin instead sees these interactions as a positive, and describes this person as a catalyst who is “jump starting his learning”.

... I can think of one example of somebody who, I don't really trust anything I get from them. I see them as one of those people who are naively worshipping technology.... And so, I would call him part of - not of my inner core because we have never met in person - but certainly one of the people I interact with the most with as far as on Twitter and things like that. And even though I think most of his ideas are not good and I don't find them to be valuable, I find the way that he speaks about things to be really interesting at generating thought on my part, because he'll say things, and then I have to think about, “okay, that doesn't make sense? But why doesn't it make sense?” You know what I mean? I'll be like, my immediate reaction to almost everything he says is, “That's a load of crap.” But then that causes me to have to think about how would, how am I going to respond to him? So, I see him as a very integral part in my learning, but not because he is supporting my learning, more because he's catalyzing my learning. Or, jump starting my learning. Initiating my learning maybe, or my thinking.

So, while participants in this research do demonstrate an understanding of the risk of their PLN developing into an echo chamber, many appear to make a conscious effort to not only acknowledge that danger, but include in their PLN people who have opinions or positions which may be different from their own, and appreciate that these different perspectives can act as catalysts to their own personal learning by challenging their existing beliefs and opinions.

The PLN extends beyond Twitter

With respect to the second boundary, the results indicate that, for these participants, the boundaries of their PLN extend far beyond the interactions they have on Twitter and encompass both real life interactions and other ICT's. For all participants, it is clear that Twitter is not synonymous with the PLN, and their PLNs consist of members with whom they interact with outside of Twitter, either face-to-face or in other virtual spaces, such as blogs or other social networking communities.

Of the participants, Todd was the most outspoken critic of this notion that membership in the PLN was limited to Twitter, and notes that if the only way an educators connects and interacts with their PLN is through Twitter, this interaction is going to lack “richness” due to the defining 140-character limitation of the platform.

One of my problems with Twitter right now is that some people say that is their PLN. And so, I think there’s great value to connect to people there, but when people say Twitter is their PLN and that’s the only way they communicate with what they call their Professional Learning Network, I kinda wince at that a little bit because there’s not a whole lot of richness you can get at 140 characters, even if you’re meeting once a week to have sort of live chats.

Todd later picks up on this idea that 140 character conversations can be limiting, and that educators who use Twitter exclusively as the primary tool to connect with their PLN are missing out on the opportunity to deeply engage with members of their PLN. In this passage, Todd refers to blogs (see Appendix F), wikis (see Appendix F), and a web-based social networking tool called Ning (see Appendix G) as examples of where he believe this type of richer interaction within a PLN could occur.

Are they actually engaging in the conversation and putting bigger bolder ideas that might be more than 140 characters, might be a full paragraph, on somebody’s blog in a response that’s in a very public way? Because those people that are blogging, they’re in the whole Twittersphere, but the thought; the levels of thought and understanding and thinking that is going on on blogs, I think, is far deeper than what’s going on just in Twitter. And I think I’d be happier if people saw Twitter as a major component of their PLN but actually that they got into Ning’s, or they participated in dialogue on blogs, or they contributed to wiki’s and that sort of thing. So that’s just my little bias. Nothing against people who really love Twitter and say “that’s my PLN, I love it.” Except that I think that there are other ways of having a really rich set of communications with other educators online.

Kris's PLN extends beyond Twitter because he recognizes that not all the people he comes in contact with who may add value to his PLN are comfortable or willing to use Twitter. In this quote, Kris was asked whether he believed his PLN extended beyond Twitter or was limited to Twitter.

I like to think my PLN extends beyond Twitter. I mean, there's probably people that I know that are not on Twitter that I consider part of my Personal Learning Network, and it just may be someone who I actually work with or someone I met at a conference that doesn't embrace Twitter, which is fine. I don't want to - again, I don't want to put up parameters and bars on where my Personal Learning Network begins or ends.

By remaining flexible and not restricting membership in his PLN to Twitter, Kris keeps many paths open for people to enter his PLN. These paths may be virtual and mediated by technology, as in the case of Twitter, or can be *in real life* connections established in face-to-face encounters.

For RJ, his concept of a PLN is very similar to Kris's in that the members of his PLN are located in both real and virtual spaces.

I guess for me, if I think about what my PLN is, it's just that network of people that I've made contact with through various modes, whether it's face-to-face, or in my job or, you know, even meeting at the coffee shop, or Twitter, or people that comment on a blog or who's blogs I read. So it's a very diverse thing and I think, for me, it's because I really haven't thought about defining it. It's necessarily a really broad kind of concept for me.

The notion that their PLN exists in both virtual and real spaces was expressed both explicitly and implicitly by all participants in this study. For these participants, the PLN consists of people who are outside their Twitter network, and that, while Twitter is one of the tools used to maintain connections with their PLN, it is just one mode of maintaining connections with their PLN.

Twitter as a conjunctive tool with other ICT's.

Through the course of their interviews, all participants referred to ICT's other than Twitter that they use with their PLN. In order to explore this finding, it is worth revisiting the

distinction between the concepts of the Personal Learning Network (PLN) and the Personal Learning Environment (PLE). A PLE represents “the tools, artefacts, processes, and physical connections that allow learners to control and manage their learning” (Couros, 2010, p. 125) while Digenti (1999) defines a PLN as “relationships between individuals where the goal is enhancement of mutual learning” (1999, p. 53). In this respect, a PLE represents the ways and methods a person uses to connect to their PLN. Using this distinction, Twitter, along with other ICT’s mentioned by the participants in this study, are tools of the PLE that enables interactions with a PLN.

These other ICT’s are significant to this research because, as illustrated in the previous section, the PLN is not limited to interactions on Twitter alone and encompass, not only other ICT’s, but also face-to-face interactions between the participants and their PLN. While ICT’s in general, and Twitter specifically, play a significant role in mediating interactions with the PLN, all participants indicated that face-to-face interactions with their PLN, while not required, were equally important as the interactions they have with their PLN using Twitter and other ICT’s.

A secondary research question for this project is to understand how Twitter might be different than other web-based social networking technologies with respect to developing and maintaining a PLN. Therefore, if we are to begin to understand what specific role Twitter might play in the PLN, then it is important to understand how other ICT’s are also used with the PLN.

Overall, this research shows that this group of participants are highly skilled in using ICT’s and employ numerous technologies with their PLN, some of which work with Twitter to add additionally functionality or features to the platform. While participants exhibited some similarities with the types of technologies they used, there are also differences in how participants view other ICT’s when it comes to maintaining and developing relationships with

their PLN. These other technologies can be divided into three broad categories; technologies that participants use to enhance, extend, view, or manage Twitter data, technologies that are used in conjunction with Twitter, and technologies that are used independent of Twitter (Figure 3).

1. **Technologies that participants use to enhance, extend, view, or manage Twitter**

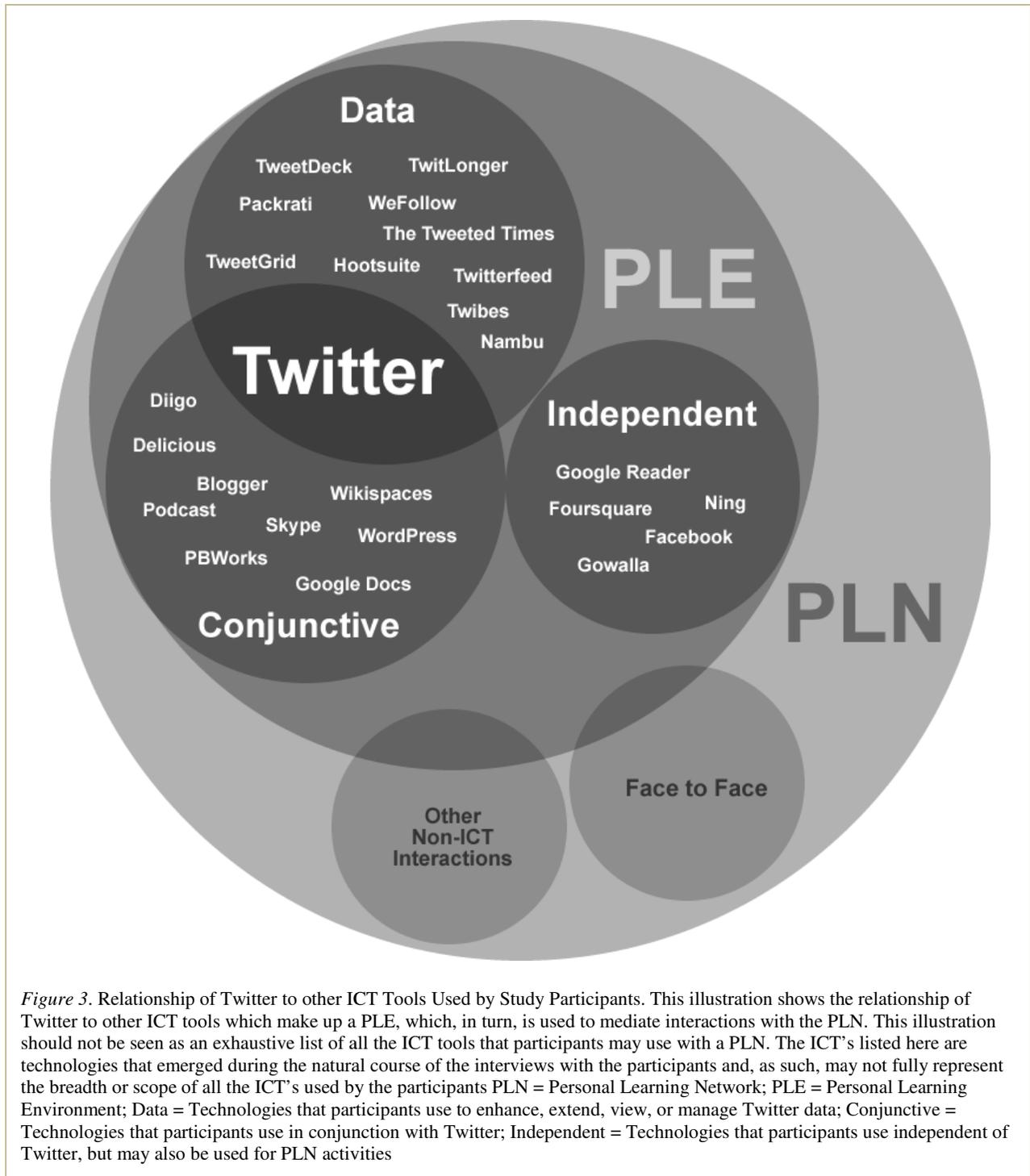
data: Twitter extensions are tools that specifically enhance, extend, view, or manage Twitter data. This category can further be divided into three subcategories; technologies which participants use to view and manage the Twitter data stream, technologies that participants use to repurpose or modify Twitter data, and technologies that are used to search Twitter data. Specific ICT tools mentioned by the participants that fall into this category are outlined in more detail in Appendix E and include TweetDeck, HootSuite, Nambu, Packrati, Twitlonger, Tweeted Times, Twitterfeed, TweetGrid, Twibes and WeFollow.

2. **Technologies that participants use in conjunction with Twitter:**

Technologies in this category are tools that can be used independent of Twitter, but that participants have indicated that they often use in conjunction with Twitter. Specific ICT tools mentioned by the participants that fall into this category are outlined in more detail in Appendix F and include blogs, email, social bookmarking applications (specifically Delicious and Diigo), collaborative tools (specifically Google Docs), podcasts, and Skype.

3. **Technologies that participants use independent of Twitter, but may also be used for**

PLN activities. These are other technologies mentioned by the participants in the interviews, but which are used independently of Twitter. Specific ICT tools mentioned by the participants that fall into this category are outlined in more detail in Appendix G and include Facebook, LinkedIn, Ning, Google Reader, Foursquare, and Gowalla.



While it is beyond the scope of this research to examine in detail the participants use of each of these ICT's, nor does the data collected support a thorough investigation of each of the technologies mentioned by the participants, there are a few which have significance to the scope

of this research question in that they are often used in conjunction with Twitter to achieve specific tasks within a PLN. For example, this research has found that Twitter provides a way for participants to access the collective knowledge of their PLN, which is expanded on later in this chapter when the findings of the primary research question are presented. As will be explained, one of the ways in which Twitter provides a way for participants to access the collective knowledge of their PLN is by acting as a tool to facilitate collaboration within the PLN. Twitter itself is not a collaborative platform in that participants do not collaboratively create tweets. However, Twitter is often used in conjunction with Google Docs, a collaborative document authoring application, to help facilitate the creation of a shared resource among the PLN. This is one example of how Twitter is used in a PLN in conjunction with other ICT tools.

Primary Research Question Findings

The primary research question for this study is to determine what role Twitter plays in the formation and maintenance of PLNs among educators. As this section will expand on, this group of participants utilize a number of different tools and strategies in addition to Twitter to engage with their PLN. While Twitter is only one of the tools, it is clear from the examples and stories shared by each participant that Twitter plays an important role in formation and maintenance of PLNs for this group of educators. It does so in four distinct ways:

1. Twitter allows participants to engage in sustained and consistent dialogue with their PLN, which deepens the relationship between the participant and their PLN.
2. Twitter provides a way for participants to access the collective knowledge of their PLN. This occurs in three ways; through the sharing and exchanging of resources among members of the PLN, through soliciting answers or opinions to questions and ideas, and

by facilitating collaborative projects. Often, other ICT tools are used in conjunction with Twitter to enable this.

3. Twitter expands the participants PLN membership through the use of specific and unique functions of the platform. These include hashtags, retweets, and lists.
4. Twitter provides the ability for participants to amplify and promote their ideas and thoughts to a large audience.

These four findings will be expanded on in this chapter.

Finding 1: Twitter allows participants to engage in sustained and consistent dialogue with their PLN.

All participants report that Twitter plays a key role in enabling and facilitating communication and dialogue with members of their PLN, and that engaging in dialogue is an important aspect of participating in a PLN. Participants place such a high value on engaging in dialogue on Twitter that a demonstrated willingness to engage in dialogue with a PLN is one of the primary determining factors in whether these participants will choose to follow someone on Twitter. Participants feel that sustained dialogue with their PLN on Twitter helps to deepen and strengthen relationships with their followers, and that the open nature of Twitter makes it possible for other people to contribute to conversations. The tone of these conversations is often collegial, however disagreements do occur, and some of the participants note that these disagreements are learning opportunities which can challenge their thinking on issues and positions they hold. Finally, participants note that Twitter is just one of the ICT tools that they use to communicate with their PLN, and will often switch from Twitter to another mode of conversation when the need arises.

RJ's reflections encapsulate the views held by participants in this study in that, of all the affordances offered by Twitter, the ability to carry on conversations with his PLN is perhaps the most important. It was also the defining feature of Twitter that helped RJ early on recognize the usefulness of the platform as a place for personal learning. In this passage, RJ was asked whether he considered the conversational aspect of Twitter important.

Yeah, for me it definitely is. I think that was probably one of the turning points that I saw the utility of it for me. When I saw that I could have these conversations with these people and, for me, it wasn't just, you know, reading this information that was coming from - for example, I follow a lot of news sources and I have a column that's local news or whatever, and I don't respond to the Denver Post or breaking news or anything like that, but I read that information and that's one thing. But for me the greater utility is in the conversations that can happen to people - the responses to ideas and the sharing and the things like that. That's not to say that the non-conversational aspect isn't useful because it certainly is, but I see the conversational part of it being more important for me, I think.

The conversational aspect that RJ refers to; the ability to engage in conversations and dialogue with members of their PLN, is a crucial aspect of learning within a PLN. To illustrate just how central RJ considers conversation to be, not just on Twitter, but within the larger concept of the PLN, he made the following observation about how his use of Twitter differs from his spouse's use of Twitter.

So, an interesting example is my wife. She's on Twitter, but she doesn't tweet, she just follows people to keep up with them. And so she doesn't really have a PLN, um, because she doesn't engage in conversations very much with people.

RJ's comment about the way in which his wife uses Twitter makes it clear that, for RJ, without engaging in conversation with the people you follow on Twitter, you do not have a PLN. For RJ, interaction in the form of dialogue is a key component of his PLN.

A demonstrated willingness to engage in dialogue is a prime determinate for following

The importance that participants place on dialogue on Twitter is reflected in the fact that, for all participants in this study, a demonstrated willingness to engage in meaningful dialogue is one of the prime determinates that influences whether or not the participants choose to follow someone on Twitter.

