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The use of micro-blogging for teacher professional development support and personalized professional learning

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THE USE OF MICRO-BLOGGING FOR TEACHER PROFESSIONAL DEVELOPMENT SUPPORT AND PERSONALIZED PROFESSIONAL LEARNING

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ABSTRACT

The purpose of this qualitative study was to look at how teachers use micro-blogging, in this case Twitter (www.twitter.com), for their own personalized professional learning and how effective Twitter is as a professional development (PD) tool. In order to measure the effectiveness of the tool, the researcher first gleaned nine essential characteristics of effective PD from the literature. This list was validated by experts in the PD community. The significance of this study was to reveal how participants actually used Twitter for PD, what their perspectives on the tool were, and how effective their experiences were with Twitter as a PD tool. Results of this study can be used to improve current practice, and provide a low cost, accessible, and available mechanism to foster an on-going, learner-centered, approach to PD, thus allowing teachers to become more involved in their own professional growth.

For the 4 participants in this study, Twitter use for PD and its effectiveness varied greatly. The effectiveness of the tool depended on the participant's fluency with the technology and attitude towards social media. For the most fluent participant, Twitter met most of the requirements for effectiveness; however, Twitter use did not automatically provide a mechanism for reflection or self-assessment; nor did Twitter use provide an evaluation of the experience, both requirements of effective PD. With added evaluation and self-assessment processes, and with a fluent practitioner, Twitter does have the potential to be a very effective PD tool with its low cost, accessibility, and availability.

Chapter 1: Introduction

The advancement of appropriate professional development (PD) opportunities for teachers in today's fast-paced technological environment is essential to the improvement of pedagogical practice, teacher efficacy, and student achievement. The importance of PD for teachers is well established (Darling-Hammond & McLaughlin, 2011; Desimone, 2011; Lawless & Pellegrino, 2007) however, finding an appropriate mechanism for delivering effective technology PD opportunities for K-12 classroom teachers is often difficult (Birman, Desimone, Porter & Garet, 2000; Lee, 2005; Putnam & Borko, 2000). Challenges to providing effective technology PD include cost, access, and available time. The micro-blogging tool, Twitter, provides free, instant access to professional development opportunities when the user chooses – anytime, anywhere. Defining effective PD is also important in order to evaluate any PD opportunity. This study looks at the effectiveness of Twitter as a PD tool.

The Purpose of this Study

The purpose of this study was to evaluate the effect of situated, social, constructivist, interactive online PD on teacher involvement in the attainment of his/her own professional learning goals. Teachers in this study were involved in a professional goals development workshop that included the introduction of the use of Twitter as a tool for personalized PD. This PD opportunity for experience in Twitter use focused on the social, situated, constructive, and interactive affordances of the technology, and included 12 weeks of continuous follow up and support. This study explored the following research questions:

1. How were participating teachers using Twitter as a PD tool during the 12-week PD experience?

1a. What did this experience look like: collaborative team, learning community, network of practice, community of practice, or collective?

1b. Was there evidence of participants using this PD tool to improve their practice?

2. What was the perception of participating teachers about Twitter as a PD tool?

2a. Did teachers find Twitter effective for PD?

2b. Did teachers find Twitter effective in directing their own learning (as a personalized PD tool)?

The Issue

The problem with many technology integration PD opportunities for teachers is that they do not have a lasting effect and are not seen by teaching professionals as relevant either to their personal situations or their communities of teaching (Schlager & Fusco, 2003). Another problem with many technology integration PD programs is that they are *technocentric* (Papert, 1978) with an emphasis on teaching a particular technology, rather than focusing on the needs of the individual teacher within his/her community and circumstances. Several reasons for this disconnect between teacher interest and PD relevance have been identified and explored in the literature of PD, technology integration, and situated learning. Teachers must see the connection between the PD experience and the realities of their individual classrooms. The one-size-fits-all PD approach flies in the face of research that shows the importance of a situated, socio-cultural, constructivist approach to teacher PD.

Barriers to Effective Online PD

There are several barriers to implementing effective online PD. Sometimes community standards and patterns of behavior work against a teacher's need to speak out or critique others.

The necessary trust for working across departments or seniority levels in some schools can be difficult to obtain. Some teachers find it difficult to think about their own practice since their identity is so tied up in what they do as teachers (Schlager & Fusco, 2003). There are other barriers to teachers' effectively integrating technology in their practice. One drawback of technology PD opportunities is the lack of time to tinker with the new technology adequately and become familiar with its benefits. Additionally, sometimes teachers do not believe that technology is important to them or their students. In some cases, lack of easy access to the technology may be a barrier. In other cases, the culture of the community may not find value in change. Effective technology integration needs a community that values risk-taking and provides support to its members while attempting change (Kopcha, 2010).

Theoretical Framework

There are three theoretical perspectives that frame this study: situated, socio-cultural, and constructivist learning. PD is a form of teacher learning. In order to provide effective PD, the experience must be directly tied to the learner's perspective. As a learner, the teacher is situated within the socio-cultural context of his/her community and interactions with fellow teachers, students, parents, and administrators (Vygotsky, 1978). According to Vygotsky, learners work within a *zone of proximal development* (ZPD) in which their knowledge level is challenged by *more capable peers* within their community. Although originally tied to children's learning, the idea of ZPD can be applied to learners in general (Roth & Lee, 2007). Putting the idea of ZPD into action through *activity settings* for adults, Tharp and Gallimore (1988) recognize the importance of *assisted performance,* or learning from other adults who already have the desired skills. Teachers are also recognized as members of a community of practice and may participate and learn in that community at a variety of levels. Although not specifically describing teacher

learning, Lave and Wenger (1991) describe this learning progression from novice to expert as *Legitimate Peripheral Participation* or LPP. This type of authentic learning is considered *situated* or tied to the context and culture of the learner. In this constructivist framework, teachers therefore are learners constructing their own learning through PD that challenges them while affording them a collaborative environment in which to test and expand their practice and knowledge. "Telling is not enough, because understanding is not a matter of passively receiving but of actively building up" (Von Glasersfeld, 1989, pp.134-135).

Characteristics of Effective PD

In order to fully understand the problem, it is essential to first understand the characteristics of effective PD. Darling-Hammond and McLaughlin (2011) described effective PD as engaging, grounded, shared (focused on communities of practice rather than individuals), connected to the classroom, ongoing and supported, and connected to school change. Teachers need to be builders of their own knowledge (Polly & Hannafin, 2010) and able to put this knowledge into practice. This new practice must have evidence and benchmarks to assess its effect on student performance (Elmore, 2002). Effective PD is based on authentic teacher activities (Darling-Hammond & McLaughlin, 2011) and its content focus connects student learning to the subject matter (Desimone, 2009). Effective PD involves active learning activities for the educator (Hoekstra, Brekelman, Beijaard & Korthagen, 2009).

Teachers' beliefs also affect the teachers' willingness to participate in PD and its effectiveness (Elmore, 2002). Teachers need to believe that what they do can positively affect students' lives (Day & Gu, 2007). Effective PD also provides for ownership of the process through collaboration (Glazer & Hannafin, 2006). PD that aligns with the teachers' beliefs about his/her own practice is more effective.

Wei, Darling-Hammond, and Adamson, (2010) stress the importance of time for PD to be effective. Extended time to reflect on practice, collaborate for change, design curriculum, create action plans, and share skills and classroom practice, are all needed for effective use of PD. Yoon, Duncan, Lee, Scarloss, and Shapley (2007) found that an average of 49 hours of PD over 6-12 months had a positive impact on student achievement.

Bybee (2001) underscores the effectiveness of PD that supports collaboration. The provision of support and mentorship during the PD undertaking also adds to its effectiveness (Elmore, 2002; Signer, 2008). This additional support also lessens stress during the learning process (Kwakman, 2003). The culture of the school community also affects the outcome of the PD (Jurasaite-Harbison & Rex, 2010).

Reflection and evaluation are also important factors in the success of a PD opportunity. Thinking about one's own learning, or metacognition (Flavell, 1979), is vital to the process of acquiring new knowledge. Teachers need a mechanism for reflecting on what they are learning in order to fully benefit from the experience (Pareja Roblin & Margalef, 2013; Steffy & Wolfe, 2001). Evaluation also plays a large role in the effectiveness of a PD activity, although researchers find effective evaluation is perhaps the most difficult to determine. They do agree that evaluation is a complex process and should be used to facilitate action (Lawless & Pellegrino, 2007; Pellegrino & Quellmalz, 2010).

Significance of the Study

Technology can play a critical role in learner-centered PD. When teachers are able to make choices about both content and activities during a PD opportunity they are more likely to adopt the teaching practices espoused. When these activities build on knowledge and beliefs that the teacher already holds, motivation increases as well. Technology allows teachers to connect

PD activities to their own classroom practice. Online PD can also provide a connection to a collaborative group of teachers for feedback, sharing of resources, and mentoring or support (Polly & Hannafin, 2010). It is hypothesized that the use of Twitter can provide teachers with choices, connections, and support so necessary to effective PD.

Twitter is the brand name for a social media platform also known as micro-blogging. This platform allows users to share information and resources, express ideas, provide support, collaborate, and connect with each other. Although the brand may not continue into the future, the process of sharing and connecting with others instantly, and choosing to follow or communicate with fellow educators and experts, has provided many educators an additional source of PD. Other platforms may or may not restrict the number of characters (140 limit in Twitter), but do require succinct communication in order to be effective. The qualities of choice, easy access, connectivity, and conciseness are essential to the process of this social media experience.

According to Glazer and Hannafin (2006), one of the challenges of effective PD is the isolation of teachers within their classrooms. Twitter use allows teachers instant access to other teachers via its social network. Using simple smart phone technology, an internet connected computer, or mobile device, the teacher chooses which individual or group to follow. Teachers may choose to tweet (communicate using the 140-character limit) or simply follow others online. Teacher interviewees from Lu (2011) stated, "[Twitter is] like PD at your fingertips" (p. 20). Anderson (2011) states that Twitter is, "a great way to build your Personal Learning Network (PLN), participate in resource sharing, and get any kind of help you might need in your classroom" (p. 27).

This study looks at the effectiveness of using Twitter as a platform for communication and connections for teachers. For the purpose of sharing ideas, resources, concerns, and tools, as well as working collectively around practice and student improvement, Twitter has the potential to foster a peer-to-peer revolution in education (Dobler, 2012; Forrestal, 2011; Forte, Humphreys, & Park, 2012; Trinkle, 2009). Twitter use as a PD experience can help teachers make connections to their own classrooms by personalization of the learning content and context. Twitter can be used for amassing useful information and resources, searching for or expressing opinions, liberating stress, maintaining relationships, collaborating on student improvement initiatives or reflecting on one's own practice through the perspectives of others (Gao, Luo, & Zhang, 2012; Zhao & Rosson, 2009).

The significance of this study is to reveal how participants actually use Twitter for PD, what their perspectives on the tool are, and how effective their experience with Twitter as a PD tool is when compared to the nine characteristics of effective PD. Results of this study can be used to improve current practice and provide a low cost, accessible, and available mechanism to foster an on-going, learner-centered, approach to PD, thus enhancing the ability of teachers to become more involved in their own professional growth.

Definition of Terms

In order to understand the way the micro-blogging technology, specifically Twitter in this case, functions, it is necessary to understand the following terms:

Twitter (www.twitter.com): a free, online social media or micro-blogging application which allows users to establish an account and, within the restrictions of 140 characters, post a statement for other users to read. Participants may also read posts from a variety of other users

who post statements periodically. Access is afforded through smart phone technology, internet connected computers, and other mobile devices (iPads and tablets).

Tweet: a verb used in Twitter which means to post or write a short statement online for others to read.

Re-tweet: a mechanism within the Twitter application which allows users to copy someone else's tweet to their account so others will see it.

Handle: the identifying name or code for Twitter participants. The name may or may not be associated with the actual person or celebrity named.

Follow/Follower: to follow someone on Twitter is to subscribe to their account and receive instant updates as tweets that have been posted by them. Twitter accounts are often judged by the number of followers they may have: the more followers, the better.

Lurk/Lurker: to lurk is to follow others online through Twitter without posting any tweets or re-tweets. It is difficult to tell the number of lurkers from those who no longer follow the account.

Individual @: in order to follow an individual, a Twitter user must know the person's "handle" or name, *e.g.* @justinbeiber

Group hash tag: a hash tag # followed by a word, allows a group of individuals to follow the same theme or idea and have all of their posts aggregated in the same spot, *e.g.* #edchat or #doglovers

Discover: is a mechanism for finding people or groups to follow; Twitter will suggest names or hash tag groups based on previous selections (similarly themed or related in some way).

Collaboration

When teachers are able to share experiences, both successes and failures, via a collaborative network, professional growth occurs (Glazer & Hannafin, 2006). When these

experiences are situated in the classroom, authentic learning can occur. Twitter allows teachers to reach out to mentors and other support groups for needed expertise and also allows the teacher to serve as a mentor or more knowledgeable peer.

