

The End of Isolation

Elizabeth Alderton

University of Wisconsin Oshkosh
Oshkosh, WI 54901 USA
aldertone@uwosh.edu

Eric Brunsell

University of Wisconsin Oshkosh
Oshkosh, WI 54901 USA
brunsele@uwosh.edu

Damian Bariexca

Lawrence Township Public Schools
Lawrenceville, NJ 08648 USA
damian@bariexca.net

Abstract

This research study provides new insight into how teachers use social networking sites, such as Twitter, as professional learning networks. The researchers surveyed and analyzed the public Twitter feeds of classroom teachers to determine the specific purposes for which teachers use Twitter. Study participants also completed surveys dealing with social networking. The K-12 educators in this study engaged in true dialogue, where evidence of actual conversation occurred in Twitter over 61% of the time. Additionally, over 82% of the time, the educators in this study chose to follow other educators or content experts related to their field of teaching so they were able to create a personal learning network meaningful to their professional needs. Analysis of data shows that a majority of tweets were educationally focused and were primarily in the categories of practice/philosophy, questions, and sharing of resources. Additional studies looking at how other online learning communities may be used as professional development venues would be beneficial and add to the knowledge base of online learning, professional development, and learning networks.

Keywords: Professional Learning Network, Teacher Professional Development, Social Networking, Twitter

Research on teacher learning and professional development often includes the notion of collaboration. Collaboration is not new in education and has been researched extensively as an essential component of learning. John Dewey (1950) discussed the importance of social experiences when looking at the growth of knowledge.

Socio-cultural theories of learning (e.g., Vygotsky, 1978, 1987) view knowledge construction as a result of individuals interacting in social environments over time. Participants in these interactions are molded by their shared experiences and contribute to the development of these experiences (Cole, 1996). The social context is integral to the learning process (Bork & Punam, 1996; Putnam & Borko, 2000). The interplay between different social experiences provides a lens that mediates what and how an individual learns.

As professionals collaborate and construct knowledge together, communities of practice are formed (Wenger, 1991, 1998; Wenger, White, Smith, & Rowe, 2005), which is viewed as a valuable practice that supports professional learning and development. Teachers need to be able to engage in dialogue with others who can give support and advice so they can try new and different techniques. These experiences in turn allow for knowledge growth and for a person's cognitive schema to assimilate and change. There have been significant benefits found in relation to the power of continual collaborative professional development (Musanti & Pence, 2010). However, in education today with factors such as assessment, No Child Left Behind, and meeting the needs of all children tugging at teachers, time becomes a significant issue and collaborative networking with other teachers diminishes.

With the introduction of the Internet and the new social media networking tools that have become available, how educators collaborate and interact with each other in professional learning communities has changed significantly. No longer is it necessary for collaboration and learning to take place in face-to-face settings, or even within the same building, city, state or country. Instead, interactions may take place in various online settings such as Twitter (in the form of short 140 character interactions) as members ask questions, formulate responses, or make statements, which instantaneously allows for the end of isolation, even as a teacher sits alone in a classroom. In recent years, the concept of social network sites (SNSs) has emerged and such sites are now seen as a venue for collaboration to transpire. Boyd and Ellison (2007) have defined a social network site as a place on the Internet where people are able to:

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

Studies have shown that SNSs offer the opportunity for people to find “significant others that can help them in their personal development” (Harrison & Thomas, 2009, p. 121). Others have found that SNSs such as Twitter are a way to give a group or network a sense of itself (Thompson, 2007) as people are in contact with each other.

One of the most popular social networking sites currently in use is Twitter, which was founded in 2006. Twitter is a free online microblogging tool that allows people to stay in constant contact with each other through short bursts of communication. Twitter allows for users to create networks of people. According to Twitter (2010), “every day, millions of people use Twitter to create, discover and share ideas with others.” One of the benefits of Twitter is that the user has control over their personal networks and many professionals are able to connect with a professional community of practice (Dunlap & Lowenthal, 2009). There are various personal account articles that have been written about the benefits of Twitter in relation to the sharing of ideas and professional development (Brunsell & Horejsi, 2010; Demski, 2010; Ferriter, 2010; Greenhow, 2009); however, very little research has been conducted about individual educators’ use of Twitter except in respect to the use of backchannels.