When Robin was asked whether he had any criteria that he used when deciding on whether or not he was going to follow someone or not, he notes that a willingness to engage in dialogue is an important consideration that will influence whether or not he follows someone.

If somebody engages me in a dialogue - like if we have a conversation, I'm probably going to end up following them. Like, if I reply to them and they replied back and we go back and forth a few times, I'll probably follow them because they are someone who is willing to engage. So I am really looking for someone who is willing to engage...I'm looking for somebody who wants to dialogue.

While Robin articulates a willingness to follow people who engage in a conversation with him (you do not have to follow or be followed to engage a Twitter user in a conversation), other participants said that simply seeing a willingness to engage in conversations on Twitter, regardless of whether the conversation was with them or was with someone else, would make them consider following a person. Kelsey, for example, did not require that a conversation occur with her, but rather that she could see some evidence that the person was engaging in conversations with other people on Twitter. She would do this by examining a person's recent tweets. If Kelsey saw evidence of conversations occurring in these tweets, combined with a biographical line that indicated they were involved in education or educational technology, she would most likely follow that person saying, "I will follow anyone who has something about edtech in their bio and it looks like their tweets include some kind of conversation with someone else..."

While a demonstrated willingness to engage in conversations was not the only criteria participants mentioned as criteria to determine who they would follow on Twitter, it is clear from the responses that it is one of the more important criteria that participants use when deciding if they will follow someone.

Twitter conversations deepen relationship

Participants noted that conversations which occur on Twitter increase the feeling of connectedness that they have with the members of their PLN. As Kelsey notes, communication helps strengthen social bonds and build relationships within her PLN, and the way to achieve this on Twitter is by using the platform as a tool for conversations.

I think the way that you obviously build the relationship is by having communication. There is not a relationship if you are constantly reading their tweets and you have no idea of what they are thinking or saying about you, you know? You don't even know if they know who you are, so there has to be the conversation piece. And the more you have in common, the more conversations you can have.

Robin also suggests that one of the keys to developing close relationships within a PLN is through constant contact between himself and the members of his PLN. In this section, Robin uses the metaphor of a "jawbreaker" to describe his PLN, with Robin located at the centre surrounded by many layers.

So there's the outside layer - the superficial layer - that's most of the people on Twitter where they're part of my PLN, but their just kind of a small little layer. They might be the most number of people, like the actual number of people in that outside layer might be the greatest, but the impact on me is the smallest because I really don't pay attention to what they say very much, they don't pay attention to me, we don't dialogue and things like that. And then you have the people I dialogue frequently with on Twitter. They are kind of the next layer. Then you have the people I meet with on a semi-regular basis. And then you have the people I meet with every single day. You know, I run into them in the

hallway. For the most part I would say that those people who are in the inner core of a professional learning are the people who are next door to you.

For Robin, the key members of his PLN with which he feels closest to are the people he runs into every day the hallway. This is also the case for Todd, however for Todd, Twitter is an important “hallway” that enables this constant contact to occur. Todd suggests that this constant contact via Twitter coupled with occasional face-to-face encounters, fosters deep feelings of connection between himself and his PLN.

The people I work with on a regular basis that I see, I don't have conversations everyday with them. I might have a conversation with them once a week. The other people on Twitter, I have conversations with these people multiple times each week. And when you have that coupled with meeting face-to-face in person...when you meet people face-to-face, it deepens the context and the level of communication that you can have with them online. And it reinforces the physical nature of your relationship. It's something you don't understand unless you actually experience it, but your relationships become stronger once you meet in person, and those textually communications sort of continue to reinforce that even though you are not physically in the same space....But there's something real about the relationship's people have through electronic means when they communicate over and over and over, even if they only physically meet a few times a year.

For Todd, there is very little delineation between physical and virtual relationships in his PLN, and he considers the virtual, often daily contact that has with members of his PLN combined with the occasional face-to-face meeting a powerful combination to build relationships among his PLN. The tool he primarily uses to maintain this daily, constant contact with his PLN is Twitter.

Anna also believes that this constant contact enabled by Twitter is a powerful method to construct deep relationships with her PLN, so deep that she considers many of the people she

met on Twitter as her friends due to this constant communication and sharing of information that occurs over time.

You are in constant conversations with the same people, and you begin to feel like friends. Then they share information as well, you know. For example, that's personal when I accomplished my masters but I wanted to - I wanted to shout that out, "Whoooo," you know, "I finished my masters! I'm so excited!" I wanted to share it so other people will say, "Congratulations!" Or, they'll share their accomplishments. I just had a friend the other day tweet that he had twins and I just thought, "Oh wow! That's amazing." And I think those stories are important because you find that even though it's 140 characters, when you're in constant communication with people, you naturally develop relationships with them. That's the way it works with communication...and I do consider people I talk with - in constant communication - I do consider the people I meet on Twitter, many of them my friends because we know about each other. I've met a lot of them now at conferences; I've stayed at their homes and shared dinners and things like that with them.

As we can see by Anna's quote and her specific use of the word "friends" to describe people in her Twitter network, Anna believes that the relationships she has developed with people on Twitter are deep enough that she feels comfortable sharing meals and staying at their homes when she does have the opportunity to connect with them face-to-face, and that this depth is a result of the types of interactions she has with them on Twitter.

The open nature of Twitter provides space for ambient participation in conversations

While Twitter provides a space for dialogue and communication within a PLN, the open nature of Twitter with conversations publically visible on the Internet makes it possible for people who are not involved in the original conversation to contribute to that conversation. With Twitter, there is a level of transparency in that participants can *overhear* conversations by others on Twitter. Not only can these conversations be overheard, but participants can choose to contribute to a conversation. While this ability to participate in overheard conversations was not

universally mentioned by all participants, for three of the participants in the study, the ability to have other people drop in on their conversations, or for them to be able to drop in on other peoples conversations, was seen as an important affordance of the tool. Kelsey describes one example of how she believes this open nature of Twitter differentiates the tool from other types of social networks.

Well, I think the difference of Twitter is the reach of the conversation. Because it's so public and so easy to be a part of...Well, that doesn't always happen on a blog or email or on Facebook because you aren't always privy to those conversations. So the fact that everything is public and you can see what people are talking about and jump into a conversation that is interesting to you, and that's expected and acceptable; it's not like eaves dropping or anything. That kind of openness of communication, I think, is something - ease of communication - that is something special with Twitter.

Later when Kelsey was asked to describe the types of conversations she has on Twitter, Kelsey returns to this idea that you can not only overhear, but participate in the conversations of others. She describes this ability as something that is "powerful".

I think sending a reply is, for me, is the most interesting because, like I said before, there are others who are watching the tweets so they can participate in the conversation. So you can end up just you and one other person talking and, all of a sudden, it's six of you having a conversation about something, so to me that's really powerful.

For RJ, the ability to drop into a conversation himself, or have others drop into his conversations, allows him to find new members of his PLN. In this section, RJ speaks to one of the ways in which his network organically grows through ambient participation in conversations. Leading up to this section, RJ said that he initially put a lot of work into building his network, and actively sought people to connect with on Twitter. However, now he has reached a point where he believes his network "builds itself". When asked to expand on this, RJ gives an

example of how the ability to be included in other conversations among members of his PLN helps him to expand his PLN.

I think what happens is when I've followed a number of people and I started conversing with them, I would see who they were conversing with about a similar thing. For example, I might have a conversation with someone about assessment, and they would reply to me and include somebody else in their reply who they think could contribute to the conversation. And that person would contribute a thing or two and I would say, "Oh, that person has a similar interest," so I would then follow them and I would pick them up that way. Or similarly other people might start to follow me because I was included in some of these conversations, or people would retweet one of my ideas or something. And so I would get, you know, new followers, and I would look at their profiles and then follow them back.

Later, RJ reinforces this idea that overheard conversations also provide a mechanism to expand his PLN.

Professionally, the thing that I try to look at now is, for example, if I see a teacher talking to another teacher - let's use this example - and the other teacher is someone that I don't follow but I see them - I don't even know the other person's a teacher - I see them responding to someone about a topic I'm interested in, I'll click on that other person who is unknown to me and I'll click on that profile and if they describe them self as an educator who has similar interests as me, then I'll follow them.

Kelsey also finds that overhearing conversations on Twitter enables her to expand her PLN as these conversations introduce her to new people.

But definitely if I see someone having a conversation, or I see someone's retweeted someone else's tweet that looks interesting, I'll follow those people, too. So if someone's having a conversation with someone else, and I'm interested in the conversation, I'll make sure I'm following both people.

In addition to being able to contribute to an overheard conversation, Shawna also indicated that she will explicitly bring in other members of her PLN into a Twitter conversation.

In this example, Shawna is asked if she has ever had another person jump into a conversation she is having with a member of her PLN on Twitter.

Oh yeah, there's lots. There's always joiners. Usually they'll have, like, either a comment or side note, or there will be a correction, maybe, in the dialogue or point of interest sort of thing. Yeah.

As a follow up question, Shawna is asked how she feels about other people joining in a conversation she is having with another member of her PLN. It is in this section that she notes that she will sometimes explicitly bring another member of her PLN into the conversation by including their Twitter name in the tweet.

I'm fine. Sometimes I bring them in. Like I'll put - I'll even put a cc in their name so, I'm fine with that, yeah. Or like, "I'm talking about you", or "we're talking about something that you should join in on". I've said that before. Yeah.

In this manner, Shawna is acting as a connector and, by bringing in other members of her PLN into a conversation, is virtually introducing two members of her PLN to each other, which sets up the possibility for each of those participants to expand their own PLNs by then following each other.

Conversations on Twitter expand to other spaces when needed

Participants noted that conversations that occur on Twitter can sometimes spill over and continue in other spaces, both real and virtual. Participants expressed a number of reasons as to why conversations may move outside of Twitter and into these other spaces. While RJ generally appreciates both the 140 character message limit and the open nature of the service, he also recognizes that there are times when both restrict his ability to use Twitter to have a conversation, in which case he will switch to another method of communication. In this example, RJ speaks to using email to continue a personal conversation with a member of his PLN when the conversation was "bigger than 140 characters".

...conversations have gone outside of that platform that is Twitter and moved into either blog posts or emails. A lot of times it will be email. Maybe that's a good example of when the conversation when it has to get bigger than 140 characters. For example, I emailed somebody recently - or I sent them a direct message and said could you please send me your email address because I really want to talk to you about this idea. And they did and we had a long email conversation about this particular thing that - 2 things - that was too long for Twitter and also wasn't necessarily appropriate for the public venue it was more a personal conversation. So they definitely expand into other things - they can. For Todd, the spill over is not so much a limitation of the platform, but rather a continuation of the conversation.

I've also interacted with people on Twitter and then subsequently met them at a conference so, um, you know we were preparing for our big conference every year and a bunch of us are on Twitter like that and we would have a meetup at the conference and meet face-to-face and talk about some more things.

Todd's comments reflect the notion that the space in which interactions occur with a PLN are not limited to technology mediated spaces, and that face-to-face contact is also an important component of relationship building within a PLN.

For Robin, conversations and comments posted on Twitter by his PLN can often provide an inspirational spark that leads to the development of a longer form blog post where he can fully articulate his thoughts prompted by the post on Twitter.

... I'd say that those little jump starts of thinking, I'd say that happens on Twitter fairly often. Where somebody will say something and then I - sometimes I won't even respond to the person, but it just gets me thinking and generates a blog post or a new research question in my mind....

While participants in this research indicate that Twitter is an important platform for conversation and dialogue with their PLN, conversations often flow from one medium to another. This represents a fairly sophisticated level of technological expertise among the

participants as it requires a degree of flexibility to be able to shift from one medium to another. In this respect, Twitter is part of a continuum of tools where conversations exist, and there is a fluidity to those conversations in that participants can and do move to different mediums and modes of communicating as the situation demands.

Disagreements and Limitations

In general, this group of participants see these conversations and interactions on Twitter as positive interactions. As Kris puts it, the atmosphere on Twitter with members of his PLN is “collegial”.

I refer to people on Twitter as colleagues so that says a lot and I mean a lot of these people I have never really worked with, but if I reference somebody in a blog post or something that that somebody says I say ‘that’s one of my colleagues’ because I feel like there is this like collegial atmosphere in Twitter

Later when Kris is asked about what kinds of expectations he has with regards to the members of his PLN, he again reiterates the importance of the collegial atmosphere on Twitter.

I see it as I my one of my expectations is it should be very collegial it should be very collaborative in essence where we’re all here for to share and to and to help each other out and to provoke thought.

However, as collegial as the atmosphere on Twitter may be in general, all participants relayed stories about disagreements that they have had with members of their PLN, both good natured and ill-tempered. Occasionally, these disagreements are caused by the nature and design of the platform. Kelsey notes that there are two features of Twitter that can contribute to misunderstandings. The first is that messages sent on Twitter may be subject to a slight delay imposed by a limitation of the Twitter platform which limits the number of requests a single person can make to the Twitter service. As a result, responses can occasionally be delayed. While Twitter is both an asynchronous and synchronous platform, and allows both one-to-one

and one-to-many conversations, responses are not as instantaneous as a chat on a true synchronous platform, which can sometimes lead to misunderstandings when one-to-one conversations on Twitter are being conducted, as Kelsey notes.

I think there are more misunderstandings on Twitter than there would be face-to-face because first of all there's the delay. So, if you're having a conversation and you're replying, it takes, you know, a minute or two for things to refresh so sometimes that will really frustrate me. I'm having a conversation and I'm kind of waiting to hear back what the other person says, but it's not coming through because you have a minimum - a maximum amount of pings you can hit in, whatever, a minute or an hour or whatever the rules are. So that is a challenge, right. Because it's not - it's real-time, but it's not real-time because there is a bit of a delay, so it's not even as real-time as having an IM chat on Skype or whatever.

The second feature of Twitter that Kelsey notes which can cause misunderstandings is the 140 character limit on messages in Twitter.

And there is the limit to the 140 characters how much you can say. I think a lot of times a quality professional disagreement would include a link to something else that supports your argument because it's hard to say everything in 140 characters. But I think there's a lot of conversations that happen where it's just - it's just split. Everyone knows there is 140 characters and all you can say is all you can say in 140 characters. And the conversation might take a little longer and have a little bit more, you know, kind of back pedaling to really clarify what you meant to say, especially if it's in the heat of the moment. But I think it's possible and does happen.

RJ also agrees that the 140 character limitation of Twitter can sometimes cause problems when it comes to dealing with conflict on Twitter.

Yeah, I've had a kind of a good natured argument a couple of times. It's not as common as it - it's harder to have that kind of conversation - it's a lot harder to have that kind of conversation than it is to have an amicable conversation, I would say, because it's easier to misconstrue disagreements in short text. In fact, sometimes when you don't mean to

disagree it can be construed to mean disagreement, so I think that is much, much harder to have that kind of conversation in this medium than it is to have an agreeing conversation.

However, while both Kelsey and RJ acknowledge that the 140 character limit can sometimes cause the meaning of messages to be misunderstood, they, and others in the study, generally speak of the 140 character limit of Twitter as a positive benefit of the platform in that it requires participants to be concise and precise with their choice and use of language.

Participants also noted that a 140 character limit makes it possible for them to send a speedy, reactive response to their PLN, which was also generally regarded by the participants as a positive feature of Twitter. RJ captures this duality of these two features of Twitter in this passage.

I think it limits it a lot, but it also enhances it a lot and what I mean by that is it forces you to react instead of deliberate and write, whereas if we were having a discourse on a formal paper and you might write a rejoinder to that, it's a process that takes time and thought and putting together your argument, um, and that's very important, but there is also something to be said for, in a conversation, reacting, um, and just putting your gut reaction out there.

Later, RJ elaborates on how he has adjusted his thinking on how he communicates on Twitter in ways that accommodate the 140 character limit, and notes that he believes that the ability to be able to communicate in a concise manner is something that he finds "important" when communicating in this particular context.

I think more often now it's the thought that you put out there is - I don't know if it's pre-edited is the right word - but it's so concise. I've figured out how to put pretty concise thoughts out that get the point across, and so I don't find myself running up against that too often. The limit, that is. And I think that's important. Now, I don't know that that's necessarily really a great skill for face-to-face interpersonal conversations about a topic. I mean, being concise is, but not that limiting. So I don't know how it kind of intersects

with that, but I think, you know, with time and exposure to it, you find yourself - yeah, definitely fitting your comments to that medium.