The use of Twitter could possibly fulfill many of the basic requirements of effective online PD as described by researchers Schlager and Fusco (2003). Twitter use is not a one-day, quick opportunity for PD but rather develops over time. It could be seen as a "context-specific and continuous endeavor" (p. 5). Whether Twitter use will be career-long depends on the evolution of technology which cannot be measured at this point but it has the potential for limitless extension in time. Many of the educational hash tag groups align their discussions to standards within each participant's domain of expertise. Teachers discuss their own classroom as well as PD experiences. Twitter users can be at any stage of career development. Beginning teachers can learn from more experienced peers and ask specific questions related to their particular classroom needs. All teachers can serve as mentors for other teachers and collaborate with teachers around the world. Teacher practices can be shared, discussed, and adapted to fit diverse student needs through Twitter. Twitter use is purely collaborative and can involve any number of support groups: local, state, national, or global. Twitter use has been incorporated into both formal and informal PD activities.

Motivating Factors for Twitter Use

Previous research has shown that one of the strongest motivating factors for teacher learning is the teacher's sense that he or she will be able to do something well (Thoonen, Sleegers, Oort, Peetsma & Geijsel, 2011); because of this finding and Twitter's ease of use, it may be an effective PD tool for exploring professional learning goals. Twitter is as simple as texting to a friend. After the initial set-up of an account, which mimics the setup of any online

service, the only requirement is to activate the app to read, post, or follow tweets. This process can be done on a smart phone, tablet, or computer. A person can also follow an account or hash tag group without establishing his/her own account for those who are not sure if they want to set up an account.

The second motivating factor for teachers and their own PD is whether they buy in or not: in other words, whether the PD provides something of value to the teacher (Thoonen et al., 2011). Since teachers are in charge of choosing which individuals or hash tag groups to follow, they will be able to choose what holds value to them. The hash tag groups may provide content or lesson plan information, technology tips for use in the classroom, suggestions for education reform, and even topics for dissertation. These tweets contain sources for websites, videos, blogs and general discussions about myriad issues that affect teachers. The list is endless and teachers can begin their own conversations on the topics they desire if they do not find ones that are already started.

Twitter is an empowering tool. For teachers who feel isolated or that their school or community is the only one experiencing a particular problem, Twitter allows them to communicate with others who may have created potential solutions to that particular problem. For teachers who find it difficult to make time for PD, checking Twitter for information is instantaneous and often reveals much more information than was initially requested. When more time is available, the teacher can go back to the original tweets and investigate further. Unlike workshops and meetings, there is no set time required to use – and learn from – other teachers and experts on Twitter.

There are many studies on the use of Twitter but most focus on the user or the message: who is saying what. Only recently have studies focused on the use of Twitter as a collaborative

learning tool (Chen & Chen, 2012; Dunlap & Lowenthal, 2009; Ebner, Lienhardt, Rohs, & Meyer, 2010; Forte et al., 2012; Gao et al., 2012; Junco, Elavsky, & Heiberger, 2013; Kassens-Noor, 2012; Marwick & boyd, 2010; Veletsianos, 2012; Zhao & Rosson, 2009). Several educational dissertations have been published on the use of Twitter as a PD tool. One researcher looked at a case study of participants in the Twitter subnetwork #edchat, a specific hashtag group for educators. Davis (2012) looked at teachers' perception of the use of a hashtag group as a PD tool. Another researcher used action research to train eight teachers in the use of Twitter and follow their progress as they developed their own personal learning networks (Deyamport, 2013). This researcher builds on the findings of previous research on the effectiveness of the use of Twitter as PD.

Overview of Methodology

This study was guided by a developmental evaluation research design (Patton, 2011) and originally incorporated a mixed methods approach using both quantitative and qualitative data collection tools to determine the value of the use of microblogging technology as a PD tool for the participating K-12 teachers. However, the quantitative survey was answered by only one participant so the researcher has relied on qualitative data to inform understanding in this study. In order to determine how participants were using Twitter, both individual tweets and groups followed by participants during the experience were captured and analyzed. Once the 12-week experience ended, a focus group interview of three of the four participants was conducted. The researcher provided scaffolding, encouragement, and formative assessment for participating teachers through Twitter and also recorded these interactions in the Researcher's Notes. Developmental evaluation data was gathered during and after the PD process to shape the evaluation results (Patton, 2011).

Summary

The problem with many technology integration PD programs is their lack of connection to teaching professionals' everyday practice and beliefs. This disconnect causes many teachers to be less engaged in PD opportunities. The use of micro-blogging as a mechanism to foster an on-going, learner-centered, situated, socio-cultural, and constructivist approach to PD, may enhance the ability of teachers to become more involved in their own professional growth. Since the emphasis is on the use of the tool for professional growth, rather than the tool itself, the focus of the PD becomes the teacher and his/her own needs and goals for PD. This study evaluated the use of micro-blogging as a PD tool, the perceptions of the participants during the 12-week experience, and the effectiveness of Twitter use as PD.

Chapter 2: A Review of the Literature

In this chapter, the researcher reviews the underpinning research on effective teacher PD that includes theories of how teachers learn and what effective PD models look like. A review of traditional PD and its shortcomings is followed by a description of reform PD (Darling-Hammond & McLaughlin, 2011) and the various components that make the newer approach successful. The integration and adoption of technology to the effective PD model is also reviewed. The author explores a specific technology, micro-blogging, in this case, Twitter, as a professional learning tool for teachers. This review of the literature supports the purpose of this study: to evaluate the use of Twitter as a tool to personalize and promote effective teacher PD and the perception of teachers during the experience.

This chapter is organized in an inverted pyramid form from general to very specific. The first section covers a broad description of the goal of any effective PD; essentially what constitutes an effective teacher. The researcher then narrows down the various areas of study to the specific technology under review. In a backward design approach to the problem, the researcher will present the ideal teacher and school environment and then discuss the various models and components of PD that foster this ideal.

The Effective Teacher (Where are we Going?)

Although effectiveness is difficult to define precisely, most models focus on the teacher's ability to work with content knowledge and pedagogical knowledge to enhance student performance; in other words, the effective teacher knows what to teach, how to teach it and what fits best for each student.

According to Shulman and Shulman (2004) "*An accomplished teacher is a member of a professional community who is ready, willing, and able to teach and to learn from his or her*

teaching experiences" (p. 259). To break down this assertion further, Shulman and Shulman define the various aspects involved in their statement. *Ready* signifies that the teacher has developed a vision of his/her classroom that reflects a deep understanding of how diverse students learn; the teacher thinks of teaching and learning as active processes. *Willing* refers to the teacher's motivation and willingness to pursue his/her vision. Motivation may be both intrinsic and extrinsic but must be strong enough to support action. Being *able to teach* involves many aspects of teacher knowledge: content, curriculum, pedagogy, classroom management, organization, assessment and use of community (classroom, school, local and professional). A teacher who is *able* is skilled in various areas of practice that interact and overlap to form a complex web of knowledge. Being *able to learn from teaching experiences* reveals the importance of critical reflection. Without the capacity for self-assessment, the ideal teacher would lack an important element for growth and change.

Missing from Shulman and Shulman's (2004) definition of the accomplished or ideal teacher is the end result of effective teaching. The ultimate goal of the effective teacher is to have a positive impact on student learning (Earley & Porritt, 2013; Wei et al., 2010) by creating a learner-oriented environment and context for learning (Baviskar, Hartle, & Whitney, 2009). In the following sections the researcher will explore how to foster the development of an *accomplished teacher* through PD activities.

The Ideal School Environment

Teachers do not work in a vacuum; therefore, it is essential that schools provide an environment for teacher improvement. The ideal school community has school leaders who promote professional learning through careful planning and an organized teacher-centered approach. The ideal school environment for professional learning involves all teachers and

affects a diverse student population. Effective PD is an ongoing process for every grade level and subject area. Teachers are encouraged to learn from a variety of sources: fellow teachers, master teachers, and experts in the field. School leaders help establish a culture of professional support and challenging goals, while using assessment and data to propel decisions about content and pedagogy (Darling-Hammond, Wei, Andree, Richardson & Orphanos, 2009).

National Goals for Teacher Learning and Technology Integration

On the national level, teacher professional learning is also stressed. National goals for teachers include providing inclusive practices for all learners, being conversant in learning theories and their applications to students, having strong competencies in content knowledge of key academic subjects, and being artful in the skill of applying appropriate teaching methods (Darling-Hammond et al., 2009). Added to these goals are those of technological competencies for teachers with an: "emphasis on innovation, leadership, multidisciplinary collaboration, collective problem identification, and resolution in a dynamic digital environment" (from *ISTE* as cited in Greenhow, Robelia & Hughes, 2009, p. 248).

The Significance of Effective PD (Why Should we go There?)

Having reviewed the goals of effective PD and technology integration, the reader may ask, why bother? Why is there such a strong push for improvement in teacher preparation and ongoing development? The answer lies in the fact that better teachers help prepare students better (Darling-Hammond, 2000). Teachers need to be able to meet the challenges of a new information and networked society. As Thomas and Brown (2011) posit in their book, *A New Culture of Learning*, "Embracing change means looking forward to what will come next...viewing the future as a set of new possibilities, rather than something that forces us to adjust…We can no longer count on being taught or trained…" ("Learning to Embrace," para. 1)

Professional learning is also important to keep up with student performance standards and new ways of learning in different content areas. New technologies encourage change and exploration as teachers and experts meet to make sense of constantly changing fields. Changing school settings and multi-ethnic populations with varying skills, languages, and backgrounds make it imperative that teachers have the best possible tools to work with (Darling-Hammond et al., 2009; Lawless & Pellegrino, 2007; Wei et al., 2010). Information is available everywhere through digital connections and anyone can access knowledge that was once limited to very few professionals. Educators must maintain their value in a rapidly changing world by developing expertise and learning how to best use this knowledge. Being connected and involved in one's own improvement as a teacher is not a choice; it is a necessity (Whitby, 2013). Long term investment in teacher PD also increases the ability of schools to solve persistent problems through the application of site-based solutions developed by the school's own professional team (Elmore, 2002).

Recent Efforts in PD (Where Have we Been?)

In the US federal government's Race to the Top program (2009), funding was provided in four areas, two of which were: to improve teachers' and school leaders' success in a more equitable balance among schools and to improve low-achieving schools through funding of effective PD. (Wei et al., 2010). Other efforts have been aimed at restructuring and revamping staffs at failing schools or initiating on site learning academies for teachers (Darling-Hammond et al., 2009).

Although not shown to improve practice or student achievement, short-term workshop PD has received more funding than more effective, longer duration, intensive PD (Wei et al., 2010). In addition, according to Darling-Hammond et al. (2009), teachers in the US receive

significantly less hours of PD than the suggested 30+ hours and those hours were more than likely (90%) to be short-term workshops or conferences. A majority of teachers (57%) reported no more than 16 hours of PD during the span of a year. Those teachers who did receive PD found in many cases the PD was of little use unless related directly to their own subject area.

Some of the weakest areas of PD for teachers are in collaborative work on curriculum design, improvement of teacher practice, and supportive strategies for special education and English language learners. Many American teachers spend their own funds on PD unlike teachers in many other countries. Compared to their foreign colleagues, American teachers also lag behind in time to plan and coordinate learning activities or participate in collaborative decisions on school policy, curriculum or assessment. Less than half of American teachers feel they have any input on their own PD (Darling-Hammond et al., 2009; Wei et al., 2010).

Traditional Model of PD

Many researchers have found problems with the traditional forms of PD. Thomas and Brown (2011) consider the traditional view of learning as "mechanistic… a series of steps to be mastered" (Chap. 2, "Mechanistic View," para. 1) with the final goal a result – a product. According to Elmore (2002), schools need specific processes for improvement. The old training model is no longer appropriate for the myriad undertakings of the modern teacher. The seat-time measurement of old no longer fits with the need for differentiation and the varied pacing of today's learning model (Dede, 2011). Schools need to stop tallying up the hours teachers have attended PD and focus on supporting teachers' needs to improve their own practice through collaboration and time to observe, reflect, and assess the results (Lee, 2005). The assumption that appropriate PD contains a list of activities and pedagogical approaches for teachers to enact and that teacher learning follows depending on how often these activities and approaches can be

used is false (Opfer & Pedder, 2011). Traditional forms of teacher PD do not foment a constructivist learning environment (Cho & Rathburn, 2013).