Backchannels are another way that Twitter has been used for learning and professional development. This is a fairly new phenomenon as related to technology: during a professional development opportunity such as a conference, there is a simultaneous stream of online text-based communication occurring among participants through the use of a social network such as Twitter. While the use of Internet-based backchannels is fairly recent, several educators have written articles describing promising outcomes in the classroom (Mishra, 2008a, 2008b; Snyder, 2009). There is also a growing body of research to show that the use of backchannels has positive results for students, including increased engagement, empowerment, increased collaborative interactions, and enhanced learning (Toledo & Peters, 2010). Additionally, Reinhardt et al. found that conference attendees could communicate, share resources and be active participants in the conference along with the ability to view and learn from streams occurring in other sectionals (2009). These positive backchannel results have prompted the need to look at individual teachers and their personal use of Twitter rather than just during a professional development opportunity. The purpose of this study is to examine the specific ways in which educators use Twitter, and the impact of this use on their professional practice.

Methods

Participants in this study were selected from a group of educators who use Twitter regularly. In order to qualify for the study, participants had to be current K-12 classroom teachers with at least 100 “followers” (users who subscribe to their Twitter feeds) who also followed at least 100 other Twitter users. Ten educators agreed to allow their public Twitter “streams” (chronological feed of messages sent on Twitter) to be analyzed for the present study. From each participant’s stream, 200 consecutive individual messages (“tweets”) were randomly selected for analysis.

Each individual tweet was assigned to one of five categories: Practice (discussion of educational practice/philosophy or link to a blog post or online discussion of same), Resource (link to an online resource or tool), Question (philosophical or practical in nature), Social (any non-professionally relevant discussion or links), or Unknown (devoid of context or purpose could not be otherwise ascertained).

Tweets were also analyzed for dialogue; in other words, the authors sought to determine the degree to which participants use Twitter for conversation, as opposed to simple unidirectional broadcast of information. Tweets directed at one or more specific users (as indicated by the inclusion of the username preceded by the @ symbol, e.g., @teacher369) were categorized as dialogue for the purposes of the present study.

In addition to analyzing the content of each participant's tweets, the follower/followee relationship was also examined. Fifty of each participant's followers were selected at random and categorized as Educator (a professional in the educational field), Content (something related to the educators content area; i.e., NASA for a science teacher), or Other (no relationship or unidentifiable).

Finally, participants were asked to complete an 11-item survey consisting of multiple choice and open-ended items. The survey asked respondents to identify their Twitter username, subject and grade level taught, length of time in education, length of time as a Twitter user, and approximate number of hours per week devoted to Twitter. Respondents were also asked to expound upon their purpose for using Twitter, their decision-making process in choosing who to include in their Twitter network, and the frequency with which they have moved communication with other educators from Twitter to a different medium (e.g., email, telephone, Ning). Respondents also indicated if they have ever collaborated on a professional task with someone they initially met via Twitter or implemented something in their professional practice as a direct result of their involvement with Twitter, as well as identified specific professional benefits resulting from their participation in Twitter.

Participants

Participants were chosen at random to participate in the present study. Of the ten participants, five are male and five are female. One teacher has been in the profession for less than five years, six have been teachers for between six and 15 years, and three have been teaching for 16 years or longer. One teacher's primary teaching assignment was identified as elementary level (grades K-5), three identified their primary teaching assignment as middle school level (grades 6-8), and six identified their primary teaching assignment as secondary level (grades 9-12). Subjects taught by the participants included science, social studies, and English/reading/language arts; three teachers also identified as being certified special education teachers and having a primary teaching assignment in that field. Two participants also indicated teaching Basic Skills (for adult learners? – this needs clarification) and Advanced Placement [AP] courses in addition to general education classes.

When asked to identify how long they have been active on Twitter, one teacher indicated a period of less than one year, five teachers indicated one to two years, and four teachers indicated a membership period of greater than two years (Twitter was initially launched in July 2006). Responses to the open question, "How many hours weekly do you devote to Twitter?" drew a variety of responses. Respondents suggested ranges between three and 20 hours per week, with some qualifications, such as, "Very often, I have it on in the background while I'm doing other things" and "I don't devote hours to Twitter. I just glance at my feed at random. Probably 3-5 hours during the week in tiny bursts".