For Robin, this 140 character limit is not a barrier and he often uses two methods to work around the limitation of the barrier when he needs to. One is through the use of a third party tool called TwitLonger (see Appendix E), which allows him the ability to extend the 140 character limit of the platform. The second method Robin employs is a technique he calls “rapid fire tweets”.

I also do a lot of - and it actually people have actually commented on this before that they, I don't know - they say they like it but I don't know if they do - they like my rapid fire tweets. And so I'll just shoot out a whole paragraph in successive 140 character tweets. And so I just kind of just go I kind of break down those barriers a little bit by just - I don't let the 140 characters stop my thought process I just keep going, and then break it down into other tweets.

While some of the conflicts and disagreements can be attributed to the design of Twitter itself, there are instances where the regular back and forth of a conversation resulted in disagreements or conflict. These conflicts are not necessarily viewed as negative. As was noted earlier, Robin sees his role as someone who pushes back at what he sees as a technological deterministic attitude by many educators in his PLN. In this sense, Robin believes he is perceived by his PLN as someone who is a critical thinker about the role of technology in education, and, as such, is willing to instigate a disagreement with members of his PLN in order to challenge their thinking. Indeed, Robin seems to relish this role of critical instigator, and he often receives positive reinforcement from his network for this role.

I get, you know, direct messages from people saying, “I really like how you stir stuff up on Twitter.” And I get - I don't know - I know what they mean by that, but at the same time, it's just kind of my nature that when somebody says something and I don't agree with it, I let them know, you know?

Some participants did express concerns that there were people on Twitter who were intentionally looking for conflict. For example, Todd noted that he has observed people intentionally instigating others into a public confrontation, a behaviour sometimes referred to as *trolling*. In this example, Todd talks about how he has witnessed people on Twitter intentionally instigate an argument.

I don't want to mention any specific names of any individuals, but there are some people who are deliberately trolling and trying to engage in public discussions to slam people. They are baiting people. I don't know if you've seen this where people will cast a line out there and say something con-snarky with an intent to get a response, and when someone responds, they'll publicly slam them. And they'll put that little dot in front of their response so that the response becomes public for the whole world to see how they're - how they're really taking it at this particular individual rather than keeping the conversation neutral or between the two people, do you know what I mean?

At the end of this passage, Todd notes that when he witnesses this type of trolling behaviour, it lessens his willingness to engage in a dialogue with these people. However, he does still remain connected to the person, and this behaviour alone, while he finds it distasteful, is not enough to cause him to sever the connection he has to them. They remain a member of his PLN.

I don't necessarily respond to those people, but I do watch if their writing something new. If they are saying I've done this recent blog post on Huffington Post or whatever, I'm going to go and check it out. But I'm not always going to want to interact with those people who have contradictory views.

While Kelsey noted that she would be "hard pressed to think of" more than two negative interactions she has had on Twitter with members of her PLN, she also finds that there are people on Twitter who use the platform in a confrontational manner. In this passage, Kelsey makes reference to her "mentality" with regards to engaging in confrontational situations, indicating

that she has defined a personal strategy for herself when it comes to how she chooses to deal with these types of confrontational people.

There are plenty of people that thrive on negativity and being challenging and constantly criticizing, and that's how they build their, you know, persona online as well, so that just happens to be my mentality about it, not everyone's. And I will definitely do my best to turn away from conflict if it arises because I just don't think it's productive.

Later, Kelsey expands on what her "mentality" is, explaining that, when faced with a potentially confrontational situation, she consciously moderates her own responses in recognition of the fact that what she is posting is being seen in a public space. Kelsey's usual response to provocative postings is to ignore them and move on, preferring to remain positive.

So it does happen, negative conversations. But I would say, for the most part, in my general dealings in online spaces - especially public online space - I keep everything very, very positive. I can be upset about lots of things but I won't share them in a way that is negative towards any individual because I know how important it is to - you shouldn't bash anybody. I mean it's just like manners basically....And that's a mentality that I really follow...

While Kelsey's personal strategy for dealing with confrontational people on Twitter is to ignore them, Anna has a slightly different tact when it comes to dealing with confrontational people, especially when those confrontational people cross her boundary line of professionalism. In this case, Anna will choose to unfollow that person on Twitter and exclude them from her PLN.

If there's an educator, and then the educator comes out and starts harassing me or something like that, then I'll unfollow them....And, you know, I do think that if someone is really negative and they don't want to argue in a professional way, then yes, I'll unfollow them and then I'll just count it off as differences of opinion they can connect with some else.

For Robin, however, heated and passionate debates are not something that leads to unfollowing on Twitter and exclusion from his PLN, even when those debates become heated and personal. In this section, Robin describes a disagreement he had with a person on Twitter that became heated.

I mean, we were arguing on Twitter. And what was really neat is that people were direct messaging me during the argument, telling me how much they were enjoying the argument...and some people would join in. But this person and I, we went for probably three or four hours into the night, and then it resumed the next day for another hour or so. And I did not unfollow that person. I mean we were irate with each other, you know. Blood pressure raised and things like that. We just, like, we were insulting each other, we were being rude to each other, and we both recognized this that we were being rude to each other and things like that. It was just - it was an argument. And so, I did not unfollow that person and that person did not unfollow me. You know, it was just kind of just like, that's okay, that we both respected the merits of the argument.

From both Robin and Anna's comments, we can see that there are different levels of acceptance among participants as to what level of conflict or discourse will be tolerated before removing someone from their PLN. While all participants indicated that they do have disagreements with members of their PLN on Twitter, most said that disagreements carried past the point of what they believed are acceptable boundaries would result in them unfollowing someone. However, where those boundaries exist appears to differ for each participant.

Finding 2: Twitter provides a way for participants to access the collective knowledge of their PLN.

The results of this research show that, for the participants in this study, Twitter provides a way to access the collective knowledge of their PLN. This occurs in three ways; through the sharing and exchanging resources among members of the PLN, through soliciting answers or opinions to questions and ideas, and through facilitating collaborative projects. Often, other ICT

tools are used in conjunction with Twitter to enable these functions, which will be expanded on in the following sections.

Sharing and Exchanging Resources.

All participants agreed that the ability to share and exchange resources was an important function of Twitter within their PLN. While the 140 character limit of a tweet means that writing a particularly rich resource in the body of a tweet is difficult, participants found that 140 characters was long enough to share a hyperlink to a richer, more detailed resource than could be shared in 140 characters. Kelsey believes that this is one of the great strengths of the platform.

Because it's only 140 characters, one of the, I think, best uses that people have of Twitter today is sharing a link to something else that is more in depth. So a link to a blog post they wrote, or one someone else wrote, or a newspaper article. I think the depth comes, not only from the deeper connections you can make with people, but the sharing of resources and links and images and that kind of stuff.

For Todd, what is being shared on Twitter is an important consideration for who he will follow on Twitter. Not only is he looking for evidence that people are sharing links on Twitter, but that they are sharing unique links that he would not be able to find from others members of his PLN.

I'm looking for people that are maybe pointing to things that I'm normally going to find....So if someone is posting links to something that is off the beaten track a little bit, then they hold more value than just adding someone else who is reading the same things everyone else is reading.

Embedded in Todd's answer is evidence that he is looking to follow people who will add diversity to his PLN, and that he chooses to connect with people who will provide him with resources that are "off the beaten track" from what he might otherwise be getting from his existing PLN.

For Anna, the resources shared on Twitter are much more valuable to her than those she would find using a Google search because the resources are peer reviewed by her network.

You'll see some things that are shared by many people. So, if you see the same article or something shared by many people, then you know that if 20 people recommend a resource, then it's going to be much better than the one that is recommended once....They've already been reviewed, a lot of them have been reflected on, they've been used in classes, things like that.... It's like having my own peer review board that I've checked for every single link that I get from the network.

In this passage, Anna articulates an expectation she has of her PLN; that they will share material on Twitter that they have personally reviewed. While Anna notes that this is not always the case, she clearly has an expectation that her network will do this. In Kris's experience, he also notes that this is not always the case, but that he strives to share worthwhile resources that he himself has vetted.

I've seen instances where someone will put a blog post out and two seconds later it will be retweeted by someone else, and I don't know why. I understand that they couldn't have read that in that amount of time. And so, I think that happens a lot. But my thing is, if I am going to retweet something, or if I'm going to put something out, I want it to be - I want to think about who could this help? Someone? Could this be beneficial?

By questioning what he shares with his network before he tweets it, Kris recognizes that there is an expectation by his PLN that he will share information that he has read, reviewed, and believes his network will find useful. When the passages by Anna and Kris are viewed holistically, we can see that Anna has an expectation of those in her PLN that the resources they share are vetted and, with Kris's response, we can see the opposite side of this expectation articulated through his self-filtering action. He thinks of his network and of their expectations before he shares a resource.

Three of the participants indicated that they have begun using additional tools to help manage the resources that are being shared by their network. Todd uses a tool called The Tweeted Times (see Appendix E). Once a day, The Tweeted Times searches through Todd's entire Twitter network and grabs all the links that members of his network have shared on Twitter. The Tweeted Times arranges and presents these links on a webpage in a hierarchical fashion, with those resources that have been shared by the most people in his network listed at the top of the page. In this way, Todd can quickly see what are the top resources being shared by his network in the past 24 hours. By doing this, Todd is able to leverage the network effect of following a large number of people who have similar interests as he. For review, the network effect states that the value of a network increases with the more nodes that are added to the network (Hendler & Golbeck, 2008). By using a tool like The Tweeted Times, Todd is able to filter and better control the flow of content coming from his Twitter network.

Shawna and Anna also use a third party tool to help manage the flow of links shared by their Twitter network, but instead of harnessing the network effect of a large number of users, they use a tool called Packrati (see Appendix E) and a social bookmarking tool called Delicious (see Appendix F) to help streamline their digital workflow and archive the links they share on Twitter with their network. Packrati works as a connector between Delicious and Twitter and automatically archives any link they shares on Twitter into their Delicious account. In this way, Shawna and Anna are able to streamline their digital workflow by both sharing a resource with their network, and archive that resource in their own digital archiving repository using a specialized service designed for archiving digital resources.

Finding answers.

Another common use of Twitter by the participants is as a tool to ask their PLN for assistance in locating resources, answering questions, or soliciting feedback on ideas and thoughts. Kris gives a common example of how he uses Twitter to connect to his network and find resources. In this passage, Kris refers to the tweet he sends out on Twitter as a “flyer”.

There have been times where I have been in class, or I have been working with colleagues and they need resources for teaching German or something. And so I basically put out a little flyer to my PLN and say, ‘Hey, does anybody have any resources on teaching German to high school students?’ And, again, within like three or four minutes you know, I have responses and I have resources.

Kris’s observation that responses come back in “three or four minutes” points to an affordance of Twitter mentioned by participants in this study, which is that responses on Twitter from the PLN often occur very quickly. When resources are requested, responses from someone in the PLN can occur within moments, an observation that RJ made early on in his use of Twitter.

And I distinctly remember another affordance and that was getting very timely feedback on a nascent idea. So I think I’d kick out a really random idea or something that was very much in its infancy and asking for information - this was after I had, you know, developed a network of at least a few dozen people I suppose - and right away getting some responses to that, so that was pretty cool to me I thought, “Wow, I could, you know, throw this out and say, ‘Hey, I’m thinking about this what do you think?’” And for better or worse, independent of the quality of those responses, I could get some responses really quickly, and that’s pretty cool. So I think that was one of the chief affordances that I saw.

In RJ’s example, he is sending out a tweet to his network asking a question, which is an example of Twitter being used as a tool for one-to-many communication in that the tweet is going from one person (RJ) to many people (his PLN). This context is different than the one-to-one conversational context Kelsey noted earlier in the section about disagreements and limitations of

Twitter, where a slight delay in one-to-one interactions on Twitter occasionally frustrated Kelsey. In the one-to-many instance in RJ's example, responses to questions posed to his network usually happen "really quickly".

RJ's example is another example which illustrates the importance of the network effect in a PLN. As RJ points out, the ability to receive a quick answer from his PLN to his question is dependent on RJ having developed a large enough network of followers to accommodate the fact that most people in the PLN may not be able to respond to his query at that moment for a number of reasons, and his request may pass through their Twitter stream unnoticed. RJ relies on the fact that he has built up a large enough network of followers to account for the fact that the vast majority of his followers may not actually see his request. By having a substantial number of followers, he can mitigate this limitation by having a large network and harnessing the network effect.

RJ also makes another observation that speaks to the expectations he has with his PLN. When RJ posts a question on Twitter, he notes that he does expect to receive some kind of response, indicating that he has an expectation of his PLN that they will respond.

Yes, I expect to get some kind of reaction back, whether it's an answer, or an affirmation, "That that's a good question", or an, "I don't know." I expect to get a response. If I put something out posed as a question, I do expect to get some kind of response or feedback.

Robin utilizes a feature of Twitter known as lists to help him target specific groups of people in his PLN with specific questions. With lists, a Twitter user can segment their followers into groups, which they can then follow independent of their regular Twitter stream. However, Robin notes that he does not use Twitter lists to follow the tweets of the specific groups he create, but rather uses these lists to organize his followers into groups that he can call upon as resources for specific purposes. While Robin notes that he doesn't use lists "very much", he does

use them for the specific purpose of segmenting his followers into groups so he can better target questions to his PLN.

I put people in them, but it's not for purposes for using Twitter. It's for purposes for when I have a question, I know who I can go contact. Like, if I have a question about ED leadership, I have a list of ED leadership people. If I have a question about science education, I have a list of science education people. So, I don't use my lists so much for looking at my Twitter stream.

As Robin explains, he does not use Twitter lists as a way to segment the conversations of his PLN, but rather as a way to organize his followers into logical groups based on their area of expertise that he can contact, either through Twitter or using other means, when he requires assistance.

Facilitating Collaboration.

All seven participants in this study reported that Twitter played a role in specific collaborative projects they have initiated or taken part in. While Twitter itself was not seen as a platform to collaboratively create something on (as in, for example, collaborating on creating a specific tweet), it does play a role in the collaborative process and contributes to the creation of resources and artifacts, many of which are often directly related to their teaching and learning practice. Each participant had specific examples of how they used Twitter to collaborate on projects with their PLN. These projects varied in size and scope and include; creating and organizing both face-to-face and virtual conferences for educators, securing supporting partners for grant applications with national funding agencies, the creation of materials, such as videos, documents and books, many of which are directly related to teaching and learning practices, and recruiting members to assist in the delivery of course material in a class or workshop.

Shawna gives an example of how this process occurred for her with the creation of a social media policy. In this example, Shawna speaks about how Twitter, a podcast (see Appendix

F) she hosts, and Google Docs (see Appendix F) were used to create a collaborative resource with numerous contributors representing a number of different higher education institutions from across the US.

Between the student affairs and advisors I work with, we started a document on some examples of best practices or strategies. We called it social media strategies because people used guidelines, policies, rules, whatever. And we started sharing some examples; sharing some real life examples from them, and then giving them different samples of these guidelines or strategies. We talked about it on our podcast, and we said, “We’re going to talk about it on the show.” So we put it out before the show and some people responded, and afterwards it was retweeted out and people anonymously were adding, and, I think, were still adding to it....

Later, Shawna expands on the mechanics of how the project worked. Shawna hosts a podcast with two other people. The idea to create a collaborative social media policy document was first publicized by Shawna and her co-hosts as part of this podcast. Later, Shawna used Twitter to send out tweets reminding people to contribute to the project. These tweets contained a link to an open Google Doc document that anyone could edit.

We said, “Hey, do you have a social media policy or strategy or suggestions from your home campus? If so, please share.” And then we left the Google Doc open; open access, so anyone can go and edit with or without an account. And there’s three of us who kind of moderate the show and are the hosts of the show, so we went in and checked back a week or two after that podcast was out and we had tweeted about it. People were retweeting it, and people were sharing, and there was a discussion around it...