PD that puts pressure on teachers to perform has many consequences according to Day and Gu (2007). Not only are teachers' fundamental identities tested, but as teachers feel a need to teach to the test, they spend less time on students' specific needs. PD also cannot be used as a means of constraint or compliance (Elmore, 2002). The shortcomings of traditional PD include a lack of connection to the teachers' own classrooms often with a one-size-fits-all large group approach, as well as a lack of time for teachers to learn from each other. Support for continued learning and improvement is often lacking as well (Darling-Hammond et al., 2009; Elmore, 2002). Technology integration PD traditionally suffers from the same problems. Just learning how to use a technology without knowing how to use it in the classroom to help students learn is not considered good use (Plair, 2008). PD that lacks an overall plan and focus on student learning ends up being just a compilation of disjointed events (Elmore, 2002).

Reform PD and Teacher Learning (How do we get there?)

If the traditional forms of PD no longer fulfill the needs of teachers and schools, what does reform PD look like? One major difference in traditional PD and reform PD is that reform PD takes into account the ways teachers learn. Based on constructivist theory and a socio-cultural perspective, reform PD takes into account that teachers learn through a process of constructing their own knowledge in the context of their own classrooms and schools, and in their various communities as well (Baviskar et al., 2009; Greenhow et al., 2009; Hoekstra et al., 2009; Signer, 2008). This context of teacher learning must be taken into account in reform PD. The constructivist approach is process, rather than product, oriented (Ebner et al., 2010). This approach fosters a wide range of learning opportunities and subsequent engagement in reflection

on the learning process (Baviskar et al., 2009; Ebner et al., 2010). Whereas traditional models of PD feature workshops, seminars, conferences, and university coursework, reform PD adds more opportunities for the inclusion of informal and situated learning as well. Much of 20th century learning theory focused on cognitive processes; however, learning theory in the 21st century involves many dimensions of learning and a much broader view including the physical, affective, spiritual, and cognitive aspects of learning (Merriam, 2008). Opfer and Pedder (2011) describe teacher learning as "the ongoing transformation, simultaneously, of both the knower and knowledge. Learning is a continuous process through which both the learner and the knowledge to be learned is redefined in relation to one another" (p. 388). Reform PD emphasizes "situated, authentic, learner-centered instruction for complex problem solving and higher order thinking skills" (Polly & Hannafin, 2010, p. 557).

Stages of Successful PD

How does this view of teacher learning affect PD? If teacher learning is no longer seen as a linear, step-by-step training model, then teacher PD must reflect the cyclical nature of the learning process as teachers move away from previous pedagogies and try out new ideas. Brody and Hadar (2011) suggest four phases or stages of effective PD. The first stage is seen as *anticipation and curiosity* when teachers view the PD as an opportunity to fulfill a need: a gap in content knowledge, additional pedagogical skills, or additional understanding of a novelty or phenomenon. The second stage is seen as *withdrawal*. In the withdrawal stage, the teacher tries to organize the new knowledge along the lines of his/her current practice, essentially reinforcing his/her own ideas about practice rather than examining new possibilities. Teachers may also just categorize their existing practices using the new terminology without looking at their actual practices for improvement. Another part of the withdrawal stage is when the teacher finds

obstacles to making a change. In order for the PD to be successful, teachers must get past the withdrawal stage and become aware of the potential rewards of this new knowledge and how to conquer any roadblocks. This *awareness* stage is a transition from withdrawal to actual change. In the awareness stage, teachers realize that their current practices do not fulfill their students' needs in one way or another and that this new practice offers the potential for growth. Teachers who do not reach the awareness stage will not take action and without action there is no true *change* – the fourth stage. Change is seen in implementation of the new knowledge in classroom practice. The ultimate goal of PD includes change in practice, development of new expertise, and teacher empowerment.

Baviskar et al. (2009) propose similar PD stages in identifying "four critical elements for learning: 1) eliciting prior knowledge 2) creating cognitive dissonance, 3) applying new knowledge with feedback and 4) reflecting on learning" (p. 543). This cyclical model echoes the Brody and Hadar (2011) model in that the creation of cognitive dissonance can cause some teachers to withdraw from the learning process. For others, having to deal with dissonance is what allows teachers to learn and grow. Both of these models are cyclical and based on the teachers' application of their new knowledge to influence student learning, a transfer that is difficult to both measure and observe.

Motivation for professional learning should come from the teacher and involve both cognitive and affective processes (Day & Gu, 2007). This new view of professional learning requires teachers to analyze their own practice, change and relearn classroom roles, and teach in new ways. This new knowledge cannot be pre-packed or delivered through training (Darling-Hammond & McLaughlin, 2011). This organic process is echoed by Thomas and Brown (2011): "the context in which learning happens, the boundaries that define it, the students, teachers, and

information within it all coexist and shape each other" (Chap. 2, "Learning Environments," para. 1).

Factors Affecting Teacher Learning

Teacher learning is closely tied to a teacher's vision of what is best for his/her students and requires constant examination. There are many personal factors affecting a teacher's willingness to learn according to Kwakman (2003): the meaning a teacher attaches to his/her professional role, the practicality of the learning/activity, the significance of the knowledge to the teacher's classroom, and the teacher's emotional level (stress, overload, excitement).

Other factors for teacher learning are related to the task itself. The amount of work required of the teacher (workload), the emotional demands of the work, the availability of a variety of learning opportunities (not only repetitive task oriented ones), the amount of independence (the freedom to choose tempo, methodology, and sequence of the lesson), and the teacher's contribution to decision making (Kwakman, 2003) all play a role in teacher learning.

Another major factor in teacher learning is the environment or context of that learning. The situated nature of learning means learning can take place anywhere: the classroom, the hallway, online, face-to-face, in communities, in electronic networks, or at universities; to name a few (Kwakman, 2003; Putnam & Borko, 2000). The key factor is that the teacher is the driving force behind the construction of his/her own learning and can then apply that new knowledge to classroom practice and student improvement. Informal learning in a variety of contexts is an important component of life-long learning (Jurasaite-Harbison & Rex, 2010). A teacher's pedagogical beliefs forged by first-hand experiences, his/her working environment, and higher education experiences; affect not only instructional decisions but also the teacher's willingness to learn (Opfer & Pedder, 2011).

Defining Effective PD

If teachers learn in different ways, both cyclically, and situatively, then what does effective PD involve? Although many researchers have addressed this question in a variety of ways, there is a general consensus in the literature about what constitutes effective PD (Beach, 2012; Darling-Hammond et al., 2009; Earley & Porritt, 2014; Elmore, 2002; Guskey & Yoon, 2009; Kuijpers, Houtveen & Wubbels, 2010; Lawless & Pellegrino, 2007; Lee, 2005; Masuda, Ebersole & Barrett, 2013; Opfer & Pedder, 2011; Polly & Hannafin, 2010; Schlager & Fusco, 2003; Tinoca & Oliveira, 2013; Vescio, Ross & Adams, 2006; Wei et al., 2010). The major components of effective PD are included in Table 1 and discussed below:

Table 1

Nine Characteristics of Effective Teacher Professional Development

1. Focus on student and teacher learning
2. Emphasis on content and pedagogy essential to authentic teacher activities
3. Alignment of teachers' beliefs, career stages, and ownership through choice
4. Provision of time for thinking, making connections, and sustaining change over time
5. Encouragement of collaborative activities within and outside of school environs
6. Sustained support, scaffolding, and formative assessment necessary for growth
7. Close alignment or coherence to school and community standards and culture
8. Provision of mechanism for reflection and self-assessment
9. Procedure to evaluate the PD and its impact on teacher learning and student achievement

Focus on student and teacher learning. High quality PD allows teachers to participate as active learners while focusing on the learning needs of their students. Learner-Centered

Principles (APA, 1997 as cited in Polly & Hannafin, 2010) draw from cognitive and constructivist theories of learning that underscore the need for students to be the builders of their own knowledge (Polly & Hannafin, 2010). Elmore (2002) defines improvement as "the engagement in learning new practices that work, based on external evidence and benchmarks of success…resulting in continuous improvement of students' academic performance over time" (p. 13). Effective PD designers must contemplate what expertise and techniques are needed for students to learn more successfully, what levels of expertise teachers already have, and how teachers might gain the necessary expertise (learning theory; Elmore, 2002).

Emphasis on content and pedagogies essential to authentic teacher activities. Teachers' own top priorities for PD often focus on content area knowledge, classroom management, students with special needs, and using technology in the classroom (Darling-Hammond et al., 2009), all issues related to teacher practice and authentic activities. Content focus of PD may vary but must include teaching techniques that are tied to the specific content presented (Birman et al., 2000; Lee, 2005). Engaging teachers in the content through authentic activities is essential. Desimone (2009) found that content focus may be the most influential feature of effective PD. Activities that connect student learning and subject matter content were associated with "increases in teacher knowledge and skills, improvements in practice, and increases in student achievement" (p. 184).

Active learning activities. Active learning activities come in a variety of forms. Hoekstra et al. (2009) identifies four types of learning activities. The first type of active learning activity is *learning by experimenting*. Trying out new practices in the classroom is an integral part of teacher learning (Kwakman, 2003). A second type of active learning activity is *learning by considering one's own teaching*. Observing other teachers in their classrooms or videotapes of

one's own teaching can be an active form of learning (Desimone, 2009; Martin et al., 2010; Richter, Kunter, Klusmann, Lüdtke & Baumert, 2011). Reviewing student work (Birman et al., 2000; Desimone, 2009; Martin et al., 2010) can also engage a teacher's mental processes of analysis and diagnosis (Hoekstra et al., 2009) about his/her own teaching. A third type of active learning activity is *learning by getting ideas from others*. Volunteer or teacher-generated study groups (Birman et al., 2000; Richter et al., 2011), peer feedback (Desimone, 2009; Hoekstra et al., 2009), committee or task-force work (Birman et al., 2000), and professional reading (Kwakman, 2003; Richter et al., 2011) all provide opportunities for teachers to learn from others. The fourth type of active learning activity identified by Hoekstra (2009) is *learning by doing*. Hands on activities such as internships, individual or action research projects, simulations (Birman et al, 2000), leading of discussions (Birman et al., 2000; Desimone, 2009), writing, and presenting, offer authentic learning activities for teachers (Birman et al., 2000).

Alignment to teachers' beliefs, career stages, and ownership through choice. It is essential that teachers have a choice of PD activities and are able to align these activities to their specific, personal beliefs and career stages.

***Teachers' beliefs*.** Teachers' beliefs have a huge influence on their commitment to professional learning. There are three main facets of teacher beliefs: personal beliefs, formed outside of school; situated beliefs, based on experiences with students in school(s); and professional beliefs, shaped by interactions with more formal knowledge and educational policies (Day & Gu, 2007; Opfer & Pedder, 2011). Improvement in practice often requires a drastic shift in teacher's beliefs not only about what might be obtainable but also how these new practices might affect student achievement (Elmore, 2002). Differences in beliefs about pedagogy, social responsibilities, and self-confidence can affect a teacher's willingness to

participate fully in PD (Glazer & Hannafin, 2006). Teachers need to believe not only in themselves but also that they can "make a difference" (Day & Gu, 2007, p. 430). In some cases, teacher beliefs change after implementation of the new practice; in others, the beliefs must change in order for the teacher to change his/her practice (Elmore, 2002).

Teachers' beliefs and needs are also often aligned to the stages of their careers. Researchers vary in determinations of categories according to years of experience, but do agree that it is important to recognize how teachers' beliefs and practice will often reflect the phase of their careers. Day and Gu (2007) find it is important to note that teachers do not inevitably get better with age and experience and it is important to mold the PD experience to meet different needs. Experience does not naturally equate to expertise and some very experienced teachers may need to let go of some deep-rooted beliefs in order to change their practice (Elmore, 2002).

Career stages. Various models of career stages for teachers have been proposed. Huberman (1989), Day and Gu (2007), Steffy and Wolfe (2001), and Masuda et al. (2013), although differing in specific age divisions and traits, do paint a general picture of the transitions that occur during a teacher's career. Beginning in the pre-service stage, teachers feel obligated to learn as much as they can about content and pedagogy that might apply to their future classroom experiences (Masuda et al., 2013). The next stage is the beginning teacher phase. Huberman (1989) identifies this stage as that of *survival and discovery*. Masuda et al. (2013) agree that during these first years, teachers are in *survivor mode* and often feel overcome by the sheer amount of information they are processing. Beginning teachers are concerned with creating a professional identity and developing classroom management skills (Day & Gu, 2007; Masuda et al., 2013). Teachers in the initial stage of their careers do not want PD opportunities about theory; they want practical applications to their own struggles in the classroom (Day & Gu,

2007; Masuda et al., 2013). Beginning teachers also prefer to select topics they feel are of value to their own experiences. Teachers during this phase also seek opportunities to collaborate with peers (Masuda et al., 2013). As novices at the beginning of their careers, they may have less ability to explain difficult concepts through the use of a variety of illustrations and approaches; they may have fewer ways to differentiate instruction for diverse learners; and they may lack the facility and natural flow of more experienced teachers (Elmore, 2002). As apprentices, they are eager to combine pedagogy and content knowledge with classroom management and self-confidence (Steffy & Wolfe, 2001).