Results

Purpose for Twitter

The survey asked the participants to describe what they saw as their purpose for using Twitter. All of them responded that Twitter allows them to build connections with educators beyond those in their immediate vicinity. These connections are purposefully made as a way to find and share resources and to provide and receive support. For example, Participant 8 stated, "My primary purpose is to connect with other teachers, so that I can learn from them and share resources that I find." Similarly, Participant 9 wrote, "I am the only biology teacher at my school. I use it [Twitter] as a means of obtaining advice, resources and collaboration...I also use it to find out about new tech tools." Participant 6 also specifically explained that using Twitter helps her stay informed about her local community by following news organizations and local businesses. Participant 1 described how connecting with other educators helps to keep her informed: "I know that when a link comes through Twitter, it has caught the interest of like-minded professionals and people. That means it is likely to be of value to me. This process of information filtering saves me tons of time because I'm getting good information quickly---I'm using the network to sift through content for me."

Four participants also described how using Twitter gives them a voice and confidence in educational discussions. Participant 4 stated, "Twitter is my forum for my ideas on social reform, school reformation, education, ability/disability, and more." Participant 1 adds,

"Twitter has helped me to build a strong professional reputation. Because the content that I share is seen as valuable by a large number of followers, my voice is recognized and respected. That ability to develop a reputation as an expert is something that many teachers working with traditional tools in traditional classrooms don't ever have. I've always known that I was the intellectual equal to those working beyond the classroom. Twitter gives me the chance to publicly prove that."

Follow Whom?

The clearly identified purpose that these educators have for using Twitter is reflected in how they determine whom they will follow on Twitter. In the survey, all but one participant specifically stated that they follow educators. They also follow content experts and others who share professional interests. For example, Participant 9 had this to say about those with whom she networks: "I think that about 90% of those I network with are related to my job in some way. I really don't use Twitter for my personal life. I follow many teachers who are science/ biology/marine science teachers, educators, or other sources of such information because it pertains for my job." Similarly, Participant 4 wrote that he "will network with anyone who is willing to share resources, ideas, philosophies and conversation. Most of those people are teachers, administrators, librarians or other people with some connection to school, but I also engage with parents, musicians, philosophers, marketers and others."

Participants also commented that they are likely to follow accounts suggested by those they trust. For example, Participant 3 stated, "I started by following big names, #ff [Follow Friday] mentions from trusted individuals...". "Follow Friday" is a part of Twitter culture, in which individuals publicly identify people they enjoy following. Follow Friday assumes a sort of "seal of approval" of users; a recommendation to follow certain users because they provide valuable information, good conversation, interesting links, funny or entertaining stories, or any number of other reasons. In addition to Follow Friday, educators will often identify educators that they find valuable during Teacher Tuesdays (#TT). These traditions serve the purpose of recognizing the value of these people or organizations, but also help to expand others' networks.

The results from the researchers quantitative analysis of whom these educators follow also shows that they overwhelmingly follow accounts for professional purposes. The researchers randomly selected fifty Twitter followers from each participant. Each follower was coded as an educator, content expert, or "other." Content experts were defined as non-educator individuals (i.e.: historians, scientists, etc), news organizations, or professional organizations (i.e.: National Science Teachers Association, Edutopia, ISTE, etc). Of the Twitter followers sampled, two-thirds were educators, 16% were content experts, and 18% were coded as "other." Table 1 shows the individual breakdown of whom the participants follow.

In addition to looking for professional contacts, five of the participants also explained that the accounts they follow must add substance to their network. For example, Participant 2 wrote, "If their tweets seem to be of interest - providing ideas or resources, as opposed to just opinion - I will network with them." Similarly, Participant 6 stated, "I look for people who interact and don't just post links."

Finally, tone does matter. Participants explained that they choose to follow people who are open, positive, and constructive. Participant 7 wrote that he believes "people online who reciprocate acts of generosity, praise, encouragement, and useful criticism will be the best contacts for collaboration." Participant 2 commented, "If their tweets are friendly, I'm also more likely to network with them." Participant 4 simply stated, "In short, the only people I refuse to network with are selfish, bigoted or vacuous people."