In Shawna’s example, the fact that she made a decision to create an open Google Doc document that anyone could edit without an account is significant for a number of reasons. First, it suggests that there is a great deal of trust by Shawna with her PLN in that she believes they will contribute content that is useful and relevant. She trusts that the members of her PLN will not, for example, delete or deface the content that is being collaboratively created. Additionally, the fact that the

document is left open and available for anyone to edit removes a potential barrier for those who wish to contribute. They do not have to create, or sign in with, an account. This increases the likelihood that Shawna's PLN will participate in creating the document. Open also allows others from outside of her own PLN to participate in the project. As she tweets out the message that she is looking for participants for her project, her PLN retweets the message to their PLNs, encouraging them to participate and contribute. By leaving the document open, Shawna creates an environment that allows contributions to be made from participants beyond her own PLN. In this way, she is able to leverage each of her PLN members' PLN through the Twitter mechanism of retweets. By allowing more participants to contribute, a richer end product is created that includes a variety of diverse opinions and perspectives.

This idea of being open extends to other facets of the collaborative process as well. Often these collaboratively created resources get shared back, not only the PLN, but to the general community as a whole. For Todd, this sharing of collaboratively created resources is an important component of the collaboration process; that all those who contribute to a project should reap the reward of the project. In this passage, Todd expresses that when he is working on collaborative projects, the framing of his PLN shifts slightly as he thinks of his PLN as a CLN; a collaborative learning network, which he explains in this passage.

I called a CLN because I saw my professional network as a collaborative learning network as opposed to a personal one, which would just be one person. It's sort of – it's professional. I like the word professional for learning network, but I use the word collaborative learning network because there's a sense of symbiotic nature, like we benefit one another by being involved. It's not just me that's getting the benefit. It's not so much personal. But for me it's very much collaborative benefit; there's a whole bunch of people that are benefiting from it.

In this passage, Todd suggests that there is a “symbiotic nature” to collaborative projects, and that “we benefit one another by being involved”. This implies that there is a reciprocal relationship at play here with Todd’s collaborative interactions; that if you help with my project, not only will you get to reap the rewards of this project, but I will participate in future shared projects as well because we will both benefit.

This reciprocal relationship is not motivated strictly because there is a shared resource to be gained. As this example from Kelsey illustrates, a demonstrated willingness to be open and share the resources collaboratively created with her PLN is a motivating factor for others in her PLN to contribute to Kelsey’s collaborative projects. In Kelsey’s PLN, openness and a willingness to share these resources are seen as positive values which, in turn, motivates others who have similar values to participate. In this passage, Kelsey recalls a collaborative project that she initiated, and describes putting a message out to her PLN looking for contributors to the project. She then goes on to say that after she put out the call on Twitter to her PLN, she received a message from a member of her PLN saying that they wished to contribute to the project because they have witnessed how Kelsey has, in the past, created these collaborative resources and freely shared them back with the larger community. Note that the name of the person has been removed from this passage to ensure the anonymity of both the research participant and the person Kelsey is referring to.

I think it was probably <name removed> in <location removed> who wrote in and said “You know, I don’t even know what’s on your document but I want to be part of it because of your openness and your willingness to share, and your willingness to let everyone collaborate and use it again.” That’s the kind of attitude that we need. And I’m not saying that I’m special for having that attitude, I’m just saying that idea of openness I think is really critical.

What Kelsey appears to be describing in this passage is the creation of the type of social capital that Couros (2010) considers foundational in his definition of a PLN. By conducting this work in the open on public spaces such as Twitter, Kelsey's work becomes transparent, and the efforts she expends in initiating and coordinating these types of projects with members of her PLN becomes visible to all the members of her PLN, who then reward her with social capital. This goodwill that she builds up with her PLN translates itself into motivation among members of her PLN to participate in projects initiated by Kelsey. Key to the development of this cycle, however, is the fact that her behaviour is done in an open forum and is able to be witnessed by all the members of her PLN. This social capital would not be accrued if she was not seen by her PLN as someone who is open to both collaborating and to sharing the resources that she creates with her PLN as part of that collaboration.

Finding 3: Twitter provides participants the ability to amplify and promote deeper thoughts and ideas to a large audience.

For all the participants of this study, Twitter served as a platform for them to promote and amplify ideas and thoughts that required more than 140 characters to articulate. They did this in conjunction with other ICT tools, most commonly a blog (see Appendix F). All seven participants in this study were active bloggers in addition to Twitter users and, for this particular group of educators, there appears to be a very close relationship between their use of a blog and their use of Twitter.

A common example given by the participants that illustrates how the two platforms work together begins with the participant writing a post on their blog about a topic or an idea they are interested in and have been thinking about. Once this blog post has been completed and published, the participant then sends a tweet out on Twitter to their PLN with a link back to the

newly created blog post. Members of the PLN who see the link may decide to do a number of things at this point. They may decide to do nothing with this tweet or they may decide to click the link and visit the blog to read the post. If they visit the blog and read the post, they can decide to leave a comment and engage with the author in a conversation on the blog. If they find the blog post interesting, they may decide to retweet the link to their own PLN, thus amplifying the blog post and exposing the ideas and thoughts of the author to a new audience of peers who, in turn, may either visit the blog and engage in the conversation, or retweet the link on to their own PLN. This amplification effect was cited by some participants as a motivational factor to blog more frequently. The more that their posts got amplified by the network, the more comments they received, the more incentive they had to blog, as RJ explains in this passage.

I really saw the point of how that would work when I wrote this one blog post and tweeted it out that I'd written that and then it got a lot of attention, and a few comments, but just a ton of hits and a lot of retweeting and that kind of, I guess, empowered me to write more and share more.

Whether the research participants had an expectation that members of their PLN would click on that link and visit their blog, or take the step to amplify the link to their own PLN was not consistent among the research participants. RJ, for example, expressed that he did have an expectation that "if I publicize a link to a blog post, I expect to get at least a couple of hits on the blog post. So I do have those expectations, I think." Kris, however has the opposite view and states that he has no expectation that anyone in his PLN will either click on or retweet the link to his blog post.

I am in the habit now where a lot of people will. There's a good amount of people in my PLN that will retweet what I put out. I don't have an expectation that they do. I wouldn't be, like, "Hey guys, what's the deal? I just put a blog post out why didn't you retweet it?" I mean, I also understand that while people are tweeting they are also at their jobs or on

their phones or having lives other than focusing on being on Twitter. So there is that whole other element of people having lives so they may get to that later, or may get to see that in a backchannel and not get a chance to retweet it. So you have to take those variables into consideration.

It should be noted that there is a difference in the size of RJ and Kris's networks that may influence the answer each gives. Kris's available network is twice the size of RJ's, so for Kris, getting some kind of response to what he posts usually occurs as he can more easily access the benefits of the network effect of having a large network. In Kris's case, he suggest that he routinely gets a response from his network to the blog posts he promotes on Twitter, so this may influence his answer to the question regarding expectations.

The size of a network and expectations of the PLN with regard to promoting and amplifying blog posts plays out in a slightly different manner for Anna. With close to 10,000 followers, Anna has the largest available network of all the research participants. This means that Anna is dealing with issues that others in this study may not be dealing with yet. For example, Anna notes that it is quite common for her to get queries from members of her PLN asking her to tweet their blog posts in an effort to get Anna to use her sizeable network to promote their work. While Anna is often happy to do this, she does express in this passage that, taken to an extreme, this behaviour may cause her to unfollow someone.

Or even if they have a blog post and they say, "Share my blog post." Okay, I don't mind doing that. But I've had some people two minutes later say, "Hey, you didn't share my blog post yet!" Or, if I shared their blog posts they say, "Hey, you didn't comment yet." I think that's a bit rude actually. That's my personal opinion. I think that crosses a boundary, and so I try to tell people "Hey, you've crossed a boundary." And if they don't listen and they do it again, then I'll unfollow them because, for me, that's a boundary.

So while Anna is more than willing to help her PLN by promoting their posts and their work, she does have a limit to how much prodding she will accept from her network with regard to promoting their posts.

For all the participants of this study, the ability to amplify their messages to their PLN and possibly engage not only their PLN, but also the PLN of each of their PLN members, is seen as an important role that Twitter plays with the PLN.

Finding 4: Specific features of Twitter help to expand PLN.

As noted earlier, the boundaries of a PLN extend beyond the scope of the network that the participants develop on Twitter and include people with whom these educators have face-to-face, or other technology mediated interactions with. Because there are numerous channels available to the participants to connect and interact with members of the PLN, it is important that this research highlight specific functions that Twitter serves within a PLN that are a result of unique features of the platform. One of the functions that Twitter serves within the context of a PLN is that it allows participants to expand the membership of their PLN. This is achieved using the specific Twitter features of hashtags, retweets and lists. Hashtags, retweets, and lists can be seen as boundary spanning mechanisms within a PLN, which allow the participants to be exposed to, and connect with, people they might not otherwise connect with. All three features are used by the participants to introduce them to people who they may wish to follow. It is through the act of following someone on Twitter that their PLN is expanded.

Hashtags

Hashtags were mentioned specifically by four of the research participants as a mechanism that they use to expand their PLN. Hashtags are a feature of Twitter that allows tweets to be categorized based on a keyword that contains a hash symbol (#) before it. This combination of

symbol and keyword is called a hashtag. People who use Twitter include this hashtag in their tweets as a way to ensure their tweets are seen by people who may be following that particular hashtag. Common uses of hashtags include at a conference, where conference organizer may ask participants at the conference to tag all the tweets they send with a common hashtag, which can then be used to aggregate all the tweets related to that conference and allow virtual participants to participate in the conference.

Participants in this study noted that they often subscribe to specific hashtags related to topics they are interested and, in the course of following that hashtag, often find people who are contributing to that hashtag who they wish to follow. In this passage, Kris speaks generally about using hashtags, and then moves into speaking about a specific hashtag, the #edchat hashtag, that he believes “really changed the game” for him and his use of Twitter because it introduced him to many educators.

I almost want to say #edchat has almost really changed the game because #edchat really brought together a lot of like minded people and a lot of specifically like minded educators into a forum, and really introduced a lot of people to different people that they never would have know before. I met a lot of people through #edchat, so I think #edchat is kind of - I would call them a game changer, if you will.

In this section, Kris provides a very strong indication that the #edchat hashtag has expanded his PLN in that it he has “met a lot of people through #edchat.” Later, Kris provides more evidence that he will follow people on Twitter who he discovers via a hashtag when he is asked to explain how he finds people to follow on Twitter and responds by saying, “One is the hashtag. I think working within the hashtags and...whether it be #edchat or #edtech or so on and so forth.”

Todd was an early adopter of Twitter and, early on in his use of Twitter, wanted to try to connect with other educators on the platform. He describes a situation where he worked with

another educator who used Twitter and came up with an idea to try and identify other educators on Twitter by having them use a common hashtag so they could be identified.

But in the first year, I started doing experiments with Twitter almost immediately where we were trying to say, “Okay, how can we find out if there are teachers out there? Well, what if we had them use a little keyword to identify themselves?” I think the word edutweet was the one that I used and said, “You know, if you’re a teacher out there use this word edutweet so we know who you are.” And people started using it and we started discovering people that way initially.

In this manner, hashtags are one specific feature of Twitter that participants use to identify other people who may share a similar interest with them. Once they have identified these people, participants can then choose to follow them based on their shared interest in this common hashtag.

It should be noted that the participants for this study were chosen based on the fact that they all used a common hashtag, #edchat.

Retweets

Retweets are another Twitter specific function used by five of the participants as a PLN boundary spanning element. While a retweet is a way of sharing information among members of a PLN, it can also be a method to virtually recommend and introduce PLN members to new people. Since PLNs are unique to each individual, if someone from the participants PLN retweets a tweet from someone in their PLN, the study participants indicate that this may make them curious to find out more about the person who was the source of the original tweet. Shawna explains how the process works for her.

I’ll either see a retweet or a comment or a thread from somewhere else and I’m like, “Oh, this person sounds interesting.” And I’ll probably look at their Twitter feed and that they have their bio is pretty important to me. And having a web link to something else they do or a blog; I always feel that’s pretty cool to figure out a little more about them.

Shawna also notes that she is not actively looking to expand her network, but that the process of retweeting is one mechanism that may cause her to add someone to her network.

Like Shawna, Kelsey does not feel the urge to expand her network as she feels she already has a sizeable network. However, she will consider adding people to her network that she has not yet connected with who are being retweeted by her PLN.

I feel like I have enough, but definitely, if I see someone having a conversation, or I see someone's retweeted someone else's tweet that looks interesting, I'll follow those people, too.

So, despite the fact that both Kelsey and Shawna feel their networks are large enough, they will still consider following people who are retweeted by their network, thus expanding their PLN.

Participants also indicate that someone in their PLN who retweets one of their tweets to their PLN could also be a mechanism to connect them with new PLN members, as illustrated by RJ when he states that, "...people would retweet one of my ideas or something. And so I would get new followers and I would look at their profiles and then follow them back." However, for Todd, someone who simply retweets one of his tweets does not necessarily mean he will follow that person.

Everybody out there is going to have people who are, say, fans who will retweet key things that they will say. To lesser degree, someone who's a fan I might be interested in following. I'm more interested in following someone who wants to engage in a conversation who will respond to something you have written as opposed to just retweeting it.

While retweets are a way that participants can expand their PLN, some participants view a person who retweets a lot of content from other sources as a less valuable resource in their PLN and may, in fact, dissuade participants from following them. In this quote, RJ was asked to

expand on why he felt that an overabundance of retweets from a person might dissuade him from following them.

You know, I think some of them are okay - it's certainly one way you gain information, but if that's all a person is doing is just retweeting, then it seems to me that they don't have a lot of their own unique contribution. I mean, it's great that they are redistributing things that are useful, but I think one of the reasons I follow people is because they themselves have something to share to the conversation. You know, an automated bot can retweet things that have a keyword in it or something like that. And so I see it following an individual as more of a chance to hear what they themselves have to contribute to the conversation and share.

So, it appears that, for RJ at least, retweets need to be used judiciously within the context of a PLN. However, even with this limitation expressed by RJ taken into consideration, retweeting is generally seen by the participants of this study as a Twitter function that can trigger an expansion of a participants PLN.

Lists

While not used as prevalently as hashtags or retweets in the context of expanding a PLN, lists are another Twitter specific function that are used by two study participants as a way to expand membership in their PLN. Lists are a relatively new feature of Twitter, introduced in October, 2009 (Stone, 2009) and are used as a way to divide and classify people followed on Twitter based on specific criteria. However, two participants did indicate that they use lists to find new people to follow and add to their PLN. Kelsey noted that she follows lists that have been created by other members of her PLN. The names in this section have been removed to protect the anonymity of the people mentioned in the quote.

And I follow some other people's lists, too. Like I follow my former colleague <name removed> in <location removed>. He has a list of the people who all worked at <organization removed> and I follow that list.

In this way, Kelsey is able to follow the specific stream of tweets being generated by the people that are on that list; a list that is curated by another member of her PLN. In this context, Kelsey's act of following a list of Twitter users curated by a member of her PLN implies that she places a great deal of trust in the judgement of that person with regards to membership of that list. She follows the list and the people on that list based on the recommendation of the person in her PLN who created the list. The fact that they appear on a list curated by this person is enough of a validity check for Kelsey that the people on the list are worth following. These are people whom Kelsey might not otherwise connect with or follow.

While Kelsey used the recommendation of a single trusted user in her PLN as a validity check when it comes to finding people to follow on Twitter via the lists feature, Todd utilized the entire network in conjunction with Twitter lists to help him determine whether he should add a person to his PLN. Todd used the number of Twitter lists a person appears on as a criteria to judge whether the person he considers following is someone he wants to connect with.

But if there are people who choose to follow me and are new and I check their list and I see that maybe they've been listed. You know how Twitter will say that they've been listed 50 times or 10 times. Other people have said, "Hey this is a person who belongs on a list of educators or a list of librarians or technologist or whatever." Being listed, having a lot of tweets - those are things that I look at.

For Todd, the number of lists a person is included on is a quantitative affirmation that this person is a valued member to other Twitter users and, as such, may hold some value for him in his PLN.

In examining the primary research question *what role does Twitter play in the formation and development of PLNs among educators*, we can see that Twitter does play a role in the formation and development of PLNs among educators in four ways. Twitter provides a platform with which participants can engage in sustained and consistent dialogue with their PLN. Twitter also provides a means in which participants can access the collective knowledge of their PLN.

Specific features of Twitter, notably retweets, hashtags and lists, act as PLN boundary spanning elements which allow participants to expand the membership of their PLN. Finally, Twitter provides a way for participants to promote ideas and thoughts to a large audience, which can then be amplified to other networks. In the next section of this thesis, I will examine the findings of the secondary research questions asked as part of this research.