Once teachers have reached a level of balance and security in the classroom, they enter into a mid-career stage. Teachers at this stage are working out a balance between professional and personal obligations. Mid-career teachers like PD opportunities that provide content specific knowledge that they consider of value, especially if related to curriculum or improving practice (Day & Gu, 2007; Masuda et al., 2013). They do not want to waste precious time and like to be paid or earn credit for PD (Masuda et al., 2013). Day and Gu (2007) consider this stage as a crucial point in a teacher's career. During PD it is important for teachers to be supported by leaders and colleagues. As professionals, teachers at this point enjoy sharing their expertise with other teachers and are most likely to seek higher education opportunities (Richter et al., 2010; Steffy & Wolfe, 2001).

Anywhere from 20 to 24 years of teaching experience places a teacher in the late career stage (Day & Gu, 2007; Masuda et al., 2013). Day and Gu (2007) stress the importance of teachers' abilities to adapt to change during this stage. Huberman (1989) refers to this stage as that of *serenity and conservatism*. As experts, late-career teachers seek out new PD experiences that might work in their classrooms. They are bothered by compulsory attendance at PD that is

unconnected to their own classrooms. They value technology that helps them find and join with others to share experiences and knowledge (Masuda et al., 2013). Older teachers read more professional literature than their younger peers (Richter et al., 2011).

At this stage, veteran teachers may experience a loss of identity as experts if thrust into situations requiring new pedagogical skills and approaches. According to Brody and Hadar (2011), veteran teachers may choose to stay within their zones of comfort rather than experience the cognitive dissonance needed to incorporate new knowledge. Steffy and Wolfe (2001) call this a withdrawal stage if teachers detach themselves from the process of renewal through reflection and growth. Rather than moving on to the level of *distinguished* or *emeritus* teacher exemplified by having a positive impact on education or a lifetime of achievement, respectively, withdrawn teachers slowly disconnect psychologically from improvement of their teaching. Huberman (1989) defines this stage as *disengagement*. Disengagement can lead to physical and emotional symptoms such as tiredness, lethargy, sadness, and sullenness. It is important to recognize these symptoms at any stage of a teacher's career (Steffy & Wolfe, 2001).

These various career stages are not set in stone, nor are they completely linear in growth. The importance of recognizing differences in teacher expertise and interests is important in order to support their commitment to improvement which leads to classroom and school change (Day & Gu, 2007). The goal of PD in terms of career stages of teachers should be to encourage mid- and late-career stage teachers to return to the passion of transformation (Fessler & Rice, 2010).

Fessler and Rice (2010) see a need for further research into appropriate PD to keep teachers in the field. With half of new teachers in some cities leaving teaching within 5 years, they see a need to shift PD to teacher retention and a focus on more experienced teachers. With external factors such as fast track policies for content specialists and short-term programs like

Teach for America bringing inexperienced teachers into the field and scripted curriculum guides taking the creativity out of practice, PD needs to focus on keeping experienced teachers in the classroom. Re-recruitment might be a possibility as well as creating more opportunities for teacher leaders to stay in the classroom.

***Ownership*.** Ownership is a vital part of the teacher learning process. Researchers concur that when teachers are involved in the decision-making process and have choices about their own learning the effect is more likely to cause change (Elmore, 2002; Glazer & Hannafin, 2006; Lee, 2005; Vescio et al., 2006). Teachers should be seen as collaborators and empowered to take ownership of their own personal growth and encourage the growth of their colleagues (Glazer & Hannafin, 2006; Lee, 2005).

Provision of time for thinking, making connections, and sustaining change. The duration of a PD opportunity is another major factor in its success. Research has shown that the limited sit-and-get workshop formats, even those offering up to 14 hours of contact, do little to impact teacher learning and ultimately student achievement (Wei et al., 2010). Duration refers to both the time span of the activity itself (number of contact hours) and the extent of the activity (over a semester, a year). Although there is no specific minimum, research shows that success has been achieved with PD spread over a semester or with a summer workshop of at least 20 contact hours plus extensive follow up during a semester (Desimone, 2009). Yoon et al., (2007) found that an average of 49 hours (range 30 – 100 hours) over 6 to 12 months positively impacted student achievement. The factor of extended time gives teachers opportunities to design curriculum, create action plans, tie together tools, skills and technologies, share classroom practices, and collectively create an environment for sustained change (Archambault, Wetzel, Foulger, & Williams, 2010; Birman et al., 2000).

Encouragement of collaborative activities within and outside of school environs.

Collaboration is another major factor of effective PD. Teachers are not feudal lords in their own fiefdoms, but form part of a larger community within the school and beyond. When teachers from the same school, grade level or subject area work together they form a learning team. As a team, teachers can collaborate to solve common problems and encourage each other to improve their practice. This collaborative participation is essential to the growth of both individual teachers and the school system (Birman et al., 2000; Desimone, 2009; Elmore, 2002). There are a variety of ways that PD can support collaboration: through the formation of study groups to investigate current practice and evaluate data on student outcomes; through support and guidance of novice/apprentices by more experienced teachers; through affiliations with experts in the larger community such as scientists or business leaders; through the establishment of connections to professional learning communities that address shared issues (Bybee, 2001). Teachers may also share practice by observing each other's teaching strategies and discussing them, by telling stories, and brainstorming creative solutions to shared problems (Glazer & Hannafin, 2006; Kwakman, 2003; Pareja Roblin & Margalaf, 2013). The challenge of collaborative work is to fulfill the needs of the individual teacher while accomplishing the tasks of the larger group (Elmore, 2002).

Darling-Hammond et al. (2009) describe the cycle of a learning team: initially, teachers explore student data to establish needs; then, they determine what PD learning experiences would address these areas; third, they design lessons and evaluations from those experiences and transfer this new knowledge to the classroom; after tweaking and reflection, the learning team again sets new goals based on student outcomes. Thomas and Brown (2011) describe the team: "the team relies on everyone to understand that their success as individuals creates something

that amounts to more than the sum of its parts." (Chapter 9, The Virtual Space of Collective Indwelling, para. 7)

Sustained support, mentoring, scaffolding, and formative assessment. Support is an essential part of teacher professional growth. Teachers need satisfying work that is sustained and recognized by others. Support can be in the guise of opportunities to work with others on an issue or the use of a mentor or *critical friend* to ask incisive questions and offer thoughtful advice (Elmore, 2002; Signer, 2008). Support may be in the form of expressions of empathy and analytical feedback to help teachers probe their own practices and beliefs in order to improve them (Pareja Roblin & Margalef, 2013). Teachers can be involved with these *more capable peers* (Vygotsky, 1978) to provide scaffolding for their continued learning (Polly & Hannafin, 2010). Mentors can also provide formative assessment in terms of observations of new practices and subsequent discussions, just-in-time support and additional resources, and reflection on and unpacking of teacher performance (Hudson, 2013; Kopcha, 2010). Teacher stress can be lessened by specific learning support, coworker support, or administrative support (Kwakman, 2003). It is important that teachers have myriad opportunities to continue their quests for personal and professional growth (Slepkov, 2008).

Close alignment or coherence to school and community standards and culture. Coherence is a term used by researchers to describe the alignment of PD purpose to the policies and cultures of school and community (Birman et al., 2000; Desimone, 2009; Martin et al., 2010). This important factor of context for teacher learning cannot be overlooked. School settings have meaningful impact on teacher development and therefore the PD must take into consideration the culture of the school community (Elmore, 2002; Jurasaite-Harbison & Rex, 2010). An environment that fosters communication, collaboration, and examination and provides

a secure space for community members to take risks and explore possibilities is a healthy one (Glazer & Hannafin, 2006). Other characteristics of a positive school culture include a common vision held by teachers, administrators, students and the general school community as well as physical and social spaces for community dialogues (Elmore, 2002; Jurasaite-Harbison & Rex, 2010). The school culture can limit teacher growth as well through lack of support, leadership, and mutual vision (Opfer & Pedder, 2011). PD opportunities must align to the realities of the existing school culture even while pushing for change (Elmore, 2002).

Provision of a mechanism for reflection and self-assessment. A dynamic part of the learning process of any learner, teacher or student, is the need for reflection on one's own learning. This use of metacognition (Flavell, 1979) allows teachers to modify, question, and improve their practice. Reflection can involve self-inquiry about curriculum, pedagogy, student learning, class management, and relationships between the teacher and his/her students (Pareja Roblin & Margalef, 2013). PD opportunities that allow time for teacher reflection and encourage its use through coaching, portfolio development, journaling, blogging, and mentoring are considered more effective (Steffy & Wolfe, 2001).

Procedure to evaluate the PD and its impact on teacher learning. Of the nine most commonly listed traits of effective PD, the most difficult to fully realize is the evaluation of the connection between the PD opportunity and its effect on both teachers and students. Many researchers extol the benefits of proper assessment of the PD experience, yet find the perfect instrument beyond their reach. They do agree on the assertion that evaluation is a complex process and should be used to facilitate action (Lawless & Pellegrino, 2007; Pellegrino & Quellmalz, 2010).

***Models of effective evaluation*.** Perhaps it is easier to look at some characteristics and models of effective evaluation frameworks that have been proposed. Earley and Porritt (2014) suggest three areas for evaluating PD: *products, processes,* and *outcomes*. They call for evidence-based results (products) rather than asserted results. In order to judge the impact of the PD it is essential to have a clear picture of student learning and teacher practices before the PD experience. The desired outcome of the PD must be clearly stated in both teacher learning and student performance. This preliminary evaluation or baseline is also necessary to establish the type of PD needed to effect change. Rather than focus on the quality of the PD, the evaluation needs to focus on the desired changes anticipated through the process of the PD experience. These changes can be seen in differences in "staff behaviors, attitudes, skills and practice" (p. 121).

Lawless and Pellegrino (2007) also propose looking at teacher practice to see what teachers are doing differently as a result of PD. Are these changes likely to affect student learning? Are the three areas of knowledge, attitude, and behavior (KAB method, p. 606) being assessed? What are the measurements being used? There are fundamental questions about assessment over time. Are these changes long-term? According to Martin et al. (2010), a framework for PD evaluation would involve three different areas: an assessment of the PD experience (value and usefulness), the connection between the experience and teacher learning, and the transformation of practice and student outcomes.

Although these models provide some frameworks for evaluation of PD experiences, there is still much to discover about what makes PD effective. Desimone (2009) suggests concentrating on the features of a PD activity that affect student results rather than the structure

of the PD activity itself. Wei et al. (2010) posit that what works with one set of students, teachers and administrators may not work with a different population, school culture and context.

Barriers to effective PD. Elmore (2002) notes that there are several factors that work against successful PD. It is important to include teachers in the planning of school-wide change or implementation or they could be restricted in their abilities to follow through on the initiatives. Attaching teacher evaluations to the completion of PD activities also can cause conflict. Some obligatory PD activities that have little practical applications to teachers' classrooms or ones that emphasize social aspects over academic improvements may cause more harm than good by sidetracking the purpose of the group. Effective PD is not a haphazard invention by a few teachers in isolated classrooms, nor is it a one-shot attempt to change teacher practice detached from curriculum and teaching methods.

Certain beliefs can also torpedo attempts to provide effective PD opportunities for teachers. School cultures that invest in the belief that all practice is developed inside the classroom do not allow teachers to look outside for inspiration and answers to challenging problems. The belief that experience alone brings expertise does not allow teachers with more access to knowledge over years of experience to be recognized as experts. The belief that all teachers are equal is a huge obstacle to improvement because it invalidates the notion that teachers can and should learn from each other and from experts outside of the school. In order to improve student learning, people in schools must be willing to take on different roles and tasks. A lack of flexibility limits a school's abilities to grow. A culture of inaction or powerlessness in contributing the school's failures to outside factors can work against effective PD attempts as well (Elmore, 2002). The fundamental issue is that change in practice,

> …requires all people in the organization not just to do their work differently but to THINK differently about the nature and purpose of their work… requires a high degree of cooperation among people with diverse roles in deploying knowledge and skills necessary to help students with very different levels of interest prepare to meet common, high expectations for learning. (Elmore, 2002, p. 16)

Technology Integration and PD

Identifying the common elements of effective PD and integrating technology into those elements can make a significant difference in the professional lives of teachers. The affordances of modern technologies have expanded the abilities of teachers to take ownership of their professional progress, tap into the plethora of teacher learning communities that abound on the web, and take on leadership roles perhaps unavailable in their local communities of learning.

No longer a choice. Technology use not only provides teachers with access to other learners and practitioners; it also allows teachers to teach differently and reach more students. Even if teachers would like to ignore the possibilities held by the use of various technologies, their students are already immersed in them and teachers need to be conversant in the same language in order to provide effective learning experiences (Archambault et al., 2010). Waiting for more technology oriented teachers to enter the system through a natural progression is chancy since many of them are being taught by less tech-savvy professionals (Plair, 2008). Teachers need to learn not only what technology to use but when to use it, and how to use the technology to support learning. These decisions must be research-based and not made in solitary classrooms but through the collective knowledge of other users through failure and success (Lawless & Pellegrino, 2007; Wright, 2010).