Conversations and Collaboration

Since Twitter is considered to be a social networking website, one aspect of this study looked at dialogue that transpired between followers to show evidence of collaborative conversations rather than unidirectional sharing of information. To accomplish this, tweets that were directed at one or more specific users (as indicated by the inclusion of the username preceded by the @ symbol, e.g., @teacher369) were categorized as dialogue. For each of the 10 participants, 200 tweets were coded as dialogue or no dialogue. Analysis of these 2000 tweets shows that for these 10 educators, 61.85% of the tweets

provided evidence of dialogue. Thus, this study clearly shows that conversations do in fact occur on Twitter. Table 2 shows the individual participant data results.

Table 1. *Types of Twitter accounts that participants follow.*

	Following	Sampled	Educators	Content Experts	Other
Participant 1	289	50	78.00%	10.00%	32.00%
Participant 2	432	50	38.00%	12.00%	50.00%
Participant 3	457	50	74.00%	16.00%	10.00%
Participant 4	2429	50	56.00%	22.00%	22.00%
Participant 5	225	50	86.00%	6.00%	8.00%
Participant 6	453	50	48.00%	22.00%	30.00%
Participant 7	1072	50	70.00%	20.00%	10.00%
Participant 8	804	50	78.00%	12.00%	10.00%
Participant 9	438	50	66.00%	30.00%	4.00%
Participant 10	875	50	72.00%	8.00%	20.00%
TOTALS:		500	66.60%	15.80%	17.60%

The notion of intentional dialogue and true collaboration was further explored as part of the survey. Participants were asked to reflect on their collaboration with other professionals on Twitter and if the collaboration ever moved to venues other than Twitter. Survey results show that nine out of ten of the respondents were able to give concrete examples of collaboration that occurred with fellow Twitter users. These examples included ideas such as creating units, sharing of resources, students collaborating on projects between classrooms, exchanging professional materials and readings, writing book chapters, and even co-presenting at conferences. A typical response is shown from Participant 2 as she stated, "I've communicated with a lot of Twitter people in regards to things like finding appropriate research articles, using different classroom resources & activities, and conference attendance." Several people gave more in-depth responses as to how Twitter has provided a collaboration forum, as can be seen when Participant 1 responded with:

Jim and I have worked together on several projects between our classrooms. Specifically, we worked on a project designed to raise attention around the genocide occurring in Darfur. Our students developed blog entries, videos, Animoto presentations, Voice threads around the issue...I'm also in the middle of a book project that I'll co-author with two Twitter colleagues. Finally, I've done presentations with and for people who have gotten to know me through Twitter. It's crazy, really.

Participant 10 reported that while he was using Twitter at "professional conferences like ASCD and NCTE, I have met and collaborated with other educators from around the country to share ideas and best practices. These kinds of exchanges strengthened my experiences at the conference, allowing for a much more positive experience socially and professionally."

Evidence of collaboration as a result of Twitter was further discovered as participants responded to a survey question asking if connections made on Twitter developed into intentional collaboration in other forums. The data show that 100% of the participants had taken connections made on Twitter to another forum. The diversity in the forums varied from each participant and mentioned venues such as wikis, Facebook, and even face-to-face meetings. There were, however, some commonalities; 5 of the

participants used email and/or Skype as a forum. Additionally, 5 people responded that they used blogs/RSS feed readers as another communication venue. Finally, 7 people stated that they had moved collaborative dialogue to other online areas such as Ning.

Table 2. *Tweet data showing dialogue or no dialogue.*

Name	Total Tweets Analyzed	Tweets with reply	Percent of Tweets Showing Dialogue	Tweets with No Dialogue	Percent of Tweets Showing No Dialogue
Participant 1	200	100	50.00%	100	50.00%
Participant 2	200	89	44.50%	111	55.50%
Participant 3	200	163	81.50%	37	18.50%
Participant 4	200	160	80.00%	40	20.00%
Participant 5	200	98	49.00%	102	51.00%
Participant 6	200	174	87.00%	26	13.00%
Participant 7	200	91	45.50%	109	54.50%
Participant 8	200	84	42.00%	116	58.00%
Participant 9	200	156	78.00%	44	22.00%
Participant 10	200	122	61.00%	78	39.00%
Totals	2000	1237	61.85%	763	38.15%

These changes in venue evidence further, deeper discussion and fleshing out of ideas and practice. While Twitter appears to be an excellent platform for establishing and maintaining network connections, the nature of microblogging limits its utility for communication beyond 140-character messages. That teachers moved discussions to forums that allow for deeper discussion and expansion of ideas is encouraging; Twitter does not seem to be a place to collaborate in depth, but rather to make those initial connections - a "jumping off" point.