Secondary Research Questions

As part of this research, a number of secondary research questions were included in this project. For review, these questions are:

1. What motivates an educator to develop and maintain a PLN?
2. How is Twitter different than other web-based social networking technologies with respect to developing and maintaining a PLN?
3. What are the expectations of reciprocity among educators who engage in a PLN?
4. How is trust established and maintained between an educator and their PLN?
5. What is the nature of informal learning, both intentional and incidental, that may occur when Twitter is used in a PLN?

What motivates an educator to develop and maintain a PLN?

Earlier in this research it was noted that the educators in this study used a PLN primarily for professional purposes, and that the membership of their PLN consisted primarily of other educators. As a result of this finding, two tentative motivational factors related to this professional networking are presented to answer this secondary research question. A third motivating factor, unrelated to the participant's professional networking context, is also presented.

The first motivating factor related to the participant's professional development context is that educators are motivated to develop and maintain a PLN because within it they find professional support, understanding, and positive encouragement from their peers, as evidenced by Anna's comments when she was asked about why she uses Twitter. While her answer is specific to Twitter, we have seen from this research that, for this group of participants, Twitter does play an important role in the development and maintenance of PLNs.

It's professional development, but it's also the support. So, not only do you get the intellectual, but you get a lot of support. And in schools when you - I think the average teacher that's in a school doesn't get the support. Usually you're overwhelmed with maybe parents telling you, you know, you're not doing a good enough job because their child is failing, or maybe the student doesn't appreciate you, or maybe the administration is busy trying to get things together so sometimes they overlook the appreciation part. So sometimes when you're in the environment of education, it's very easy to get overburdened and to get down and feel like you don't have any support. But on Twitter, people are very supportive.

Shawna also speaks to this idea that support can be found on Twitter, but at a more general level than Anna, stating that she works at "...getting the idea out there that there's a support network and there's a place where you can talk beyond going to a once a year conference." Shawna is also a grad student, and when she speaks about who she connects with on Twitter she states that, "a few of them have been other people who are researching or doc students because misery loves company." This comment that "misery loves company" implies that, on Twitter, she finds people who will support her as she works through her research projects. So, as we can see from both Anna and Shawna's responses, motivation to participate in a PLN appears to be driven by a desire to find support from people who are experiencing the same kinds of issues and challenges that they are facing.

A second motivating factor suggested by this research is that educators exert the effort to develop and maintain a PLN because they wish to connect to other educators in an effort to improve their teaching and learning practice, and that this desire to connect with other educators is intrinsically motivated by their strong sense of self-identity as an educator. Anna provides evidence to support this factor when she explains that she has a passion for her chosen profession as an educator, and that she loves to have conversations with other educators about education as she finds these conversations “stimulate her mind”.

I’m always having these conversations and they stimulate my mind and I’m always kind of invested and immersed in education. And I love it because education is my passion. I really love being a teacher. I really love educating.

Anna expresses not only a love and passion for education, but notes that she is “always kind of invested and immersed in education”. This use of the word “always” suggests that Anna sees her role as an educator as something that extends beyond the classroom and is a role that is embedded deep in her life and her identity.

This deep embodiment of the role of an educator is something that RJ touches upon when he discusses the diversity of his PLN. For RJ, he states that he believes his PLN is made up of educators, but that his PLN extends beyond his role as an educator. However, as RJ speaks, we get the sense that, for RJ, his identity as an educator is very closely tied to his overall self-identity, and that the boundaries between his life as an educator and his life away from his profession are closely connected. In this passage, RJ is asked if he sees his PLN as a group of professionals or whether it expands beyond his professional work. In his response, RJ recounts that Twitter provide to be a trigger that led him to reflect deeply on the nature of his identity.

I think it definitely expands beyond the work I do. For me it primarily involves that. But I’ve thought a bit about this actually, ever since getting involved in Twitter, I guess, a year and a half or two ago. And that idea that I see my identity as a bundle of identities.

It's not just me a science educator, but the things I'm interested in personally like cycling or baseball or things like that you know. It's a diverse group.

However, while RJ does express a desire to have his PLN reflect the diverse nature of his identity and varied interests, his next comments acknowledge that the boundary between the two areas is fuzzy and overlaps, and that his PLN "centres" around his professional life as an educator first.

It may centre around my education and work, but it also includes my pastimes and interests and hobbies, I guess, that are outside of the realm of science education. And it's actually kind of interesting because I do see overlap you know. You'll find people who are members of my PLN who I talk about educational policy with and we also talk about baseball because we are all baseball fans. So I guess I bring in a lot of my non-professional selves there, too.

When asked if this ability to express his non-professional self was important to him, RJ answers that, for him, it is important.

For me it is. I don't know if it's that way for everybody. I know some people who just want to put forth their professional self and isolate the rest of themselves. But for me I can't really separate the two. I think because so much of my passion for science and science education comes from my daily life and what I am doing, like riding a bike or hiking or things like that. So they're too intertwined for me to separate, and I feel like it's probably that way for a lot of other people in my PLN because they engage in similar types of conversations that aren't necessarily uni-dimensional but include all these other aspects of their lives.

In both RJ and Anna's comments we begin to see glimpses that, for some of the participants in this study, their self-identity as an educator is strong, which may hint at the motivations they have to participate in a PLN. They participate because they see their role as an educator as something that is at the core of who they are. In Anna's opinion, the "p" in the acronym "PLN"

stands for “passionate”, and she refers to those educators who participate in a PLN as “passionate” educators.

I like to call it my passionate learning network. It may be a little cheesy, but this is what I usually call it at the conferences or anything that I’m presenting at. And the reason why is that most of the educators that I find that are...on Twitter...that I connect with are very passionate about education. They have to be because we work so much in the field of education to commit to extra professional development in a social network is just amazing. You have to be really passionate as an educator to go above and beyond something that’s not even required and to do it just because you want to make yourself uh, a better educator so I like to call it my passionate learning network.

Kelsey also believes that being an educator is something that is part of her identity. In this quote, Kelsey is asked whether she connects with people outside of education or educational technology in her PLN. In answering this question, Kelsey’s bemused answer belies the struggle she faces as she balances her personal and professional life.

Um, mostly this is about balance and I don’t have very much in my life at the moment, so mostly I would say it’s educators. It doesn’t have to be technology related, but mostly its educators. I do, you know, connect with people about travel and photography and some other hobby related things, but not as much as I do about education.

When asked to expand on what she meant when she said, “it’s about balance,” Kelsey expresses that she feels like she continually wants to be part of the education conversation with her peers.

Well, I think generally, in life, we all struggle with balance and I think most of us that are kind of into this world of educational technology tend to spend a lot of time thinking about it, talking about it, connecting with the same people that are thinking about the same things, and maybe leaving other aspects of life to kind of fall by the wayside. And I think I do the same things. Like, for example, in my RSS reader I have a folder called hobbies, but how rarely do I check that folder because I’m often more interested in, or more kind of wanting to look at the stuff that relates more to education or technology? So, it’s not anything to do with the technology itself, it’s to do with me. I could say no,

I'm going to spend an hour walking around outside and taking pictures of things and try to improve that, or I'm going to cook, or I'm going to do yoga, or whatever it is, but I don't ever choose to do that because there is so much interesting stuff out there I want to be part of and be in the conversation and learning and all that kind of stuff that I will choose that over something else.

In this passage, we see that Kelsey is making choices that reinforce the idea that her passion for her profession is so strong that it often overrides her desire to participate in hobbies; her profession is her hobby and it is clear from this passage that Kelsey feels conflicted about the need to be connected and to be "in the conversation and learning".

While it is beyond the scope of this research to fully explore the nature of identity among educators and whether there is a connection between how strongly an educator feels their role as an educator is tied to their self-identity and their motivation to participate in a PLN, but these passages from the participants in this study do seem to suggest that motivation to participate in a PLN may be connected to this strong sense of identity as an educator.

The third motivating factor that may contribute to an educator participating in a PLN does not necessarily relate to their desire to connect with other educators or with their role as educators, but may be related to their position on Rogers diffusion of innovations scale (Rogers, 1962), which classifies technology adopters into one of five categories; Innovators, Early Adopters, Early Majority, Late Majority, and Laggards. Based on when they began using Twitter and their demonstrated broad and advanced use of ICT's overall, it is not unreasonable to consider the participants in this study as either Innovators or Early Adopters of technology and, as such, are motivated by a desire to explore new and novel ways technology can be used in learning contexts. While technology is not a requirement of participating in a PLN, it is clear that, for the educators who took part in this research, that technology plays a role in PLN relationships, as evidenced by the findings to the primary research question of this study.

How is Twitter different than other web-based social networking technologies with respect to developing and maintaining a PLN?

Facebook (see Appendix G) was the social network tool of comparison that was mentioned the most during the course of the interviews, with six of the seven participants reporting that they were currently using, or had used, Facebook in addition to Twitter. For these participants, Twitter and Facebook appear to serve different functions in their PLN.

One of the differences between Facebook and Twitter noted by the participants was that they perceive the networks of people within in each network differently. In general, participants felt that Twitter was a more professional space while Facebook was a more personal space. As Robin puts it, “Facebook is where you’ve been and Twitter is where you are going.” By this he meant that Facebook is primarily a place where he connects with his high school and college friends, whereas most of the people he connects with on Twitter are professional contacts.

...they are other teachers, they are people who are going to affect my life going forward as far as my career is concerned, whereas Facebook is things that - from my past....I’m on Twitter way more than Facebook because of that, because I see the people I interact with on Twitter as having similar current interests of mine, whereas the people on Facebook are people who I had common interests with in the past.

This perception that Twitter is a more professional space, while Facebook is a more personal space is supported by Anna and Kelsey as well, although both indicated that they do use Facebook to maintain connections with their PLN, although to a much lesser extent than they use Twitter. Anna also indicated that she notices differences between the two platforms in that responses from her PLN occur faster on Twitter than on Facebook, and her original request for help can be retweeted by members of her PLN, expanding the possibility that she will receive a timely response. In this section, Anna explains that she often conducts workshops with other educators on how to use Skype (see Appendix F). Occasionally, these workshops are put together

at the last minute, and Anna does not have time to line up people ahead of the workshop who can help her demonstrate Skype.

So I have done this quite a few times where I have been on Twitter and said, “Okay, I need to Skype people in five minutes. Is anyone available?” And, sure enough, within five minutes I always get probably quite a few people saying, “Yes, you can Skype with me right now.” I don’t know of any other type of social media platform that you could do that and get that kind of response. You couldn’t get it on Facebook. You couldn’t get it on LinkedIn, you just couldn’t get it anywhere. But on Twitter, because it’s so fast and because you are connected and you develop these relationships and people can retweet it and share it with their network, they can expand your message...

For Anna, this ability to have a message amplified quickly into the public space of Twitter is one of the key differences between Twitter and Facebook.

Kelsey also indicated that, while she does consider Facebook a more personal space, she does connect with educators on Facebook. While she does not explicitly say that she considers Facebook a tool to connect to her PLN, she does imply as much when she states that she uses Facebook to connect to other educators, and that she gets some great resources from Facebook.

I have a lot of educators that I know on Facebook, too, so that’s a great place for me to get - because most of the people I have on Facebook are people I actually know or have met, and that’s a smaller group of people, often times the really best things can actually come through there.

However, while Kelsey does consider Facebook another way to connect with her PLN, it appears that she thinks of the people she connects with on Facebook differently than she does the people she connects with on Twitter. Kelsey says that she reserves Facebook for “people I actually know or have met”, whereas the connections she makes on Twitter can be with people she has never met face-to-face. Kelsey also states that Twitter is far more open and public than Facebook

and, for her, this is important. In this section, Kelsey recalls that, on Twitter, she is able to jump into a conversation, which is something that she cannot necessarily do on Facebook.

I jumped in and there was a conversation about this movie. Well, that doesn't always happen on a blog or email, or on Facebook because you aren't always privy to those conversations. So the fact that everything is public and you can see what people are talking about and jump into a conversation that is interesting to you, and that's expected and acceptable, it's not like eaves dropping or anything. That kind of openness of communication, I think, is something - ease of communication - that is something special with Twitter.

For RJ, one of the major differences between Twitter and Facebook relates to how much control he has over the information. RJ did have a Facebook account, but stopped using Facebook for two reasons. The first is that he sees Facebook has having a lot of extraneous "fluff" content in the form of games and other activities. The second, and more important reason, related to how much control he felt had over his information.

But the other big thing was a lot of these privacy issues and every time they would come out with some new extensions and, by default, all of your information was shared with that provider and you had to go into your security settings and close everything down - this was about, I don't know, six or eight months ago things started getting really bad - or before that, ten months ago. And so I finally said to heck with it. I'm not getting anything out of those interactions now and I'm kind of all on Twitter so I just deactivated my account.

RJ was then asked what it was like for him to participate in a public space like Twitter considering how he felt about privacy on Facebook. In this passage, RJ indicates that he feels it is not about whether the content is open or closed. In fact, RJ feels quite strongly that being open is important. Instead, RJ articulates that he feels more in control of the content he posts on Twitter than on Facebook.

One of the things I feel strongly about is this idea of openness of content, of being able to share with a much larger audience and the idea of open access to a lot of things we do. And so all the things I share on Twitter, I'm happy for them to be in the Tweetstream. I'm happy for people to be able to access that kind of stuff, whether it's a link to my blog, or an idea, or something like that. The difference was that I'm making those choices on Twitter, whereas everything I put up on Facebook and other things that people would share about with me there were; I had much less control over that, the decisions were being made for me about that content.

As we see in RJ's comments, he values the openness of Twitter in that what he posts is open to the world. In RJ's answer, we see what appears to be a dichotomy in how he perceives the two platforms. He believes that Facebook makes too much of his information open, yet he expresses a strong belief in the value of participating in the open space of Twitter. However, the issue for RJ is not, in fact, the degree of openness, but rather the degree of control he feels he has in what he wants to make open. For RJ, this difference in the mechanics of how the two platforms work with respect to how personal information is controlled is one of the major differences between Facebook and Twitter.

While this secondary research question asked a broad question about how Twitter may be different from other social networks, no other social network besides Facebook which were mentioned by the participants revealed enough data to determine one way or another whether participants viewed them differently from Twitter. Therefore, results for this secondary research question are limited to differences between Twitter and Facebook and, as these examples illustrate, it does appear that the participants in this study perceive Twitter as being different than Facebook within the context of a PLN.

What are the expectations of reciprocity among educators who engage in a PLN?

When it comes to expectations within a PLN, most participants, either implicitly or explicitly, expressed that they do have expectations of reciprocity with their PLN. This manifests itself in that participants expect that people within their PLN will not only be consuming material and content from the PLN, but will be actively contributing interesting content back. As noted earlier, these contributions can be in the form of interesting and relevant resources, active participation in conversations and discussions, feedback and answers to questions posed by the participant, or as contributions to collaborative projects.

For Todd, this expectation is evident when he makes decisions around who he will follow on Twitter, noting that there is much more “value” for him to follow people who are actively contributing to the PLN.

I think a lot of people who are new to Twitter don't so much contribute to the conversation. They sort of sit on the side and it's not that there's anything wrong with that, it's just that at that time it's not going to be of value to me.

Both Anna and RJ echoed Todd's sentiment that, in order to provide value to the PLN, you must contribute to the PLN. Anna stated that, while she respects the need for new users of Twitter to “lurk” and “see what it's about first because they are like I used to be,” that at some point she expects that they will participate and add value to the network. RJ stated that one of the reasons he follows people is “...because they themselves have something to share to the conversation.” So, for these participants in this study, it appears that there are expectations of reciprocity within their PLN.

How is trust established and maintained between an educator and their PLN?

While it is hard to fully understand how trust gets established within a PLN without completely examining all the different manners that participants interact with their PLN, this

research does uncover some ways in which trust is established between the participants and the people they choose to follow on Twitter.

For many participants in this study, trust begins to get established at the moment they make the decision to follow someone on Twitter. When making the decision on whether or not to click the Twitter follow button, participants look for specific pieces of information about the person they are considering following which they use to verify certain criteria they have for membership in their PLN. These trust signals include; a completed Twitter biography that identifies the person as an educator, a photo of the person in place of the default Twitter avatar, and a link to an external site where the participant could find more detailed biographical information. To a lesser extent, the number of followers and how many lists a person appears on were also mentioned as ways to measure a person's credibility as they were indications that others in the network find this person useful and credible. Participants also noted that the contents of recent tweets were often examined to determine whether the type of content the person was tweeting was relevant to the participants. Once these initial criteria were met satisfactorily, participants feel comfortable enough to add a person to their PLN by following them on Twitter. Once they begin following a person on Twitter, participants indicated that trust was established through sustained communication over time. The more a person is seen as contributing relevant content for the participant, or engaging with the participant, the greater the level of trust that person gets from the participant.