Dede (2011) identifies several potential threats posed by the new educational technology models. Using technology may upset previous distribution models and affect expected remuneration and employment. Reliability and quality control can be difficult. Technology is ever evolving and requires constant updating of design and implementation. Another threat may be uncertainty about an effective system to evaluate and assess successful learning through technology (Keengwe & Onchwari, 2009).

The Role of Facilitator in Technology Integration PD

A common thread throughout the literature of effective technology integration and effective PD is the importance of the role of the facilitator or mentor. Plair (2008) sees the technology facilitator as a *knowledge broker*: "an intermediary to sort through a wealth of information about programs, tools, and web resources and to explain and demonstrate to them how to use it in a way that supports and enhances students learning and personal productivity" (p.71) This expert intermediary shares his/her knowledge through a variety of functions that Plair identifies. The *harbinger of innovation* is the facilitator who is constantly looking for innovations and the most current practice. He/she stays up-to-date by attending conferences and participating in networks of similarly minded innovators. The *master of strategies and techniques* is the expert in how to apply technology to content and pedagogy in the classroom. The *teaching artist* is able to easily explain the reason for using a particular technology, how it will fit current practice and what the advantages are to both student and teacher. *Johnny on the Spot* is the facilitator who can lend immediate support – whether technical or emotional – and assist teachers who need help in the classroom while using technology with their students. The last hat worn by the facilitator is that of *catalyst for change and unity*. Facilitators in this role work to connect groups of teachers with networked communities and urge teachers to take action through research and collaboration.

Other researchers offer their descriptions of facilitators or mentor-leaders. Kopcha (2010) describes the mentor as one who inspires teachers to take control of their own learning and technology by helping them deal with any obstacles they might encounter before becoming immersed in teaching with technology. Beach (2012) portrays the mentor as fostering new ways to view learning, outlining rules and expectations, communicating appropriately, encouraging significant participation, supplying pertinent resources and delineating collaborative roles and responsibilities within the group. Polly and Hannafin (2010) see the facilitator as *a more knowledgeable peer* who helps the learner by providing a *zone of proximal development* (Vygotsky, 1978) through collaborative planning and teaching. Mentors who develop a relationship with their mentees that allows for failure, risk-taking, open discussions and brainstorming play an important role (Glazer & Hannafin, 2006). Mentoring allows the teacher a chance to really look at his/her practice and through the lens of the mentor, then unpack and reflect on current practice (Hudson, 2013).

It is important that the facilitator or teacher-leader take an active role in establishing and supporting the ongoing PD and technology efforts (Cho & Rathburn, 2013; Glazer & Hannafin, 2006); however, as the teachers gain the knowledge and expertise to take control of their own learning, mentors must be ready to step back and allow new leaders to emerge and guide the group forward (Glazer & Hannafin, 2006; Hudson, 2013; Linder, Post & Calabrese, 2012). If mentor-leaders cannot deal with conflict, the ensuing tension may cause the relationship to collapse. Managing these relationships well is crucial since avoidance of conflict will cause less growth; meeting the conflict head on and dealing with it will bring more opportunities for growth (Glazer & Hannafin, 2006; McLaughlin & Talbert, 2006; Pareja Roblin & Margalef, 2013). Professional developers not only need to be able to manage disagreements among teachers, they

also need to be able to help shape a community of learners who are willing to experiment, fail and succeed while on their journey to improvement.

Contrary to traditional views of research and the researcher's role, Pareja Roblin and Margalef (2013) view the researcher in the role of facilitator or *critical friend* during a PD opportunity. The researcher must not only provide support through the planning, implementation, and evaluation stages, but must also serve as cheerleader, data collector, therapist, and insightful framer of the important questions. Active involvement is essential.

Online PD

Going beyond the model of the integration of technology into the current classroom, the use of technology for online PD can create a learning environment for teachers that has never been possible before. A review of online PD research shows the benefits of online PD versus face-to-face PD are numerous. With no additional expenses for accommodations or transportation, online PD can be more cost effective and allow more teachers to participate. Teachers can connect with experts in their respective fields who would not otherwise be available. Online PD is available in a timelier fashion, often just-in-time, rather than when a meeting, conference or workshop can be scheduled. Teachers can use specific classroom related topics and projects to incorporate their learning into actual practice. Online PD can last up to months or even years if needed. Online PD and learning can take on many forms: free coursework through Massive Online Open Courses (MOOCs), short courses through low cost professional development sites, online university programs, podcasts, videos, interactive websites, game development sites, free and low cost webinars, e-zines, and even specific apps for PD. One of the most effective forms of online PD is participation in an online professional learning community or PLC (Beach, 2012).

Online Professional Learning Communities

One of the benefits of online learning is the availability of professional learning communities (PLCs). Effective professional learning in schools is promoted through local learning communities and collaborative groups. These school-based PLCs can help generate a cultural shift where teachers take on the responsibilities for student growth and learning through collaborative research and collective inquiry (Beach, 2012; Linder et al., 2012; Richardson, 2011; Vescio et al., 2006; Wei et al, 2010). If a school-based PLC stays only within the walls of the school however, it limits its ability to grow and improve practice. A connection to broader networks is essential (McLaughlin & Talbert, 2006). The Internet can provide this important bridge for traditional PLCs in schools. Online PLCs provide a central forum for knowledge construction through discussion, engagement, and teamwork (Beach, 2012; Salazar, Aguirre-Muňoz, Fox, & Nuanez-Lucas, 2010). They also allow for critical reflection on individual and shared practice. Teachers can take on common issues and share resources, ideas, and encouragement through the online PLC (Linder et al., 2012; Salazar et al., 2010).

Online PLCs, Communities of Practice (CoPs), Networks, and Collectives

Online PLCs, CoPs, networks of practice, and collectives share many common characteristics. All four groups evolved out of a recognized shared need to learn from and with each other. It is through effective interactions with each other that its members have built connections that propel the group forward (Enthoven & Burijn, 2010). Lave and Wenger (1991) identified the CoP and its structure that allows members to join first as *legitimate peripheral participants* and then follow the novice-apprentice-expert cycle of learning and mastery. According to Riel and Polin (2001) these communities of practice may have different structures and purposes: *task-based*, *practice-based,* and *knowledge-building*. Online CoPs facilitate

member's interactions and abilities to incorporate diverse groups across geographies and time (Riel & Polin, 2001). These affordances can improve teacher practice. The benefits of online CoPs include the promotion of pro-social behaviors and willingness to contribute to the group. Belonging to the community can give members great pleasure. Members build self-confidence and anticipate successful implementation of shared practices (Tseng & Kuo, 2013).

There are several reasons for teachers to participate in an online community. CoPs provide a chance for members to share both positive and negative emotions, which serve as reinforcement to continue in the group. Because the online CoP is not local, often members feel less reticent to share local issues. Members look for different viewpoints from other members not situated in their same environment. Some members choose anonymity and the privacy offered by sharing without fear of reprisal. Online CoPs can help fight the sense of isolation that teachers may feel either from actual geographic separation or perhaps a lack of time or someone to understand their position. Investigating real-life situations of others and learning from others' experiences builds a sense of solidarity and friendship (Hur & Brush, 2009).

Networks of practice are different from CoPs in several ways. Whereas a CoP is rather tightly knit, networks are more loosely woven and are often made up of strangers (Wasko & Faraj, 2005). In CoPs, practitioners have confidence in each other and have communal activities and goals (Wenger, 1998). In electronic networks of practice, participants share knowledge because they feel it increases their status within the network and also because it feels good to share with others. Contributors may have very different needs and goals (Wasko & Faraj, 2005).

Collectives are even more loosely knit than networks of practice. They do not require an axis but allow participants to vary their levels and lengths of interaction with the network. "People are free to move in and out of the group at various times for various reasons, and their

participation may vary based on topic, interest, experience or need" (Thomas & Brown, 2011, Learning in the Collective, para 1). New technologies are allowing more *peer-to-peer learning* and the collective is one way to connect people who share certain tenets about the world.

Whatever the structure of the online learning community, specific goal oriented PLCs, tightly knit CoPs, loosely connected electronic networks of practice, or collectives, the benefits of these online learning communities are similar. These communities offer greater opportunities for knowledge construction though collaboration. They provide resources and support not found in local communities and a plethora of tools for professional improvement. They offer teachers a chance for reflection and self-assessment to improve their practice within a safe, non-threatening environment (Archambault et al., 2010; Greenhow et al., 2009; Killion, 2011).

Teacher Acceptance of Online PD

It is one thing to recognize the enormous potential of online learning communities and online PD for teacher growth and improvement; it is another to foster teacher acceptance of online learning communities as effective PD tools. Teachers need to become familiar with the advantages offered by online PD. They need to see the "…highly dynamic and interactive learning applications that allow learners to design their own learning pathway, manage and select their own content, co-construct understanding, demonstrate competencies and generate networks for ongoing learning" (Killion, 2011, p. 3). Besides the teacher-centered advantages of online PD, Web 2.0 networking tools decentralize knowledge and make resources available to everyone (Greenhow et al., 2009).

Social connections. Users of networked communities gain status through *social capital* (Wasko & Faraj, 2005). Social capital is loosely defined as the amount of shared connections or positive relationships a participant may have (Choi & Chung, 2013; Pil & Leana, 2009; Wasko

& Faraj, 2005). As opposed to *human capital* or expertise in the classroom, social capital grows as participants contribute to the knowledge of the group. Students of teachers with strong social capital benefit from the teachers' exchange of ideas and resources (Pil & Leana, 2009). When co-workers are successful, the others in the group may experience a *spill-over effect* (Wei et al., 2010).

If social capital has a positive effect on student learning outcomes, then how can teachers and professional developers use technology to enhance social capital? The answer may be in the use of online social networks such as Facebook, Google+, Linked-in and Twitter, to name a few (Wikipedia.com lists over 200 social networking sites, excluding online dating sites). Similar in some ways to electronic networks of practice, social networks can provide a rich variety of social capital and community building activities. Social networks can be used to sustain and cultivate knowledge, discover and correct problems, establish productive links and bonds, and do so efficiently. One of the most beneficial aspects of the use of social networks in organizations is the inherent ability to quickly address changes in the community (Derven, 2009).

As a learning tool, social networks can connect learners to new resources, help the group collaborate on decisions about emerging issues, and serve as a coaching and mentoring tool. Social networks can also support differentiated learning and various generational perspectives. Although there are potential dangers to the use of social networks in organizations, these dangers can be reduced by the establishment of policies for use along the lines of the existing philosophy of the group (Derven, 2009). The immediacy of response and feedback as well as the flexibility of roles among users also contribute to the effectiveness of social networks for learning and collaboration (Archambault et al., 2010).

Technology acceptance model. Social networking is sometimes possible through the effective use of technology. In order to for teachers to be involved in a social network, it is imperative that they feel comfortable in the adoption and use of social networking technology. Smith and Sivo (2012) used an expanded model to predict the continued use of online teacher PD. The original technology acceptance model looks at the effect of *Perceived Usefulness*, and *Perceived Ease of Use* on a user's belief about and intention to use technology. Researchers Smith and Silvo added two more elements to expand the model: *Social Presence* and *Sociability*. Social presence is the feeling that others online are real or present. Sociability deals with how much the online environment encourages engagement and teamwork. The findings of their study suggest that all four elements affect teacher beliefs and intent to continue using online PD. The most salient feature however was *Perceived Usefulness*. The researchers also suggest ways to build a successful online group: use technology that requires little effort to learn and operate; focus on the authentic connection to the teachers' classrooms; promote easy social engagement; and facilitate the exchange of successful adaptions for different classrooms.

Other researchers have also used the technology acceptance model with additional constructs to investigate predictors of technology use. Cheung and Vogel (2013) added "compatibility, perceived resource, self-efficacy, sharing and peer influence" (p. 172) to a study of collaborative technologies. They found that while *attitude* is still the most substantial factor (Davis, 1989 as cited in Cheung & Vogel, 2013), *peer influence* is also important as are *perceived ease of use* and *compatibility* with already familiar technologies. In order to promote Twitter as a PD tool, there must be a tie-in to the model. Researchers should be aware of the importance of attitude, peer influence, perceived ease of use, and perceived usefulness in the user's adoption of technology.

Twitter as a PD Tool

If social networks abound on the internet and are used for a variety of collaborative exercises, what makes microblogging and Twitter, in particular, an effective PD tool? The answer may lie in the multiple functions of Twitter for communication, the immediacy of connections, the perceived ease of use, and the mobility of access technology. Twitter use has been shaped by its users, not formulated by the company, and its use varies from the mundane to the academic.