More than Simply a Social Outlet?

Many people believe that Twitter is simply a social opportunity; however, is it possible that Twitter may be more than just social and allows those in a profession such as education to develop a professional learning network? To examine this question, the study looked at the same 2000 tweets from the 10 participants to decipher the types of tweeting that was occurring. Each individual tweet was assigned to one of five categories: Practice (discussion of educational practice, philosophy, or link to a blog post or online discussion of same), Resource (link to an online resource or tool), Question (philosophical or practical in nature), Social (any non-professionally relevant discussion or links), or Unknown (devoid of context or purpose could not be otherwise ascertained).

Practice

Discussions related to practice/philosophy of education varied from person to person. Data analysis showed that 39.80% of the tweets in this study were related to practice. Some were very practical while others were philosophical in nature, as seen in the discussion between three people below:

@xyz, @abc Yup. I think we ought to have dozens of different kinds of schools offering different curricula.

@xyz, @abc Classical schools, outdoors academies, techno centers, global ed homes, performing arts programs

@xyz, @abc When every school's a unique home, there's a unique home for almost every kid.

Resource Sharing

Resource sharing was seen in several formats. Sometimes an idea was given to someone after a question was asked, but more often, links to Internet resources were offered. In this study, resource sharing accounted for 10.50% of the 2000 tweets.

Looking at <http://aviary.com/> for photo editing. Thanks, @xyz, for tweeting about it.

Wow! Thanks @xyz. What a cool history idea! <http://twhistory.org/reenactments/>

Questions

The educators in this study did not often ask their professional network for help when they had questions or if they were in need of information for their classrooms. In the 2000 tweets analyzed, only 79 tweets (3.90%) asked educational questions. This can be seen in the examples below:

What sites, similar to CoverItLive, do you use for creating a chat room for your students?

Question: The google email method for getting student emails - yours + student 1 @gmail.com. Is it allowed by google?

RT @abc: RT: Interested in your school having a team be part of a PLP cohort next year? Info session @ 10am EST / 7pm EST [http://sni ...](http://sni...)

Social

Without a doubt, the social aspect of Twitter is very important. In this study, participants tweeted with issues related to education approximately 54% of the time while engaging in social tweets 43% of the time. These social tweets covered a variety of topics, from medical issues to weather to what their family was doing on the weekend. The examples below show the diverse nature of social tweeting, and results of the content categories from each participant can be seen in Table 3.

Don't forget to "Spring Forward" this weekend. Daylight Saving Time begins Sunday at 2 A.M. (which makes it 3 A.M.)

@abc The attacked student and the leader of the attackers had a big fight in school last year. Both big guys. It wasn't fun.

Impact

What is the perceived benefit?

In the survey, participants were asked how using Twitter has benefited them professionally. Four unique themes emerged from their responses:

- Access to resources
- Supportive relationships
- Increased leadership capacity
- Development of a professional vision

Nine of the ten participants specifically described increased access to practical resources and ideas as a benefit. For example, Participant 8 stated, "I have been able to implement ideas from others in my own classroom, and share my own ideas which people have helped me improve." Similarly, Participant 2 wrote, "It's great to be able to connect with people who are useful resources. They can point me to activities, lessons, etc. that will directly impact my students." Participant 1 describes the importance of this type of networking in the face of decreasing school budgets:

There isn't a week that goes by that I don't stumble across a resource and/or instructional strategy that I can use immediately in my classroom. Not a single week. The same resources and strategies would take me months to come up with or track down on my own. Considering the limited amount of time that I have for planning and professional development---which has been cut completely from our district's budget for next year---this kind of access to immediate, valuable information is amazing.