Kris indicated that he trusts what his PLN puts out because he "reads their blogs and I know their background and I pretty much know who they are – those that I have met and those I have not." Kris's response seems to indicate that trust is not necessarily connected to whether or

not he has met the person face-to-face, and that he can have the same level of trust with someone that he only knows in a virtual environment as he can face-to-face.

Kelsey also indicated that she can trust someone regardless of whether she knows them only virtually or whether there has been a face-to-face connection. In this passage, Kelsey is answering a question about how she defines her PLN. In her response Kelsey uses a metaphor of layers to help illustrate how she thinks of trust within her PLN.

It's maybe to me it's more like layers. And the top layer - the layer I trust the most, the layer I count on the most, would probably be the people who I have had conversations with them, whether it's virtual or face-to-face in depth conversations about something related to learning.

Later on, Kelsey expands on this idea of layers and explains that the way trust is established is with consistent and regular communication between herself and that particular PLN member.

The more conversation she has with a member of her PLN, the closer they move to the centre of her PLN and a position of high trust.

So when I talk about that layer, it's the people I have the most conversations with, I guess, is what I'm trying to say. That layer of people I kind of trust the most. That layer of people I have the most conversations with.

If Kelsey's PLN were imagined as a circle with Kelsey at the centre, Kelsey's layers analogy would suggest that Twitter enabled conversations allow members of her PLN at the periphery of that circle, which is a place of relatively low trust, the opportunity to move closer to the centre of her PLN, which is a place of relatively high trust (see Figure 4).

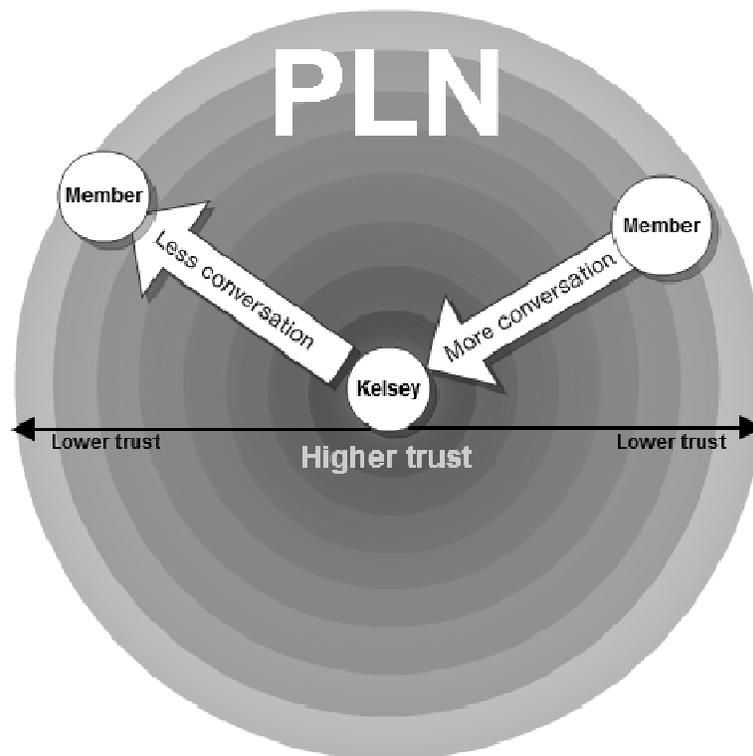


Figure 4. Increased Communication Increases Trust in PLN. Kelsey indicates that increased communication with members of her PLN moves them from a position of low trust on the periphery of her PLN to a position of high trust inside her PLN.

For Kelsey, trust in her PLN is established and maintained with the members of her PLN through conversations, and the more she feels she has in common with someone, the more opportunities she has to converse with them, which then increase their prominence in her PLN, and increases the level of trust she has with them. For Kelsey, trust in her PLN is fluid and dynamic in that people in her PLN at the periphery can move closer to the centre of her PLN through the process of Kelsey having “in-depth conversations” with them.

And that can change at any time, so that’s why I don’t want to exclude any one of the 4000 because you never know if someone else says something and suddenly we start having these in-depth conversations and they become someone I really trust, too.

Kelsey also has an interesting and unique perspective on trust in a PLN in that she indicates that she trusts her PLN *as an entity* to ensure she receives important or relevant information. The context for this quote revolves around the question of how Kelsey manages the flood of information that comes at her from her PLN. Her answer is interesting in that not only does it reveal an attitude around dealing with information, but also suggests that Kelsey trust her network to make sure that she does not miss “whatever’s really good”.

If there’s something very good it will rise to the top or it will come to me from other forms, you know, whether it’s in my RSS reader, or if it’s someone’s shared feed, or someone’s specifically mentions it to me in a conversation. Whatever’s really good, I will get through all the various avenues I have of things coming to me. I’m not panicked about reading it all on one place.

In this respect, we can see that Kelsey articulates that she trusts her PLN to draw her attention to important content. This is achieved by that piece of information repeated by different members of her PLN in different forms and at different times. While an article may be distributed by a number of members of her PLN using Twitter, it may also be simultaneously distributed by other members of her PLN using other ICT tools. If a piece of information is important, it will be shared by many in the PLN on numerous platforms. The more people in the PLN it is shared by, the more important it is likely to be, and the more likely it will be found by Kelsey.

While all the participants indicated that they trusted their network to some degree, Robin was perhaps the most sceptical participant regarding the level of trust he had with his network, noting that he feels like he has very little need to trust his network.

I don’t know that I have a lot of trust for the people I follow on Twitter. I don’t know that I expect them to have a lot of trust in me, necessarily. I think for some people, I definitely - there’s an aspect of trust. But at the same time there’s very little that the people on Twitter are doing that I need to trust them for.

Later, Robin expands upon this idea of trust with his network.

And so I would say that, if there is a level of trust, it's a cautious trust. My expectation isn't like when I think about the people on Twitter, I don't really expect them to do anything for me necessarily. Like, there's no expectation that I have for them, if that makes sense. And so, since I don't expect anything, I don't need to trust them. So it's maybe not that I don't trust them, it's just that I've got nothing to trust them with.

However, Robin's perspective on trust is one that was unique among participants, and while it is beyond the scope of this research to fully investigate this secondary research question on how trust gets established in a PLN, it does appear that, for this specific group of participants, they do have criteria in place to determine whether or not people are credible prior to following them on Twitter, and that they do have a certain degree of trust with their PLN which gets established over time and through repeated interactions with the participants.

What is the nature of informal learning, both intentional and incidental, that may occur when Twitter is used in a PLN?

While understanding the full nature of informal learning is beyond the scope of this research, there is some evidence as to the nature of informal learning as a result of this research. For one, it appears that the nature of informal learning for this group of participants is strongly social, as evidenced by the value that the participants place on dialogue with members of their PLN on Twitter. Conversations and dialogue are highly valued to the point that evidence of conversations is a prime determinant as to whether most of the participants in this study would choose to follow someone on Twitter. If the participant observes a person engaging in dialogue with other people on Twitter on topics that the participants find relevant and interesting, this will positively influence whether these participants choose to follow that person.

There is also evidence that, while most participants connect with other educators, they do value a diversity of opinions within that group when it comes to creating their PLN and will not

only connect with educators who hold alternative views to their own on topics they are interested in, but will engage with them in discussions about those topics. For some of the participants in this study, these types of discussions can serve as a catalyst for learning as they are exposed to views that are different than their own. As was noted earlier, many of the participants have engaged in discussions that push their thinking, or force them to defend a position as evidenced by the fact that most of the participants have had disagreements on Twitter with members of their PLN. While it is impossible to know if any learning occurred in these types of interactions, it does seem to replicate the types of discourse that educators strive to develop in more formal educational settings.

Additionally, based on the findings of the primary research question in this study, specifically the finding that Twitter allows participants to access the collective knowledge of their PLN through the mechanism of facilitating collaborative projects, it appears that informal learning on Twitter within a PLN is a highly participatory act with the construction of shared resources among members through collaborative projects occurring on a frequent and regular basis. As noted earlier in this research, each participant in this study related stories and experiences they had with their PLN which resulted in the co-construction of resources by the members of their PLN. To recap, these collaborative projects included; creating and organizing both face-to-face and virtual conferences for educators, securing supporting partners for grant applications with national funding agencies, the creation of materials, such as videos, documents and books, many of which are directly related to teaching and learning practices, and recruiting members to assist in the delivery of course material in a class or workshop. These collaborative projects are tied to real world objectives in that the artifacts that are created are artifacts that are often used in real life situations by not only the participant and their PLN, but by a larger

community. In this sense, informal learning within a PLN is both situational and a negotiated act that requires coordination among members of the participants PLN.

There was also evidence that some participants believed they were learning through the act of observing other members of their PLN. For example, Kelsey recalls a moment from early on in her use of Twitter where she was observing the tweets of the members of her PLN as they attended a conference. As she observed the types of links they were sharing and the conversations they were having on Twitter, Kelsey makes the comment that “I was seeing all the things they were learning.” Later, Kelsey expands on what she was seeing as the members of her PLN were tweeting from the conference they were attending.

...and then seeing them at the conference talking to each other about what they were learning, reflecting on what they were learning, sharing those quotes and links and all that - all together was really powerful. And not being there, but being part of it and feeling like I could learn along with them even though I wasn't there.

This recognition that the members of her PLN were learning and that she felt that she “could learn along with them” suggests that Kelsey believes she was learning with her PLN by observing what they were tweeting.

Finally, some participants also reported that they equate the act of sharing on Twitter as learning act. While the exact nature of why the participants believe the act of sharing is a learning act was not fully explored, there are some clues from the data as to why participants believe that sharing is an act of learning.

One of the ways that this act of sharing may be considered an act of learning is if the resource being shared is a resource that has been created by the person doing the sharing. In this way, others in the PLN can provide feedback to the resource author and contribute their thoughts and ideas around the resource. The resource author can then use this feedback from the network

to modify and improve the resource based on their suggestions. This method is implied by Kris in the following quote when he was asked about the expectations he has of his PLN.

I see it as I my one of my expectations is it should be very collegial; it should be very collaborative. In essence, what we're all here for is to share and to help each other out and to provoke thought. We're not here to shake our heads and to write notes in our notebook, we're here to write notes in Google Docs and then publish them so everyone can see them; the idea of everything being transparent and learning from each other.

In this sense, we can see that Kris equates both the act of collaboratively creating resources (“we're here to write notes in Google Docs”) and the act of sharing those resources (“then publish them so everyone can see them”) as a way of learning in a PLN. Indeed, as was suggested earlier in the findings of this research, Twitter gives these participants the ability to reach a large audience through tweeting out links to longer form blog posts as a way to elicit feedback on the contents of the post from their Twitter network. So, in this sense, the act of sharing resources created by the participants in order to get feedback from their PLN is one way in which sharing resources may have learning benefits.

As also noted earlier in this research, participants in this research are highly engaged in conversing with their PLN on Twitter, and that these conversations often push their thinking and either solidify or make them re-evaluate their position on issues. In this sense, sharing may also be considered an act of learning if what is being shared acts as a trigger that leads to these types of conversations with other PLN members about that resource, and, through the act of discussing this resource, new knowledge is created for either of the participants based on that conversation.

Chapter 5: Discussion and Summary

It is important to begin this chapter by noting that this research examined the experiences of a specific group of people operating within a very specific context, therefore care must be taken to interpret the results of this research accordingly and with the understanding that these results may not reflect a more general view. However, while these results may not be generalizable, they still remain valuable as they do give us insight into the nature of a PLN as viewed through the lens of educators. Additionally, this research offers a glimpse of what it is like to learn within a network, and moves beyond a position of espousing the potential of an ICT tool to illustrate, in a concrete fashion, how a specific ICT tool is being used in a learning context.

In defining the boundaries of a PLN, participants in this study indicated that they perceive their PLN as a professional learning tool related to their teaching and learning practice which consists primarily of other educators. However, while a variety of fields beyond education are only lightly represented in their PLNs, participants indicated that among the educators they connect with, they do value a diversity of opinions and appear to be cognizant of the fact that, when making choices about who they connect with, there exists an inherent danger in being drawn towards connecting with educators whose voices and opinions reinforce your own thinking. To combat this, participants indicated that there were willing to seek out, connect, and engage with educators who have opposing views to their own in an attempt to balance the views represented in their PLN, and to provide dissenting voices in their PLN. These dissenting voices often act as learning catalysts for the participants by pushing the participants to reevaluate and reconsider their own opinions or ideas.

While this research does focus specifically on the role of Twitter, it also shows that participants conceive the boundaries of their PLN extending far beyond their Twitter network to

include relationships in both face-to-face and other virtual spaces, and that the boundaries between these two spaces are permeable and transparent. Participants feel equally comfortable interacting with their PLN in both virtual and face-to-face contexts and value the interactions afforded by each mode, noting that interactions in each mode increases their feeling of connectedness to the members of their PLN. Participants in this research exhibited a high degree of comfort and familiarity with ICT's, specifically web-based applications, and were able to not only seamlessly switch from one ICT tool to another with relative ease, but were able to mix and match various ICT tools to match specific contexts and achieve a desired result.

In answering the primary research question examining the role Twitter plays in the formation and development of PLNs among educators, four findings emerged from this research. The first is that Twitter is a tool that participants use to engage in sustained and consistent dialogue with their PLN, which helps foster deep feelings of connectedness between the participants and their PLN. The open nature of these conversations allows others to join in and contribute. While participants overwhelmingly viewed these conversations as collegial, disagreements occasionally occurred due to technical limitations of the platform in that conversations are limited to 140 characters making it easy to misinterpret the message, and a perceived delay in the synchronous Twitter stream between participants when they are conversing one-to-one via Twitter. However, while the 140 character limit imposed on Twitter can occasionally lead to misinterpreting messages, participants generally felt that the 140 character limit was a positive for the platform in that it enforced conciseness and enabled quick responses. In addition to technical reasons, disagreements also arose through differences of opinions or views. While disagreements around opposing views were seen by participants as a positive in that disagreements often prompted moments of self-reflection on positions and views

held by the participants, the participants indicated that if these disagreements crossed their own personal boundaries of professionalism, they may unfollow the offending member of their PLN. Participants also indicated that they felt that a willingness to engage in conversation on Twitter was important enough that they often use this as a criterion when deciding who they will follow on Twitter. If participants see that a Twitter user is willing to engage in conversations with others in their network, they indicated that they were more likely to follow them. Participants also noted that these conversations could act as a spark that leads to the creation of a more in-depth response, such as a blog post.

A second finding from this research shows that Twitter provides a way for participants to access the collective knowledge of their PLN in three ways. First, Twitter provides a way for resources, in the form of links to other websites or services, to be shared and exchanged among members of a PLN. The quality and type of resources being shared is a criterion participants used to determine whether or not they would follow someone on Twitter. Participants note that they have an expectation of their PLN that the resources shared are of sufficient quality and have been reviewed by the people sharing and are aware that when they share a resource with their PLN, the PLN has this expectation of them as well. Because of this expectation, participants strive to share quality resources back to their network. Some participants also noted that they used tools in addition to Twitter to help them harvest the collected knowledge shared by their network.

A second way in which participants tap into the collective knowledge of their PLN through Twitter is by posting questions directly to Twitter in the hope that they will receive an answer back from their PLN. Among the participants, there was an expectation that, when they posted a question they anticipated getting an answer. This expectation was tempered with the

acknowledgement that, in order to get an answer, there must be a sizeable network established in order to account for the many reasons why members of a PLN may not be able to answer a question.

The third method participants use to harness the collective knowledge of their PLN is by using Twitter as a tool to facilitate collaborative projects among their PLN. While Twitter itself is not a platform for the creation of collaborative resources, it does play a significant role in the collaborative process by connecting the participant to their PLN and allowing the participants to survey their PLN for willing participants who may wish to collaborate on projects with them. Twitter is also used by the participants to prompt their PLN to contribute to a collaborative project. Often, these collaboratively created resources get shared back to not only the collaborators, but to the general population as well.