Background. Since its October 2006, San Francisco launching under the name of Obvious, Twitter has allowed its users to delineate how the microblogging social network is to be used. The company has changed very little. It is the users who have added utility functions to catalogue, screen and re-send the constant flow of communication (Drapeau, 2009; Honeycutt & Herring, 2009; Van Dijck, 2013). By 2008, Twitter had become the most widely used micro-blogging platform (Williams, Terras, & Warwick, 2013). In late 2008, the *trending topics* feature was added. In late 2011, the company added a *connect* button, *re-tweeting* (RT), and a *discover* function (Van Dijck, 2013). The popularity of Twitter stems from its effective support of dialogue and collaboration, not from its use by big brand corporations and entertainment superstars (Jenkins, Ford, & Green, 2013). In comparison to blogging, micro-blogging is faster, easier to update, and more succinct because of the restricted number of characters allowed in the post (Java, Song, Finin, & Tseng, 2007).

Users and uses. The first *early adopters* of Twitter were older adult (35+) professionals (Van Dijck, 2013), although at present 63% of users are under age 35. Five percent of all users are responsible for 75% of all tweets. There are slightly more women (53%) than men (47%) on Twitter. (Sysomos, 2014). Users can be divided into *followers* or *friends*. Although all Twitter

users have followers who are connected publicly; Twitter users may also have actual friends on Twitter who form more of a social network. When compared to Facebook users, Twitter users are more concerned with what is said than who is saying it (Hughes, Rowe, Batey, & Lee, 2012). Tweeters may have various roles, but the principal ones are: information contributor, friend, or information pursuer (Java et al., 2007). The types of messages shared on Twitter reflect these roles. Messages may include criticisms, grievances, views, updates, questions, reflections, stories and responses to others (Ebner et al., 2010; Marwick & boyd, 2010; Naaman, Boase, & Lai, 2010). To highlight the evolution of Twitter, the company changed its opening question from "what are you doing?" to "what's happening?" in November, 2009 (Stone).

The technological benefits of Twitter include its mobility and easy access in real-time, its conciseness, and its cost. By seeking information from other people, researchers and practitioners alike can keep abreast of the latest work related trends and breaking news (Zhao & Rosson, 2009). Tweeters have transmitted the political happenings of the Arab Spring in 2010, as well as the Occupy Movement and Japanese earthquake and subsequent tsunami in 2011. The dangers of the *Twitterverse* lie in that one small group of very well connected users can manipulate and influence opinion and action. Unlike the mainstream media that filters news through journalistic lenses, Twitter users gain followers through carefully orchestrated control of their messages (Van Dijck, 2013).

Twitter and learning. Twitter has been the focus of a great deal of academic research since 2007. Most of the research has examined either the user (profile, followers, number of tweets) or messages (language, dialogue, semantics). Other areas of study include the technology (hardware) of Twitter and how Twitter may be used in particular settings (Williams et al., 2013). Several studies have looked at Twitter use for learning in educational settings. Two

important threads have developed around Twitter use: learner interaction and learner identity (Greenhow et al., 2009). In the academic world, "Twitter serves as an emerging and evolving network of scholar-learners where scholarly practices can be created, refined, performed, shared, discussed, and negotiated" (Veletsianos, 2012, p. 337).

Active learning. Twitter use has an effect on *who* participates and *when*, *how*, and *what* can be learned. Participants can be from anywhere in the world. The rapid interaction among contributors makes for dynamic conversations and sharing of resources. Learning can happen anywhere via Twitter. Mobile and multiple accesses through Twitter allow learners to make the most of idea exchanges and just-in-time corrections or assessments. Twitter users can reduce the sense of isolation, common to many teachers, through social interaction and an increased sense of belonging to a learning community. Twitter users are not restricted in what they choose to learn since collaborators can provide many additional resources. Twitter also offers learners a chance to meet and work with experts in different fields (Gao et al., 2012). Tweeting encourages others to continue engaging in conversations. This active learning engagement is key to peer-to-peer learning and teamwork. Learners explore, organize and use their new knowledge in real-life situations. As a classroom tool, live tweeting can provide immediate responses and focus class attention on what is being said (Kassens-Noor, 2012).

Twitter use for learning is process-oriented and takes a constructivist approach. Teachers' roles change from *sage on the stage* to *guide on the side* (Ebner et al., 2010). Educators may engage in a variety of activities that range from contributing resources and information to managing their digital identities and providing social commentary (Veletsianos, 2012).

Twitter and social connections. Building bridges to other educators is an important component of building social capital for teachers. Twitter can help teachers link to other learners

who have new ideas and more developed tools. Teachers use Twitter differently in the sense that they are constantly looking for ways to improve their practice. Their messages are less about their personal lives and more focused on professional and practical applications to their classrooms (Forte et al., 2012). Twitter opens up the connections necessary for teacher growth and can rally others around a central cause (Williams et al., 2013). These informal conversations can increase social presence as well. Learners connect on a more emotional level that allows for sharing, brainstorming and collaborating within the setting of the online learning community (Dunlap & Lowenthal, 2009).

Audience and identity. Twitter use provides the learner with a different kind of audience from traditional broadcast outlets. Marwick and boyd (2010) name this an *imagined audience*. Since the identity of a Twitter participant is revealed through written language rather than a visual image, the audience identity must be drawn from clues imbedded in posts. The actual audience may be very different from the imagined one. Twitter posts must be carefully constructed to reach the right balance between private and public information. With so much opportunity for communication, users must be sure their message(s) are not misunderstood within the context of their audiences. In order to seem "real" to others, Twitter users offset the risk of being seen as lacking authenticity by carefully censoring themselves (Marwick & boyd, 2010).

Twitter as PLC. Twitter can be and is being used as a platform for communication within PLCs. For the purpose of sharing ideas, resources, concerns, and tools, as well as working collectively around practice and student improvement, Twitter has the potential to foster a peer-to-peer revolution in education (Dobler, 2012; Forrestal, 2011; Forte et al., 2012; Trinkle, 2009).

With a shared interest in educational reform, tweeting educators who are receptive to change and willing to take on leadership roles, can make a difference with this technological tool.

Benefits of Twitter use for teacher learning. Twitter use as a PD experience can help teachers make connections to their own classrooms by personalization of the learning content and context. Twitter can be used for amassing useful information and resources, searching for or expressing opinions, liberating stress, maintaining relationships, collaborating on student improvement initiatives or reflecting on one's own practice through the perspectives of others (Gao et al., 2012; Zhao & Rosson, 2009).

Barriers to effective use. There are several barriers to effective use of Twitter as a PD tool. First-time users of the technology need to get familiar with its use and become comfortable with the limitation of characters as well as the immediacy of the communication. The mere quantity of possible connections via Twitter can be intimidating and difficult to decipher without guidance by more experienced users (Gao et al., 2012). Teachers may view Twitter as a shallow social media tool rather than a powerful learning tool (Forte et al., 2012). Learners may lack the necessary language skills or commitment to an online context (Chen & Chen, 2012). Privacy is an issue that must be discussed since Twitter is a very public space. Some school policies and mindsets about the use of technology may cause difficulties as well (Forte et al., 2012).

Summary

In order to become accomplished educators and mentors, teachers must become life-long learners. Many present-day professional learning experiences for teachers are available online 24 hours a day, every day. The importance of effective professional learning for teachers is supported by the literature. In this chapter the researcher reviewed the studies that identify recent efforts in reform PD as well as the stages and factors in successful PD. The importance of

technology integration, the role of the facilitator, and the wide-spread use of online PD through professional learning communities are also discussed. The importance of social connections and the development of social capital are also stressed in the literature.

A discussion of the possibilities of using Twitter as a PD tool rounds out the chapter. Ownership of self-directed learning through collaborative practices and exploration is possible through the use of Twitter as a professional learning tool (Junco et al., 2013). Twitter use can be customized to meet teachers' different learning preferences and situations. Of the nine characteristics of effective PD uncovered in the literature (see Table 1), Twitter use for PD can be adapted to match most of them. By focusing on student and teacher learning through an emphasis on authentic teacher activities in the classroom, teachers can find Twitter groups that align to their beliefs and needs. Twitter participation can and should take place over time in order for learning and sustained change to occur. Collaboration and professional support are essential factors of Twitter use. Reflection and self-assessment are easily supported by an effective Twitter group. Teachers can evaluate their own effectiveness as teachers through discussions and peer reviews. Teacher Tweeters are active members of their communities and advocates for growth and improvement and those teachers who do not find a community that meets their needs can create their own in Twitter. The chapter ends with a discussion of possibilities for using Twitter as a PD tool and helps illuminate how previous research on effective PD can be used to guide the development of a new model of using Twitter.

Chapter 3: Methods

This developmental evaluation research design (Patton, 2011) originally incorporated a mixed-method approach through the collection of both quantitative and qualitative data to determine the value of the use of microblogging technology as a professional development support tool for K-12 teachers in their own professional learning. However, the quantitative survey was only answered by one participant. The survey contained qualitative open-ended questions and the answers to those questions on the survey were included in the analysis. Because of the lack of participation on the quantitative survey, the results of the study are informed by qualitative data only. This data includes: participant tweets, Twitter groups and individuals followed by the participants, open-ended survey answers, peer group interview results, and the researcher's notes. This study explored the following research questions:

1. How did participating teachers use Twitter as a PD tool during the 12-week PD experience?

    1a. What did this experience look like: collaborative team, learning community, network of practice, community of practice, or collective?

    1b. Was there evidence of participants using this PD tool to improve their practice?

2. What was the perception of participating teachers about Twitter as a PD tool?

    2a. Did teachers find Twitter effective for PD?

    2b. Did teachers find Twitter effective in directing their own learning (as a personalized PD tool)?

Philosophical Assumptions

The *Social Constructivist* (Creswell, 2009) holds the view that individuals develop or *construct* their knowledge of the world around them through interactions with other people. In research this focus allows the researcher to engage in the social process in order to understand the participant's view of the situation (Creswell, 2009). This strategy of inquiry is termed *The Constructivist Paradigm* by Guba and Lincoln (1989) who argue that "it is impossible to separate the inquirer from the inquired information. It is precisely their interaction that creates the data that will emerge from the inquiry" (p. 88). Consequently, the researcher's philosophy affects his/her choice of methodology.

Developmental Evaluation Research Design

According to Patton (2011), "Evaluation is an applied inquiry process for collecting and synthesizing evidence that culminates in conclusions about the state of affairs, value, merit, worth, significance, or quality of a program, product, person, policy, proposal, or plan" (p. 3). Evaluations are usually done either to identify where a program needs improvement or to find out the overall significance of the program to the entity requesting the evaluation (Davidson, 2005). Gray (2009) identifies over 22 different types of evaluations with varying focuses.

For this research project, the researcher has chosen the developmental evaluation research design that corresponds in many ways to what Gray (2009) terms *Responsive Evaluation*. This type of evaluation is more focused on what happens during the process and how the participants see themselves in it. Responsive evaluation may include adaptations based on the changing situations of the participants. In some ways this evaluation is a *Process Evaluation* that focuses on the participants' experience and how to improve the process being evaluated.

Developmental evaluation is not the same as formative evaluation. While formative evaluation focuses on an existing model with the intention of improving the model, developmental evaluation is more explorative and may change as needed depending on how the experience evolves (Patton, 2011).

Developmental evaluation is an ongoing evaluation with the evaluator immersed in the proceedings in order to learn, not judge (Brodhead, as cited in Dozois, Blanchet-Cohen, & Langlois, 2010). Developmental evaluation is best used when innovation and flexibility are needed to actively shape the learning process. When real-time and collaborative learning are required as the process develops, developmental evaluation is the best fit. "Developmental Evaluation is designed to be congruent with and to nurture developmental, emergent, innovative, and transformative processes" (Patton, 2011, p. 7).

The Role of the Developmental Evaluation Evaluator

The role of the *evaluator* in this research design is significantly different from the role of evaluator in traditional evaluation research designs. The role of the evaluator in a developmental approach is to actively follow the participants and pose questions to help them assess their actions and decisions (Patton, 2011). The evaluator also helps participants create strategies for continued growth and learning. As a facilitator, the evaluator helps the group capture the narratives of the learning experience and engages them in meaningful discussions of the process.

This role description dovetails with descriptions of cognitive apprenticeships and effective facilitators of PD in the literature. The facilitator's active involvement in knowledge sharing, support for ongoing learning, promotion of collaborative processes, and just-in-time formative assessment is central to PD success (Beach, 2012; Cho & Rathburn, 2013; Glazer & Hannafin, 2006; Kopcha, 2010; Plair, 2008; Polly & Hannafin, 2010).