Table 3. *Tweet data showing content categories (Practice, Resource, Question, Social, Unknown).*

Name	Total Tweets Analyzed	Tweets Related to Practice	Tweets Related to Resources	Tweets Related to Questions	Social Tweets	Unknown Tweets
Participant 1	200	134	16	15	34	1
Participant 2	200	37	5	0	157	1
Participant 3	200	137	5	17	38	3
Participant 4	200	93	7	15	76	9
Participant 5	200	78	36	21	46	19
Participant 6	200	47	7	1	141	4
Participant 7	200	59	57	0	83	1
Participant 8	200	69	38	3	87	3
Participant 9	200	63	3	1	118	15
Participant 10	200	79	36	1	81	3
Total	2000	796	210	74	861	59
Percent		39.80%	10.50%	3.70%	43.05%	2.95%

Six participants also described how they are able to receive support in a variety of ways from their Twitter network. Participants explained that they were able to “blow off steam” to understanding colleagues, receive technical and pedagogical support, identify new job opportunities, and receive encouragement. Participant 4 states, “My practice benefits from my involvement on Twitter because I am more confident in my ability, have many more resources, have a PLN [professional / personal learning network] I can turn to for instant response to a problem or encouragement when I'm in need of it.” Participant 9 explains, “I am the only biology teacher at my school. Collaboration is a bit difficult when others don't know the subject or don't understand the content because of the level that I teach...Twitter has provided me the means to connect with others and help me find answers that I would have trouble obtaining otherwise.”

Four participants explained that their use of Twitter has lead to opportunities for them to take leadership roles in developing professional development, organizing conferences, publishing, and grant writing. For example, Participant 7 writes:

Using Twitter to share and discuss ideas about teaching has been the single best decision of my career. I am a new teacher and have been able to confer with so many other leaders in the field. Even in the biggest, richest, most exciting districts in the world, I could not have had these experiences. Nearly every worthwhile professional opportunity has come to me through Twitter: publishing, writing, grant ideas, lessons, units, conversations, new job openings, interviews...the list goes on.

The participants also explained how their use of Twitter has transformed their vision of who they can be as educators and what education can be. Participant 6 stated, "It shapes how I see my practice and how I see what is possible in my classroom." Similarly, Participant 3 wrote, "Twitter has changed how I do everything in the classroom. The effects have been immeasurable." Finally, Participant 9 describes how Twitter has reenergized her teaching:

Twitter has helped me grow as a teacher. I have been teaching for awhile and was sort of in a plateau about two years ago. Twitter has helped me gain more insight and new ideas than a monthly educational journal. It has upped my game in the classroom.

Critical Events

In addition to describing the perceived benefits of using Twitter, the researchers wanted to know if our participants could identify specific impacts that Twitter has had on their professional practice. To do this, the researchers included a critical event recall question (De Laat & Lally, 2003) on the survey. Nine of the ten participants described at least one tangible impact that their Twitter network has had on their teaching. The tenth participant, Participant 7, did not describe a specific critical event, but did provide an abstract explanation of how Twitter has impacted him. Three of the participants were able to identify specific web tools found via Twitter that they incorporated into their teaching, and three participants described activities that they either received or developed based on interactions with other educators on Twitter. Two participants described how interactions with educators on Twitter impacted the development of a course or program. Two participants also described how Twitter has led to participation in professional development opportunities. One participant explained how an educator on Twitter helped her properly prepare materials for a laboratory activity. Finally, one participant described how Twitter led to a collaborative project with students from a different school. Table 4 summarizes the critical events recalled by the participants.

Conclusions

This research study provides new insight into how teachers use social networking sites such as Twitter for professional purposes. From the researchers' analyses, it is evident that these ten teachers are effectively using Twitter for professional networking and growth. Little (1993) claims that "the test of teachers' professional development is its capacity to equip teachers individually and collectively to act as shapers, promoters, and well-informed critics of reform" (p. 130). Additionally, Richardson (1997) suggests that the main objective of professional development should be to foster changes in teachers' knowledge, beliefs, and attitudes because these components of teacher cognition are closely tied to teaching practice. Evidence from this study suggests that interactions through Twitter can lead to these results. The K-12 educators in this study engaged in true dialogue, where evidence of actual conversation occurred in Twitter over 61% of the time. Additionally, over 82% of the time, the educators in this study chose to follow other educators or content experts related to their field of teaching so they were able to create a personal learning network meaningful to their professional needs. Analysis of data shows that the majority of tweets were educationally focused and were seen in the categories of practice/philosophy, questions, and sharing of resources.