The third major finding of this research shows that Twitter provides a platform for the participants to promote and amplify ideas and thoughts that require more than 140 characters to articulate. This is often done in conjunction with a personal blog where Twitter is used as a platform to promote the participants blog posts. By posting a link to their blog posts on Twitter, participants make it possible for this blog post link to get retweeted to other PLNs, which amplifies their post beyond the limits of their own PLN. By promoting their blog on Twitter, participants make their PLN aware that they have created something new in the form of a blog post, and often ask their PLN for feedback on the post in the form of blog comments or Twitter conversations. Participants indicate that this amplification effect increase the engagement on their blogs, which then acts as a positive motivator for the participants to blog more frequently.

The fourth and final finding with regards to the primary research question is that there are specific features of Twitter which help the participants expand their PLN. These features include

retweets, hashtags and lists, all of which provide ways to “introduce” participants to potential PLN members. By increasing the size of their PLN, participants are able to better leverage the network effect.

This research also includes a number of secondary research questions which examine the nature of both PLNs and Twitter. In the following paragraphs, I summarize the findings of these secondary research questions.

The first secondary research question asks what motivates an educator to develop a PLN? This research presents three possible motivating factors. As this research shows, educators consider their PLN as a professional learning tool and use tools such as Twitter to connect, first and foremost, with other educators. As a result, this suggests that educators may be motivated to develop a PLN to find professional support, understanding, and positive encouragement from their peers within the professional environment of a PLN. Participants may also be motivated to develop a PLN in an effort to improve their teaching and learning practice. In both these instances, this research suggests that the participants in this study strongly self identify as educators and, as a result, their desire to participate in a PLN may be intrinsically motivated and related to this strong self-perception of themselves as an educator. A third motivating factor as to why these participants may be motivated to develop a PLN may be related to these participants use of ICT tools in general. It is not unreasonable to consider this group of educators as early adopters of ICT's and, as such, may be motivated to participate in a PLN as a way to explore new and novel ways of using technologies in a teaching and learning context.

The second secondary research question asks how Twitter may be different than other web-based social networking technologies with respect to developing and maintaining a PLN. The data collected from the participants to answer this question focused almost exclusively on

Facebook and how it may be similar or different from Twitter with respect to developing and maintaining a PLN. When compared to Twitter, there appears to be some differences in how the participants perceived these two platforms within the context of a PLN. The most striking was a perception that Facebook was a more social network in that participants used it primarily to connect with people who were outside of the context of their professional lives, while Twitter was seen as a more professional tool which they used to develop connections with other educators. Additionally, the ways in which private information was handled was also noted as a difference between the two platforms, with Twitter allowing the participants more control over their personal information than Facebook did. Finally, participants noted that the open nature of Twitter makes the amplification of messages possible beyond their own PLN, a task which they perceive as more difficult on Facebook than on Twitter.

The third secondary research question examined participant's views of their expectations of reciprocity among their PLN. This research shows that these participants do have clear expectations of reciprocity with the members of their PLN, and that they expect the members of their PLN will actively contribute interesting and relevant resources, participate in discussions and collaborative projects, and provide feedback and answers to questions posed by the participants to their PLN. In return, participants in this study indicate that they do the same with members of their PLN.

How trust gets established and maintained between an educator and their PLN was the fourth secondary research question. As this research shows, trust begins to get established in a PLN at the moment a participant makes the decision to follow a person on Twitter. Participants indicate that they have criteria that must be met before they will consider following someone on Twitter. These criteria include; a completed Twitter biography that identifies the person as an

educator, a photo of the person in place of the default Twitter avatar, and a link to an external site where the participant could find more detailed biographical information. To a lesser extent, the number of followers, and how many lists a person appears on were also mentioned as ways to measure a person's credibility. Participants also indicated that they often viewed the contents of recent tweets made by the participant in an effort to determine whether the type of content the person was tweeting was relevant to the participants. Once the participant made the decision to follow a person on Twitter, participants indicated that an increase in the amount of conversation with members of their PLN increased the level of trust they had with that person.

The fifth and final secondary research question examines the nature of informal learning within a PLN and shows that informal learning in a PLN is highly social and participatory. Some participants also indicated that they felt that they were learning by observing the actions and conversations among the other members of their PLN. Some participants also indicated that they considered the act of sharing as an act of learning.

Further Research

While this research does answer questions pertaining to the role of Twitter within a PLN and adds information as to the nature of PLNs in general, it does also raise a number of other questions which researchers may wish to explore in future studies.

1. Previous research shows that educators who use ICT are more likely to incorporate ICT's into their teaching and learning practice appropriately and effectively (Elliott et al., 2010; Georgina & Olson, 2008; Rakes, Fields, & Cox, 2006; Selwyn, 2010). Is this the case with educators who use Twitter to develop a PLN, and, if so, how has networked learning within a PLN influenced both the technological and pedagogical choices these educators make with their students?

2. Is there a connection between how strongly an educator self-identifies with their role as an educator and their motivation to participate in a PLN?
3. Participants in this study indicated that they felt they were learning by sharing within their PLN. What is the nature of sharing as a learning activity, and how is sharing an act of learning within a PLN?
4. Has the rise of microblogging and, specifically, Twitter, changed the nature of academic blogging and if so, how?
5. What is the nature of collaborative projects that arise out of Twitter-mediated interactions in a PLN, and do these projects result in tangible artifacts related to teaching and learning practice? Additionally, are these artifacts being shared and reused among the larger educational community?
6. While this research suggests that Twitter plays a role in facilitating interactions among a PLN, it also suggests that it does not do so alone and is often at its most powerful when used in conjunction with other ICT's. What is the relationship between Twitter and other ICT's in facilitating a PLN?

Conclusion

This research set out to answer a specific question about what role Twitter plays in the formation and development of PLNs among educators. In answering this question, I have also attempted to add to the nascent body of research around the nature of PLNs in an attempt to better understand what a PLN is by investigating how educators who use that term to describe a learning activity they participate in conceptualize and define it.

While PLNs existed long before Twitter and would conceivably exist if Twitter disappeared, based on this research it is not difficult to imagine that a PLN that uses Twitter is

different than one that does not. While professional networks are not uncommon, the scope and scale of these networks have increased with the advent of social networking technologies, such as Twitter. This allows for a greater diversity of voices to emerge within the conversation on the network; conversations which are valued as important learning tools for the participants of this study. Additionally, the open nature of Twitter means these learning networks are now no longer confined to closed and private spaces, but are able to be open and public which increases the opportunities for collaboration, connections and learning opportunities.

As this research has shown, Twitter also provides distinct functions and features which make it well suited as a tool to find new members and expand PLNs. Indeed, this ability to easily create a large network of people can be seen as one of the primary benefits of using Twitter as a tool within a PLN as large networks enable unique affordances, such as the network effect. Twitter, as a technical platform, enables the repurposing of both the data and the tool, and allows both to be combined with other applications in new and interesting ways, as exemplified in this research by third party applications such as The Tweeted Times. Applications such as this combine both the network effect and the Twitter data generated by the network in a unique way which adds considerable value to the person using Twitter as a learning tool within their PLN. While these types of applications are still in their relative infancy, it will be interesting to watch future developments of Twitter applications to see if more and more applications appear which repurposes the data generated by a user's network in novel ways to provide added value to the user.

While this research examined the role of Twitter within a PLN, it also serves as an initial examination of the dynamics of a PLN, and shows that educators who participate in a PLN are passionate educators curious about how technology can be used in new and novel ways in their

teaching and learning practice. Within these PLNs, educators strive to build professional networks that includes both supportive peers and dissenting voices, whom they use to push their thinking. Using Twitter, these educators can access the collective knowledge of their peers, engage in discussions, debates, conversations, and participate in collaborative projects whenever and wherever they like. As this research shows, these educators are not passive receivers of information, but are highly engaged with their PLN and consider people who do the same as valuable additions to their PLN. This active participation requires a high degree of transparency, self-motivation and a willingness among participants to experiment with new ways of learning within a technology mediated network.

References

- Brookfield, S. (1984). Self-directed adult learning: A critical paradigm. *Adult Education Quarterly*, 35(2), 59-71. doi:10.1177/0001848184035002001
- Brookfield, S. (1995). Adult learning: An overview. *International Encyclopedia of Education*. Oxford, Pergamon Press. Retrieved from http://nlu.nl.edu/academics/cas/ace/facultypapers/StephenBrookfield_AdultLearning.cfm
- Brown, J. S., & Duguid, P. (2000). *The social life of information*. Boston, Mass: Harvard Business School Press.
- Conlon, T. J. (2004). A review of informal learning literature, theory and implications for practice in developing global professional competence. *Journal of European Industrial Training*, 28(2-4), 283-295. doi:10.11080309050410527663
- Costa, C., Beham, Guetner, Reinhardt, W., & Sillaots, M. (2008). *Microblogging in technology enhanced learning: A use-case inspection of PPE summer school 2008*. Presented at the European Conference on Technology Enhanced Learning, Maastricht, The Netherlands. Retrieved from <https://togather.eu/handle/123456789/365>
- Couros, A. (2008, December 19). What is a PLN? Or, PLE vs. PLN? | open thinking. Retrieved August 27, 2010, from <http://educationaltechnology.ca/couros/1156>
- Couros, A. (2010). Developing Personal Learning Networks for Open and Social Learning. *Emerging Technologies in Distance Education* (pp. 109-127). Edmonton, Canada: AU Press.
- Demski, J. (2010). Tweets for teachers. *T H E Journal*, 37(2), 16-18.
- Denzin, N., & Lincoln, Y. (Eds.). (1994). *Handbook of qualitative research*. Thousand Oaks, California: Sage Publications.

- Digenti, D. (1999). Collaborative learning: A core capability for organizations in the new economy. *Reflections*, 1(2), 45-57. doi:10.1162/152417399570160
- Downes, S. (2007). Learning networks in practice. In D. Ley (Ed.), *Emerging Technologies for Learning* (Vol. 2). Coventry, UK. Retrieved from <http://nparc.cisti-icist.nrc-cnrc.gc.ca/npsi/ctrl?action=rtdoc&an=8913424&lang=en>
- Downes, S. (2010, September 14). PLENK2010 Participant Feeds ~ Stephen's Web. Retrieved September 30, 2010, from <http://www.downes.ca/cgi-bin/page.cgi?post=53716>
- Dunn, D. (2009). *An analysis of informal learning in the 21st century workplace* (Doctoral Dissertation). Capella University, United States -- Minnesota. Retrieved from <https://ezproxy.royalroads.ca/login?url=http://search.proquest.com/docview/305161598?accountid=8056>
- Ebner, M., & Schiefner, M. (2008). Microblogging - more than fun? Paper presented at the IADIS Mobile Learning Conference, Algarve, Portugal.
- Ebner, M., Lienhardt, C., Rohs, M., & Meyer, I. (2010). Microblogs in higher education - A chance to facilitate informal and process-oriented learning? *Computers & Education*, 55(1), 92-100. doi:10.1016/j.compedu.2009.12.006
- EDUCAUSE Learning Initiative. (2007). *7 things you should know about Twitter* (Report No. ELI7027). Retrieved from <http://www.educause.edu/ELI/7ThingsYouShouldKnowAboutTwitt/161801>
- Elliott, J., Craft, C., & Feldon, D. (2010). Is informational material shared between K-12 professionals on Twitter supported by research? *Society for Information Technology & Teacher Education International Conference 2010*, 2010(1), 444-448.

Embury, E. (2010, March). Survey Results: Twitter Use in K-12 Education « Visibility Matters.

Retrieved June 11, 2011, from <http://cblohm.com/blog/2010/03/08/survey-results-twitter-use-in-k-12-education/>

Finlay, L. (2009). Debating phenomenological research methods. *Phenomenology & Practice*, 3(1), 6-25.

Franzak, J. K. (2002). Developing a teacher identity: The impact of critical friends practice on the student teacher. *English Education*, 34(4), 258-280.

Georgina, D. A., & Olson, M. R. (2008). Integration of technology in higher education: A review of faculty self-perceptions. *The Internet and Higher Education*, 11(1), 1-8.

doi:10.1016/j.iheduc.2007.11.002

Giorgi, A. (1997). The theory, practice, and evaluation of the phenomenological method as a qualitative research procedure. *Journal of Phenomenological Psychology*, 28, 235-260.

doi:10.1163/156916297X00103

Groenewald, T. (2004). A phenomenological research design illustrated. *International Journal of Qualitative Methods*, 4(1), 1-25.

Grosseck, G., & Holotescu, C. (2008). Can we use Twitter for educational activities? *eLearning and Software in Education*. Presented at the 4th International Scientific Conference

eLSE, Bucharest, Romania.

Hendler, J., & Golbeck, J. (2008). Metcalfe's law, Web 2.0, and the Semantic Web. *Web Semantics: Science, Services and Agents on the World Wide Web*, 6(1), 14-20.

doi:16/j.websem.2007.11.008

Henry, G. J. (2009). Practical sampling. In L. Bickman & D. J. Rog (Eds.), *The SAGE handbook of applied social research methods* (2nd ed., pp. 77-105). Los Angeles: SAGE.

- Introna, L. (2005, February 19). Phenomenological approaches to ethics and information technology. Retrieved September 1, 2010, from <http://plato.stanford.edu/entries/ethics-it-phenomenology/>
- Java, A., Song, X., Finin, T., & Tseng, B. (2007). Why we Twitter: Understanding microblogging usage and communities. *Proceedings of the 9th WebKDD and 1st SNA-KDD 2007 workshop on Web mining and social network analysis* (pp. 56-65). San Jose, California: ACM. doi:10.1145/1348549.1348556
- Johansmeyer, T. (2011, February 3). 200 million Twitter accounts... But how many are active? Retrieved April 17, 2011, from http://socialtimes.com/200-million-twitter-accounts-but-how-many-are-active_b36952
- Kester, L., & Sloep, P. (2009). Knowledge dating and knowledge sharing in ad-hoc transient communities. In R. Koper (Ed.), *Learning Network Services for Professional Development* (pp. 43-55). Berlin, Germany: Springer Berlin Heidelberg. Retrieved from http://www.springerlink.com/index/10.1007/978-3-642-00978-5_4
- Klingensmith, K. (2009, May 5). PLN: Your Personal Learning Network made easy. Retrieved August 31, 2010, from <http://onceateacher.wordpress.com/2009/05/05/pln-your-personal-learning-network-made-easy/>
- Laverty, S. (2003). Hermeneutic phenomenology and phenomenology: A comparison of historical and methodological considerations. *International Journal of Qualitative Methods*, 2(3). Retrieved from http://www.ualberta.ca/~iiqm/backissues/2_3final/pdf/laverty.pdf

- Livingstone, D. W. (1999, February). *Mapping the Iceberg*. Presented at the NALL Annual Conference. Retrieved from <http://www.oise.utoronto.ca/depts/sese/csew/nall/res/54DavidLivingstone.pdf>
- Livingstone, D. W. (2000). Exploring the icebergs of adult learning: Findings of the first Canadian survey of informal learning practices. *NALL - New Approaches to Lifelong Learning*. Retrieved August 24, 2010, from <http://www.nall.ca/res/10exploring.htm>
- Livingstone, D. W. (2001). *Adults' informal learning: Definitions, findings, gaps and future research*. Toronto, Canada: Centre for the Study of Education and Work, OISE/UT. Retrieved from <http://hdl.handle.net/1807/2735>
- van Loon, J. (2006). Network. *Theory, Culture & Society*, 23(2-3), 307 -314. doi:10.1177/0263276406062696
- Magna Publications. (2010). *Twitter in Higher Education: Usage habits and trends of today's college faculty*. Madison, WI. Retrieved from <http://www.facultyfocus.com/free-report/twitter-in-higher-education-2010-usage-habits-and-trends-of-todays-college-faculty/>
- Marsick, V. J., & Volpe, M. (1999). The nature and need for informal learning. *Advances in Developing Human Resources*, 1(3), 1 -9. doi:10.1177/152342239900100302
- Marsick, V. J., & Watkins, K. E. (2002). Informal and incidental learning. *New Directions for Adult and Continuing Education*, 2001(89), 25. doi:10.1002/ace.5
- Maxwell, L. (2009). Designing a qualitative study. In L. Bickman & D. J. Rog (Eds.), *The SAGE handbook of applied social research methods* (2nd ed., pp. 214-253). Los Angeles: SAGE.