Qualifications of the Developmental Evaluation Evaluator

Dozois et al. (2010) identified several characteristics that are essential to the role of the evaluator. The effective evaluator asks incisive questions, helps the group make the most of their expertise, encourages members to identify areas of further study, and supports the group work rather than push his/her own preferences. The evaluator works as a member of the team and is embedded in the process. The importance of the facilitator's ability to facilitate and manage conflict and shape a community of learners is also prominent in the literature (Glazer & Hannafin, 2006; McLaughlin & Talbert, 2006; Pareja Roblin & Margalef, 2013).

Online coaching by the researcher included technical support in using the technology (micro-blogging) and content support in terms of possible links to websites, learning communities, videos and other support materials for each teacher's stated PD goal. This type of coaching is supported by the cognitive apprenticeship model which includes *coaching, modeling, scaffolding, articulation, reflection,* and *exploration* (Brown, Collins, & Newman, 1989). The researcher's consistent support was also important to help participating teachers avoid the *withdrawal* stage of the learning cycle (Brody & Hadar, 2011).

Participants

The group of participants for this study was a volunteer group of faculty members of a private K-12 English language school. The workshop was offered free of charge to the participating school and its faculty. Initially, it was thought that it would be ideal to have 10 to 15 faculty members participate, however, the actual number of participants was four. Although conducting PD in a school setting allows the participants to discuss problems affecting teachers across subject and grade levels as well as specific groups within the school, the effect of being in the school was somewhat lost because of the summer break. The camaraderie of the group that

can help keep the group work going, as members boost each other's knowledge and confidence, was also missing because of lack of contact (Lee, 2005). Not all participating teachers had a technology background; however, the teachers needed access to a smart phone, tablet or computer (or any combination of the three) in order to participate in the 12-week long process. There was no prerequisite age or number of years of teaching experience. Participants provided feedback on the workshop experience, the use of the microblogging technology, and the overall learning experience (See Appendix A for the specific timeline of the study).

Sources of Data

"Developmental evaluation does not rely on any particular method, design, or tool…can include any kind of data…, any kind of design…, a variety of measures…, and any kind of focus" (Patton, 2011, p. 307). Given the broad range of choices, the sources of data are determined by the setting and specific needs of the group. Open-ended survey question answers, tweets, groups followed on Twitter, and peer group interview responses were used along with the researcher's notes. See Table 2 following the descriptions of each data set.

Survey. Participants were asked to evaluate the PD experience via a survey evaluation administered through *Qualtrics,* an electronic survey tool. Items on the survey reflected the results of the researcher's literature review on effective PD. The survey combined closed-end and open-end questions about the experience. The survey was validated and piloted to insure accessibility, ease of use, and legibility, and was administered two weeks after the PD experience. The online survey link was sent to all workshop participants via the school email (See Appendix B). Only one participant answered the online survey.

Focus Group Interview. A focus group interview of three of the four participants was conducted by the researcher at the end of the 12 weeks to capture the participants' experience of

the learning process. As suggested by Creswell (2009), the researcher prepared five questions with five or more follow up probes. The focus group was videotaped, transcribed and coded according to standard coding practices (Saldaña, 2009). The purpose of this focus group was to draw out various perspectives from the teachers involved (Creswell & Plano Clark, 2011; See *Proposed Data Analysis*). The focus group interview transcript was analyzed by dividing participant statements into either a description of how they used Twitter (RQ1) or how they perceived Twitter as a PD tool (RQ2). The Focus Group Interview Protocol is included (See Appendix C).

Tweets. Individual participant's posts as well as the groups or individuals followed by each participant were used for analysis. Coding for emergent themes and prevailing sentiments formed part of the overall analysis of the use of this technology for PD. An analysis of the number and types of tweets as well as the duration of posting during the experience was also analyzed. Although the use of *HyperRESEARCH* software was first proposed to facilitate the coding process for the microblogs, the small amount of data obtained did not require the use of software and the researcher chose a manual method instead. (Saldaňa, 2009).

Researcher's Notes. As both researcher and facilitator for this learning process, it was important to record the ongoing process of providing feedback and varied support to understand the intervention. This written account of researcher tweets and direct messages showed events, strategies, and support techniques to help the researcher keep track of how the learning process developed (Bazeley, 2007). The researcher referred to the cognitive apprentice framework model which includes *coaching, modeling, scaffolding, articulation, reflection*, and *exploration* (Brown, Collins, & Newman, 1989) to support the PD process. The researcher developed a template but found that using a Twitter application called Tweetbook to capture all of her tweets

from May 25th to September 18th was more efficient. Memos and notes about each participant's progress were recorded in a separate notebook and completed the information to understand the process of the intervention.

Table 2

Research Questions, Data Collection, and Data Analyses

Research Question	Data Collection	Data Analysis
1) How are participating teachers using Twitter as a PD tool during the 12-week PD experience? 1a) What does this experience look like: collaborative team, learning community, network of practice, community of practice, or collective? 1b) Is there evidence of participants using this PD tool to improve their practice?	Survey Evaluation Open-ended questions Posted Tweets/Groups Followed Focus Group Interview Researcher's Notes	Coding for emergent themes Descriptions of groups and individuals followed Discussion
2) What is the perception of participating teachers about Twitter as a PD tool? 2a) Do teachers find Twitter effective for PD? 2b) Do teachers find Twitter effective in directing their own learning (as a personalized PD tool)?	Survey Evaluation Open-ended questions Focus Group Interview	Coding for emergent themes Descriptions Discussion

Professional Development Workshop and Introduction to Twitter

Participants in this workshop worked through a series of activities that helped them recognize effective forms of PD and factors affecting professional learning. Participants looked

at Twitter as a viable form of effective PD and then focused on personalized professional development goals. In order to personalize the PD activities, an open ended questionnaire about teachers' professional concerns, professional learning interests, technological expertise and demographic information was emailed to them before the start of the initial workshop (See Appendix D). This information was for the researcher to be able to understand the personalities, perceptions, and needs of the participants in the context of their school community. This orientation is essential for building a successful relationship with the participants (Dozois et. al., 2010). The facilitator also seamlessly modeled a variety of technological tools for teacher use in the classroom during the presentations and subsequent group exercises.

Professional Development Workshop Design

The PD Workshop consisted of four basic activities divided into 1.5 – 2.5 hour slots delivered over the course of two days. The workshop was actually offered twice. The first workshop was given at the end of the school year as two four hour sessions on separate days. The second workshop was offered during summer school, again as two four-hour sessions on two separate days. The second workshop was abbreviated somewhat since the attendee was already familiar with the use of Twitter and did not need extensive practice (See Appendix E). The workshop design and activities were validated by an expert panel (Judges' Panel) in the area of workshop design and professional development (See Appendix F).

Human Subjects Considerations

This research study focused on adult professional educators. All of the data has been stripped of identifying markers. This research neither presented more than minimal risk to the participant nor would the disclosure of the data outside the study place the participants at risk of criminal or civil liability or damage to their financial standing, employability, or reputation; and

no deception was used in this study. The Institutional Review Board (IRB) category was *Exempt* under Regulation 45 CFR 46.101(b)(2).

Permission from the K-12 private school providing access to the subjects was obtained and evidenced in writing (See Appendix G). Informed consent of the participants was obtained in writing for the focus group interview (See Appendix H). The electronic survey contained a consent action and all participants were given an information sheet explaining the entire study (See Appendix I). The risks associated with this research included frustration in learning how to use a new technology (See Appendix J). The researcher was available for the entire 12-week program to lessen the participants' frustration by providing online coaching throughout the process. Benefits from the study, as a PD activity, included the learning of new techniques for developing personalized professional goals as well as learning how to use new technological and collaborative tools. Information from this study also added to existing literature and may benefit other teachers in the future.

Participant anonymity was provided by the use of Twitter "handles" online and corresponding pseudonyms for reporting. Twitter does not require real name use in establishing an account. The key to the handle-pseudonyms is being kept in a password-protected computer. Audio and video recordings of the focus group interview are also stored in the same password protected computer and have been erased completely from the original recording device(s). Findings have been reported with anonymity of the participants in the study since the Twitter handles are not being used for reporting purposes.

Ethical Issues

Although the researcher has stripped all identifying information to avoid any disclosure of participant information and stored all pertinent keys in a password-protected computer, the

primary learning tool in this study is a publicly viewed social network tool. The issue of public access and subsequent security issues was addressed during the workshop and carefully monitored by the researcher.

Data Analysis

Quantitative data. Although the researcher proposed a mixed-methods approach to this study, the lack of more than one response to the online quantitative *Qualtrics* survey did not allow the results to inform a quantitative evaluation of the PD experience and the use of Twitter as a PD tool. However, the open-ended survey question answers by one participant were included in the qualitative results.

Qualitative data. The researcher culled data from the participants' tweets, groups followed, open-ended survey answers, and the focus group interview. The focus of this study was on the participants' experiences while using microblogging technology, therefore a variety of cognitive, affective, and social codes were anticipated. According to Saldaña (2009), it is often best to keep one's options open in terms of coding during the initial data collection because of the emergent quality of the material; however, the researcher did use coding as appropriate to capture the experiences of the teacher participants. Notes from the Researcher's Notes were also used in the description.

Means to Ensure Study Reliability and Validity

In order to determine the effectiveness of the PD experience, the researcher had to first characterize effective PD. After thoroughly researching the topic (see discussion in Chapter 2), the researcher developed a list of nine characteristics of PD (see Table 1). This list was then validated by members of the professional development community.

In order to insure the reliability of the survey, the survey was reviewed by experts in the field of professional development and piloted to insure accessibility, ease of use and legibility. The small number of participant answers (one) did not allow the results to be generalized to a larger population (Dane, 2011).

There are several ways to provide reliability and validity in a qualitative study. In order to ensure reliability in the coding process, the researcher used an additional coder to cross-check and compare the codes for *inter-coder agreement.* The input of the additional coder helped the researcher create more specific descriptions of the tweets posted by the participants. The researcher found that the codes corresponded to those suggested by the literature (Gao et al., 2012; Zhao & Rosson, 2009). Validity strategies included *triangulation* of the findings from tweets, survey answers, focus group interview results, and the researcher's notes. The researcher also used *member checking* by taking the finished analysis back to the group to share and collect comments from the participants (Creswell, 2009). The researcher has further increased the validity of her findings by presenting any negative information that may run counter to a recurring theme. The amount of time spent in engagement during the study also contributed to the validity of this qualitative study. This study took place over a time span of four months, adding validity to the findings (Creswell, 2009; Guba & Lincoln, 1989).

Reported Findings

This developmental evaluation research design provided a rich description of how the participants used Twitter as a professional development tool as well as an evaluation of the PD experience. Chapter 4 includes this evaluation along with the emergent themes of the study as well as the stories and experiences of the participants. The researcher also compared her findings about the participants' experiences to the nine characteristics of effective professional

development as discussed in Chapter 2 in order to evaluate the effectiveness of the tool for each one. Chapter 5 includes conclusions from the findings about the effectiveness of Twitter use for PD from the teacher perspective, recommendations for professional developers using Twitter, and suggestions for further study.

Chapter 4: Results

In order to capture the experience and perceptions of the four study participants, the researcher analyzed various sources of data: participant tweets, Twitter groups and individuals followed by the participants, open-ended survey answers, peer group interview results, and the researcher's notes. This chapter presents the results of this analysis focusing on answers to the two research questions, and also connects these results to the characteristics of effective professional development.

Part 1: Research Questions Answered

The first overall research question was: How did participants use Twitter during the 12-week PD experience? In order to answer this question, the researcher looked at the number and nature of actual Twitter posts of the participants and the types of groups each participant chose to follow.

Tweet analysis and usage. This analysis looks at the number and types of tweets produced by each participant as well as the number and types of groups followed by each participant in order to get a view of each participant's use of Twitter. In order to insure anonymity yet still provide a way to identify each participant, the researcher has labeled them Participant One, Participant Two, Participant Three, and Participant Four. These labels correspond to a scale of one to four: one representing the least amount of participation and four representing the greatest amount.

Participant One actively participated in the workshop and generated seven tweets as part of the workshop. She did not continue using Twitter. She followed only the initial members of the study (workshop participants and the researcher) and no groups. This lack of continued participation shows that she did not find value in using Twitter as a professional tool. To further

validate this analysis, during her participation in the peer group interview she revealed her reluctance to use any social media tools and felt overwhelmed by the tasks involved in keeping up with the tools.

Participant Two actively participated in the workshop and generated nine tweets directly related to the activities of the workshop. She continued tweeting for one week. Her tweets involved: showing concern for others (1); asking for information from an expert (1); sharing resources (2); and practicing (1) for a total of five additional tweets. Participant Two followed one educational group and two experts in education in her particular field as well as the study group members and the researcher for a total of seven groups/individuals followed. She made an effort to use Twitter as a PD tool but was sidetracked by vacation and a lack of practice with the tool. Attempts by the researcher to contact her by Twitter were fruitless since she did not log back in.