Darling-Hammond and McLaughlin (1995) state that teachers need professional development that extends far beyond the one-shot workshop. They need opportunities to learn how to question, analyze and change instruction to teach challenging content. Loucks-Horsley and colleagues (Loucks-Horsley, Love, Stiles, Mundry, & Hewson, 2003) argue that effective professional development should: provide opportunities for teachers to build content and pedagogical content knowledge; be research based and engages teachers in the learning approaches they will use with their students; provide opportunities for teachers to collaborate; supports teachers to serve in leadership roles, links with other parts of the education system and; is based on student data and is continuously evaluated. Professional learning networks created through social networking, like Twitter, can provide these opportunities. However, collaborative conversations alone are often not enough to promote teacher learning and change. Teachers must try complex innovations in their classroom and reflect upon these implementations in order to extract from experience the knowledge that leads to improved teaching (Ladewski, Krakcik, & Harvey, 1994). Additional studies looking at how other online learning communities may be used as professional development venues would be beneficial and add to the knowledge base of online learning, professional development, and learning networks. These studies should seek to understand the nature of how learning in professional networks is transferred to the classroom.

Table 4. *Critical event recall.*

Participant 1	April is National Poetry Month---which I didn't know until @[name removed] started Tweeting out posts from his blog that included picture prompts that he wanted people to write about. @[name removed] and I became regular visitors, writing a ton of poems. @[name removed] was recording his poems each day using a new tool I'd never heard of. As a result of the daily poetry fun, I put together several activities that asked my students to write poems around images. We finish those tomorrow---and my students will be using a digital tool to record their voices while reading. Of course, I shared all of the materials I created through Twitter as well!
Participant 2	I'm sure that I have found video clips from @[name removed] and @[name removed] that made it into my classroom. I also remember communicating with @[name removed] regarding prep for an AP Bio lab and how to mix solutions. I also got a review activity for the AP Bio class from someone on Twitter last year, though I do not remember who that was.
Participant 3	My interactions with @[name removed] have had significant implications for my integrated studies program.
Participant 4	I have used a variety of resources gained through Twitter in my classroom, among them Wallwisher, Maps101, Nings for my classes, Photopeach, Wordle, Animoto, and so many others.
Participant 5	I often find myself using new tools that are introduced to me on Twitter. I have also attended conferences I hear about on Twitter.
Participant 6	I've already mentioned partnering with a fourth grade class. They had posted Voice Threads of themselves reading stories they wrote. I used it as an opportunity to talk about what makes good writing. My students and I wrote comments to each student praising some specific part of what they created that we liked. Then they sent us a Flat Stanley. My students loved taking photos throughout the school with Stanley, and they are finishing up stories about Stanley's adventures. We're making an online storybook for the fourth graders with our work.
Participant 7	Nearly every part of my educational philosophy has been shaped by my community of professionals online (my Personal Learning Network). I go to them, as well as my face-to-face colleagues and principals in my building, to sound out new ideas. I go to them for reflection on things that didn't work out so well or things to celebrate. I can get nearly instant feedback from people I trust, people I don't know very well, people with vast experience, and new folks like me. I use Twitter as a sounding board every day for my practice as a teacher.
Participant 8	Thanks to people heavily involved in Universal Design for Learning, I've tried to implement different tools in my classroom such as Text to Speech software for students who have difficulty reading. I've discovered more useful activities through my Twitter network than anywhere else.
Participant 9	Gosh there are so many things. For example I think @[name removed] told me about Animoto a long time ago and the ability to have an educator account to get more time for free for their videos. My students use this program quite a bit. He also taught the Intel master teachers workshop I did last summer. What a wonderfully inspiring person! And @[name removed] was really helpful when I started a new course in marine science in the fall. He had been teaching a marine sci course for some time and has a Ning for it. His ideas helped me devise my course Ning for that class. And also some of my coworkers at my school like @[name removed] and @[name removed] are regularly feeding me info that they find out from their connections on Twitter.
Participant 10	Thanks to my Twitter Network. I now routinely use Text-to-Speech software with students during the editing phase of the writing process. Also I will be participating in the National Writing Project because my Twitter Network has convinced me that I need to participate to improve my teaching practice.

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