McNeil, T. (2009, September 21). Twitter in Higher Education. Retrieved August 3, 2010, from

<http://www.scribd.com/doc/20025500/Twitter-in-Higher-Education>

Mischaud, E. (2007). *Twitter: Expressions of the whole self* (Masters Thesis). University of

London, London, England. Retrieved from

http://www2.lse.ac.uk/media@lse/research/mediaWorkingPapers/MScDissertationSeries/Mishaud_Final.pdf

Moran, M., Seaman, J., & Tinti-Kane, H. (2011). *Teaching, learning, and sharing: How today's*

Higher Education faculty use social media. Pearson Learning Solutions. Retrieved from

<http://www.pearsonlearningsolutions.com/blog/2011/05/09/teaching-learning-and-sharing-how-todays-higher-education-faculty-use-social-media/>

Moustakas, C. (1994). *Phenomenological research methods*. Thousand Oaks Calif.: Sage.

Palys, T., & Atchison, C. (2008). *Research decisions: Quantitative and qualitative perspectives*

(4th ed.). Toronto, Canada: Thomson Nelson.

Penner, C. (2011, March 14). Twitter Blog: #numbers. Retrieved April 17, 2011, from

<http://blog.twitter.com/2011/03/numbers.html>

Rakes, G. C., Fields, V. S., & Cox, K. E. (2006). The influence of teachers' technology use on

instructional practices. *Journal of Research on Technology in Education*, 38(4), 409-424.

Reinhardt, W., Ebner, M., Beham, Günter, Costa, C., & Luckmann, M. (2009). *How people are*

using Twitter during conferences. Presented at the 5th EduMedia conference, Salzburg.

Retrieved from <http://elearningblog.tugraz.at/archives/2157>

Roberts, G., Aalderink, W., Cook, J., Feijen, M., Harvey, J., Lee, S., & Wade, V. P. (2005).

Reflective learning, future thinking: digital repositories, e-portfolios, informal learning and ubiquitous computing. Presented at the ALT/SURF/ILTA Spring Conference,

- Dublin, Ireland. Retrieved from
[http://www.alt.ac.uk/sites/default/files/assets_editor_uploads/documents/ALT_SURF_IL
TA_white_paper_2005.pdf](http://www.alt.ac.uk/sites/default/files/assets_editor_uploads/documents/ALT_SURF_IL_TA_white_paper_2005.pdf)
- Rogers, E. M. (1962). *Diffusion of innovations*. Glencoe: Free Press.
- Rubenson, K. (2007). *Determinants of formal and informal Canadian adult learning insights from the adult education and training surveys*. Gatineau, Canada: Human Resources and Social Development Canada.
- Sakamoto, B. H. (2009, September 10). What is a PLN, anyway? – Teaching Village. Retrieved August 31, 2010, from <http://www.teachingvillage.org/2009/09/10/what-is-a-pln-anyway/>
- Selwyn, N. (2010). Looking beyond learning: notes towards the critical study of educational technology. *Journal of Computer Assisted Learning*, 26(1), 65-73. doi:10.1111/j.1365-2729.2009.00338.x
- Selwyn, N., & Gorard, S. (2004). Exploring the role of ICT in facilitating adult informal learning. *Education, Communication & Information*, 4(2/3), 293-310.
doi:10.1080/14636310412331304726
- Siemens, G. (2005, January). Connectivism: A learning theory for the digital age. Retrieved July 23, 2009, from http://www.itdl.org/Journal/Jan_05/article01.htm
- Smith, J. A., Flowers, P., & Larkin, M. (2009). *Interpretative phenomenological analysis: Theory, method and research*. SAGE Publications Ltd.
- Smith, M. K. (1997). A brief history of informal education thinking. Retrieved February 28, 2010, from <http://www.infed.org/thinkers/et-hist.htm>

- Stieger, S., & Burger, C. (2009). Let's go formative: Continuous student ratings with Web 2.0 application Twitter. *Cyberpsychology & Behavior: The Impact of the Internet, Multimedia and Virtual Reality on Behavior and Society*. doi:10.1089/cpb.2009.0128
- Stone, B. (2009, October 30). There's a list for that. Retrieved May 15, 2011, from <http://blog.twitter.com/2009/10/theres-list-for-that.html>
- Tobin, D. R. (1998). Personal Learning Network. Retrieved October 4, 2009, from <http://www.tobincls.com/learningnetwork.htm>
- Warlick, D. (2009). Grow your personal learning network: New technologies can keep you connected and help you manage information overload. *Learning & Leading with Technology*, 36(6), 12-16.
- Wenger, E. (2006, June). Communities of Practice - a brief introduction. Retrieved February 26, 2010, from http://www.ewenger.com/theory/communities_of_practice_intro.htm
- Wenger, E., Trayner, B., & Laat, M. de. (2011, April). Promoting and assessing value creation in communities and networks: A conceptual framework. Ruud de Moor Centrum Open Universiteit. Retrieved from http://www.social-learning-strategies.com/documents/Wenger_Trayner_DeLaat_Value_creation.pdf
- Williams, E. (2006, July 13). Twtr is alive. Retrieved June 21, 2011, from <http://evhead.com/2006/07/twtr-is-alive.asp>

Appendix A: Initial Contact Email

My name is Clint Lalonde and I am a Masters student at Royal Roads University (<http://www.royalroads.ca>) in Victoria, British Columbia, Canada.

I am contacting you to participate in a research project I am conducting in partial fulfillment of my Masters of Arts in Learning & Technology called The Twitter Experience: What role does Twitter play in the formation and maintenance of Personal Learning Networks among educators. The purpose of the research is to understand the experiences of educators who use Twitter as a tool for informal learning within the context of a Personal Learning Network (PLN). You were chosen as part of a random sample of participants from the #edchat twitter archives.

If you choose to participate, I will conduct an in depth interview (approximately 1 hour) with you about your experiences using Twitter as a tool for informal learning within a PLN

Your participation in this research is completely voluntary.

I realize that a stranger asking for you to commit an hour of your time for a research project is a big request. However, there is a lack of academic research in this area, especially around Personal Learning Networks and the role Twitter plays in them. Your participation will contribute greatly in the creation of foundational research that others may be able to build on in the future.

If this is an activity you wish to be a part of, please contact me. If you agree to be interviewed I will forward you a copy of the consent form to be returned to me, and arrange the logistics of conducting the interview.

Thanks for your time.

Sincerely,

Clint Lalonde
Master of Arts, Learning & Technology (candidate)
Royal Roads University in Victoria, British Columbia

Appendix B: Follow up Email (if no response)

Dear <participant>,

Three days ago I sent you an email regarding a research project I am undertaking as part of my Masters thesis in Learning & Technology at Royal Roads University. I would like to follow up and ask if you have had the chance to review the invitation and would be willing to participate in the study.

Thanks for your time,

Clint Lalonde

Appendix C: Letter of Consent

Dear <participant>,

This letter of consent is to obtain your permission to participate in the research project called The Twitter Experience: What role does Twitter play in the formation and maintenance of Personal Learning Networks among educators. The purpose of this research is to understand the role that Twitter plays in the formation and maintenance of Personal Learning Networks among educators. The research will examine the experiences of educators who use Twitter in this manner through in depth interviews with them. The research will also examine the nature of Personal Learning Networks as a construct of informal learning, and the role that Twitter plays in facilitating informal learning within the PLN.

For this research, you are being asked to take part in an in depth (1 hour) interview. In that interview, I will be asking you to recall details of your personal experiences using Twitter as it relates to your activities in a PLN. The interview is semi-structured, meaning that the exact questions asked to each participant will vary, depending on each participants unique experiences using Twitter. The interview can be done face-to-face or virtually, depending on your comfort level and geographical location.

I do not anticipate there will be any risks or discomfort from your participation in this study.

The results of this research will add to the body of work on how educators use web-based social networking tools like Twitter for their own personal learning. Additionally, by conducting this research within the context of a Personal Learning Network, this research will attempt to address, in a small way, the lack of academic research on PLNs by examining your learning experiences within a PLN.

Your participation in the study is completely voluntary and you may choose to stop participating at any time for any reason. In the event you withdraw from the study, your data will be removed from the study and discarded, providing this does not affect the integrity of the research project. To be more specific, once I begin to analyze your data as part of the project, it will be difficult to separate your data from the experiences of the other research participants. If you choose to withdraw from the study after I have begun to analyze the data, I will not be able to remove your data from the study.

All information you supply during the research will be held in confidence. All personally identifiable information, including names, institutional affiliation, or other information that may otherwise identify you will be removed from the final research report. While the research will be publically available once published, your name will not appear in any report or publication of the research. You will be given a pseudonym during the transcription process, and this will be used to identify participants in the final report.

The data will be collected using audio recordings of the interview, which I will then transcribe verbatim. Once these recordings are transcribed, I will send you a copy to ensure that

the transcription accurately represents our interview. Any comments you have on the transcript will be included in the final research study.

The interviews and transcripts will be safely stored, and I will be the only one who accesses your information. Your data will also be stored on a separate hard drive as a backup. Your interview and transcript will be destroyed 3 years after the research has been published.

If you have questions about the research in general or about your role in the study, please feel free to contact me by telephone at <removed> or by email <removed>. You may also contact my Graduate Supervisor, <removed> either by telephone at <removed> or by e-mail <removed>.

This research has been reviewed and approved by the Royal Roads Research Ethics Board and conforms to the standards of the Canadian Tri-Council Research Ethics guidelines.

Legal Rights and Signatures:

I (*fill in your name here*), consent to participate in The Twitter Experience: What role does Twitter play in the formation and maintenance of Personal Learning Networks among educators conducted by Clint Lalonde of Royal Roads University. I have understood the nature of this project and wish to participate. My signature below indicates my consent.

Signature _____
Participant

Date _____

Signature _____
Principal Investigator

Date _____

Appendix D: Interview Guide

1. Tell me about how you started using Twitter?
 - Follow up: Why did you begin using it?
 - Follow up: Was the way in which you use Twitter changed in the time that you have used it? How?
2. How do you find people to follow on Twitter?
 - Follow up: When you find someone you wish to follow, what criteria do you use when deciding on whether or not you will follow them?
3. Have you ever stopped following someone?
 - Follow up: Why did you decide to stop following them?
4. Describe for me how the people you follow on Twitter relate to the people who are in your Personal Learning Network.
 - Follow up: Why did you think it was important to start a PLN?
5. Can you tell me the different communication or social networking tools you use to connect and interact with your PLN?
 - Follow up: If we look specifically at Twitter, can you give me some examples of interactions you have had with your PLN on Twitter?
 - Follow up: In your experience, how are these types of interactions different on Twitter than they are using other communication tools?
 - Follow up: What does Twitter do that other tools cannot? What can't it do that other tools can?
6. Describe for me a conversation you have had on Twitter with someone in your PLN.
7. What types of content do you post on Twitter?

- Follow up: How do you decide what you will post on Twitter?
 - Follow up: How do you feel about the 140 character limit on Twitter messages?
 - Follow up: How do you feel about the fact that what you post on Twitter is public and available on the Internet for anyone to read?
 - Follow up: Tell me what it feels like when someone in your PLN retweets something you post.
8. What kinds of content does your PLN post on Twitter?
- Follow up: How do you decide whether or not to retweet their content to your PLN?
 - Follow up: How do you keep up with all the information that flows from your PLN?
 - Follow up: How much do you trust the information posted on Twitter by your PLN?
 - Follow up: What do you think about personal information that others post. Do you consider it irrelevant, or does it serve some kind of useful purpose for you?
9. Is there anything else you would like to add about your experiences with Twitter, or experiences with your PLN?

Appendix E: ICT's which enhance, extend, view, or manage Twitter data

This appendix provides a brief overview of the different ICT tools mentioned by the participants during the course of the interviews which they use to enhance, extend, view, or manage Twitter data.

Table 3

Technologies participants use to enhance, extend, view, or manage Twitter data.

| Tool | Description | URL | Data Use ^a |
|--|---|------------------|-----------------------|
| TweetDeck | A desktop application for Twitter that allows users to send and receive tweets without having to visit the Twitter website. TweetDeck also interfaces with Facebook, MySpace and LinkedIn and allows users to send and receive messages to these platforms as well. | tweetdeck.com | View |
| HootSuite | A web-based application that allows users to send and receive tweets without having to visit the Twitter website. Also allows users to post to Facebook, LinkedIn, MySpace and WordPress. | hootsuite.com | View |
| Nambu | A desktop Twitter application for the Apple platform that allows users to send and receive tweets without having to visit the Twitter website. No longer in development. | nambu.com | View |
| Packrati | Bookmarking service that takes URLs from tweets and retweets and adds them to Delicious, a social bookmarking application. | packrati.us | Repurpose |
| Twitlonger | Service that lets Twitter users post tweets longer than 140 characters in length. | twitlonger.com | Repurpose |
| Tweeted Times (formerly Twitter Times) | Web service that aggregates links to websites posted in a user's Twitter stream and ranks those links by popularity among how many followers have shared that link. | tweetedtimes.com | Repurpose |
| Twitterfeed | Service that automates posting blog posts to Twitter. Monitors a blog and posts a tweet when a new blog post is published. | twitterfeed.com | Repurpose |
| TweetGrid | A real-time Twitter search engine that | tweetgrid.com | Search |

allows users to search and display tweets based on topics, events, hashtags, and people.

| | | | |
|----------|---|--------------|--------|
| Twibes | A Twitter user directory that allows Twitter users to search for and join groups of other Twitter users based on user defined criteria. | twibes.com | Search |
| WeFollow | Twitter user directory that allows Twitter users to search for and join groups of other Twitter users based on user defined criteria. | wefollow.com | Search |

^a Defines whether the technology is used by participants to view or manage the Twitter data stream (View), or whether the technology is used by the participants to modify or repurpose Twitter data (Repurpose), or allows users to search Twitter (Search).

Appendix F: ICT's used in conjunction with Twitter

This appendix provides a brief overview of the different ICT tools mentioned by the participants during the course of the interviews that they use in conjunction with Twitter.

Table 4

Technologies that participants indicate they use in conjunction with Twitter

| ICT | Description | URL (if applicable) |
|-------------|--|---------------------|
| Blogs | A general classification of web sites. For the purpose of this research a blog is defined as a frequently updated personal website which is maintained by an individual, and reflects the views and opinions of that individual. | n/a |
| Wikis | A general classification of web sites. For the purpose of this research a wiki is defined as a collaboratively created website which many users can add, delete or edit content. | n/a |
| Delicious | A social bookmarking application that allows users to save, store and organize links to other websites. These lists of links are often public and shared with other people. | delicious.com |
| Diigo | Like Delicious, Diigo is a social bookmarking application that allows users to save, store and organize links to other websites. These lists of links are often public and shared with other people. | diigo.com |
| Google Docs | Google Docs is an online suite of collaborative tools which include a word processor, spreadsheet, and presentation applications. | google.com/docs |
| Podcasts | A podcast is a series of audio program which are released and delivered to subscribers on a regular basis. | n/a |
| Skype | Skype is a software application that allows users to make audio or video calls over the Internet. | skype.com |

Appendix G: ICT's used independent of Twitter which may be used within a PLN

This appendix provides a brief overview of the different ICT tools mentioned by the participants during the course of the interviews that they use independently of Twitter, but may also use for PLN activities.

Table 5

Technologies that participants indicate they use independent of Twitter, but may also use for PLN activities

| ICT | Description | URL (if applicable) |
|---------------|---|---------------------|
| Facebook | Facebook is a social networking website. Users create a profile, add other users as friends, and exchange messages with those users. | facebook.com |
| LinkedIn | LinkedIn is a social networking site. Like Facebook, users create a profile, add other users as friends, and exchange messages with those users. The primary difference between Facebook and LinkedIn is in its intended users. LinkedIn is marketed to working professionals as a professional networking tool, while Facebook is a more general purpose social network. | linkedin.com |
| Ning | Ning is an online platform that allows users to create their own social networking website. | ning.com |
| Google Reader | Google Reader is a web-based RSS reader which allows users to subscribe and organize RSS feeds from websites which offer RSS feeds. | google.com/reader |
| Foursquare | Foursquare is a location based social networking site where users can "check in" at physical locations using their mobile device. This check in information can be made public to other Foursquare users, allowing users to locate each other. | foursquare.com |
| Gowalla | Gowalla is also a location based social networking site where users can "check in" at physical locations using their mobile device. This check in information can be made public to other Gowalla users, allowing users to locate each other. | gowalla.com |