Participant Three also actively participated in the workshop and produced seven tweets during the workshop. She continued to use Twitter for the next five weeks. Her tweets involved: showing concerns for others (5); sharing resources (4); and making a political/social statement (1) for a total of 10 additional tweets. Participant Three followed five educational groups and one education expert as well as the study group members and researcher for a total of 10 groups/individuals followed. She was on Twitter long enough to follow Participant Four who joined during the second workshop series. Participant Three was conscientiously involving others in the professional learning process by checking on their welfare and sharing resources she felt were of value. She communicated with the researcher until July when she disconnected for summer vacation.

Participant Four attended the second workshop series. She then actively tweeted for five weeks. Her tweets involved: showing concern for others (3); sharing resources (29); requesting information from experts (2); sharing information on technology use and integration (7); making political/social statements (4); motivating others (2); and promoting professional development (2) for a total of 49 tweets. This participant also followed a variety of groups: eight related specifically to her content area; eight professional learning communities; six educational technology communities and experts; six individual teacher experts, and one educational news group for a total of 33 groups/individuals. Participant Four was very active and attempted to involve others in the study group in professional learning. She responded to the researcher's mini-assignments and support, often retweeting posts of value to her.

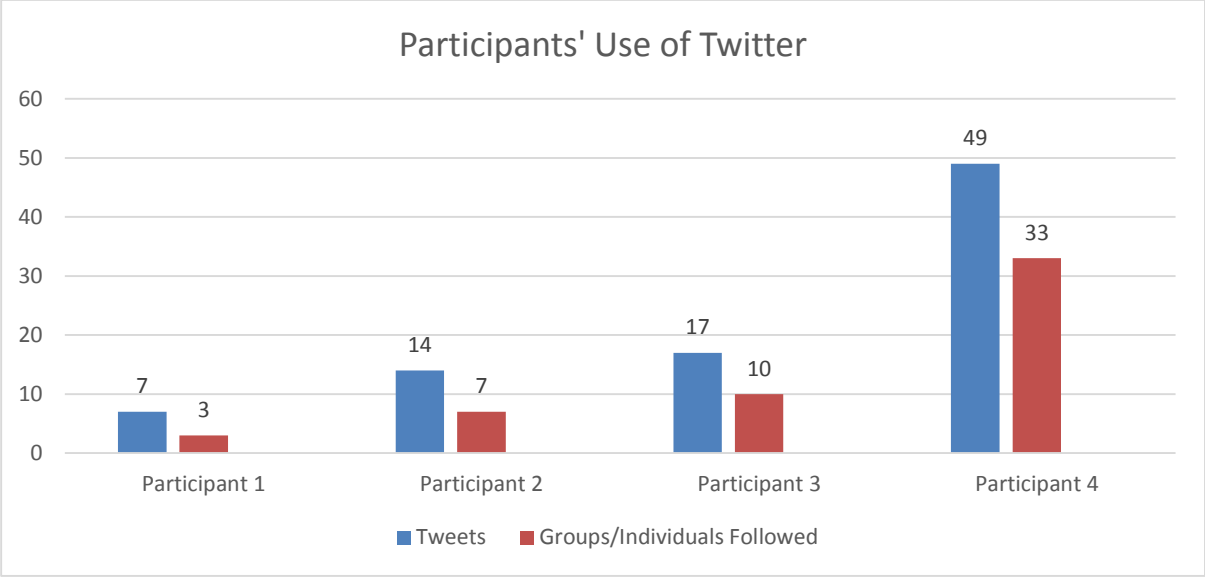

Figure 1: A visual representation of the participants' tweets and groups followed.

In summary, the actual participant use of Twitter for PD during the 12-week experience varied widely. An analysis of the posted tweets and groups followed by each participant revealed that Participant One did not continue using Twitter after the initial workshop. Participants Two

and Three produced a small amount of tweets over a short duration, one week and five weeks respectively, and followed a few groups/individuals other than the study participants. Participant Four actively tweeted and produced a relatively large amount of tweets, 49, and followed 33 groups/individuals over the duration of five weeks. Although none of the participants continued with the study past the five week disconnect of summer vacation, Participant Four began using her personal Twitter account for professional learning when she was given a new position at the school.

An analysis of the types of groups/individuals followed by each participant shows that, excluding Participant One, they were indeed involved in professional learning. Each participant chose groups and/or experts that were related to her stated professional learning interests.

The second overall research question asked: what was the participants' perception of Twitter as an effective PD tool? In order to answer the second research question, the researcher met with three of the four participants who were able to attend a peer group interview.

Perception of Twitter use by participant. Although Participant Three did not attend the peer group interview, the three other participants shed light on their own use of Twitter.

Participant One expressed a lack of knowledge and a bit of confusion about both creating a tweet and the use of hashtag groups. She did receive notifications from Twitter but was not sure if the feeds were from Twitter or one of many other notifications she receives daily. "I think in my case I have this reluctance to social media in general. And because of that I just don't gravitate to social media…I get stressed out because I know I'm missing out on so many things."

Participant Two was initially excited about using Twitter but then went on a trip for summer vacation and forgot about using the tool. She admitted that, as with any technology, she

needs to continually use the tool in order to be proficient and she stopped using Twitter before she became proficient. She had some difficulty with linking the Twitter notifications to her cellphone e-mail. When she did return to check her account, she had received tweets from people she had previously contacted. As a language teacher, she also expressed that often the websites and links available are not related to her class. The language is the same but the vocabulary and concepts differ. The resources have to be adapted for her use.

Participant Three was unable to attend the peer group interview so the researcher was unable to analyze her views.

Participant Four was very involved in her use of Twitter for five weeks after the workshop. She was particularly interested in information for a new course she was preparing to teach. She was also sharing a great deal of information for the study group members, particularly the language teacher. Much of the information she was finding could be adapted for the other teacher so she shared it. She also showed her husband how to use Twitter for his occupation and shared with her son who is going through the college application process. Because the study was done during the summer, she felt unable to share with other colleagues.

Participant Four also expressed her excitement about being actively involved in a particular group in her field. "I had all that information at my fingertips and then I could connect with so many other people. Then people started following me because I was retweeting certain things and that opened up to more people. That was nice." She was rewarded with a Twitter designation of #FF which means Follow Friday and indicates someone who should be followed.

When asked why each participant stopped tweeting, the most common answer was because of summer vacation. Participant Four stated, "Then what happened was summer. At the beginning I was really active and then in July I disconnected because that is my disconnecting

time for many things." Participant Four also had the added challenge that when she returned to school in August, she was given a different role – a leadership role. "And then with the new job that was very difficult for me to continue but I did continue with my own personal one [account]." She changed the focus of her Twitter use to reflect the new position, began using her own personal account with her real identity, and made new connections around the subject of leadership. One connection she related was with a professional whom she followed and often retweeted. When the professional gave a webinar, Participant Four was unable to attend but expressed her interest through Twitter. The expert had her assistant send an email with all of the information from the webinar and Participant Four is now on her mailing list.

Participant Four continues to use her own Twitter account for professional learning as well as personal knowledge. "Like twice a week I open Twitter or if I see something is going on I will go in because I want to find out more about that." She also continues to build her connections. "I go in once in a while if I receive an email saying someone is following me. I check to see why they are following me." She also uses Twitter for practical purposes. "Or a hurricane or storm – I will go in because I follow [local weather forecaster] and what have you."

In the follow up to the first research question (1a): what did this experience look like: collaborative team, learning community, network of practice or collective? The closest description of this study group experience within the confines of the research is *collective.* While Participant One, Participant Two, and Participant Three did not work together as a learning community, Participant Four's experience fits the description of collective by Thomas and Brown (2011). They use the term collective to describe a group of learners who loosely connect to each other for peer-to-peer learning at various levels and lengths of collaboration. This description mirrors Participant Four's experience with online groups through Twitter. According

to Thomas and Brown (2011), collectives are a new model of how teachers may learn from each other through active participation but without needing to belong to a specific community. These platforms are "content-neutral" (Chap. 4, "Emergence," para. 6) and only exist when learners interact with each other.

In answer to the second follow up to the first research question (1b): was there evidence of participating teachers using this tool to improve practice; only Participant Four evidenced using Twitter for her practice. She was actively involved in gathering content and motivational materials for the new class she was to teach in the fall. She had reached out to other practitioners in her field and was connected to several groups organized around the subject. When her job focus changed, she commented, "And then everything changed…they might be saying, 'Where is this woman? She's disappeared' because I stopped and I'm looking now more at leadership."

The second research question was: what was the perception of participating teachers about Twitter as a PD tool with the follow up (2a): did teachers find Twitter effective for PD? Participant One stated,

> I want to learn more about it. The little workshop you gave us was excellent, but of course if I don't practice…I would have to go back and look…but I really feel that I need to learn. I know it's very relevant to professional growth. Social media is a conversation, so it's not something you read and then that's it. You're supposed to act on it, respond, retweet, and…in order to be effective. But it's still a conversation you can't have on a website. The good thing is you can talk and exchange ideas good and bad. You can't do that with a website or newspaper (Peer group interview, 1 October, 2015).

Participant Two said, "I understand it is a very good tool. I didn't continue because I was involved in so many things I forgot." She also said that on a certain level she was a bit afraid of the technology. She realized that she needed more time to practice using the technology in order to feel confident. An example she used was in the use of "tinyurl.com," a website for shortening the length of website addresses to conform to the 140-character limit on Twitter. Although she

was able to use it effectively during the workshop, when she returned to Twitter to use it later, she had forgotten the process. She also expressed that her personal learning style requires more time to practice new processes. “If you explain something to me, I am a person who is slow while learning. Once I’ve got it, I can go [snaps fingers]. I have to look, observe, organize things. I am not the one burning rubber.” When asked whether she would use Twitter in the future, Participant Two responded,

> I think I will use it on my own. I am more aware so I am going to force myself to use it In this era we now live in, we have to learn to play with these technologies. My kids [students] communicate through Twitter. In fact, they say Facebook is for old people. They use Twitter and Instagram because the less they have to write the better for them. They get tired. I do believe it is a good tool. It gets there fast and is better received (Peer group interview, 1 October, 2015).

Participant Two also revealed that she had found some excellent resources for her class, among them a journalist who has very interesting tweets. She expressed a desire to continue using Twitter for those connections. “Even though the study is ending, I understand this experience has opened my eyes.”

Participant Three was unable to attend the peer group interview therefore her perception of the use of Twitter for PD cannot be analyzed.

Participant Four, before participating in the study, had already been using a personal Twitter account. “I thought it was easy for me. I had not taken advantage of it before. I had it for news, some friends, but never for professional development.” Once she redirected her use for professional learning, “I loved it. I learned a lot. One of the groups I follow, I learned so much from them.” She found the use of Twitter for professional development, “very helpful, very effective. I was able to get tons of ideas. I was going to be teaching a [new] class so I kept many of those tweets that I used. It was awesome.”

When asked if she plans to continue using Twitter for PD, Participant Four, the only one who completed the survey, responded: "Yes! I have learned that there are whole communities willing to help and share valuable information."

The second follow up to the second research question (2b) asks: did teachers find Twitter effective in directing their own learning (as a personalized PD tool)? Participant Four found one of the benefits of Twitter to be the ability to personalize her learning: "That's one thing I enjoy about Twitter – that I just read what I want and it's constantly changing. You hit refresh and it's like you get a whole new set of things. I'm a happy camper." In her answer to the survey question, "How would you compare this PD experience to other PD experiences you have had," she responded, "It was done at my own time, whenever I wanted and however I wanted. That is something I had never had before."

In summary, Participant One, although recognizing the importance of social media and technology use for professional development, did not find Twitter effective for her particular needs and did not use the technology after the workshop. Participant Two expressed interest in continuing to experiment with Twitter. She found the technology confusing at first and because of other involvements, including summer vacation, she did not continue using Twitter. Participant Three was unable to attend the peer group interview. Participant Four found Twitter effective in providing a personalized professional development experience and was able to transfer her use of Twitter from her originally expressed professional goal to meet the needs of a new role within her professional community.

Part 2: Comparison to Nine Characteristics of Effective PD

In addition to answering the two research questions, as part of this study, the researcher compared the experiences of the participants to the nine characteristics of effective PD

established through her review of the literature (see discussion in Chapter 2) and had the list validated by experts in the professional development community:

1. Focus on student and teacher learning
2. Emphasis on content and pedagogy essential to authentic teacher activities
3. Alignment of teachers' beliefs, career stages, and ownership through choice
4. Provision of time for thinking, making connections and sustaining change over time
5. Encouragement of collaborative activities within and outside of school environs
6. Sustained support, scaffolding, and formative assessment necessary for growth
7. Close alignment or coherence to school and community standards and culture
8. Provision of mechanism for reflection and self-assessment
9. Procedure to evaluate the PD and its impact on teacher learning and student achievement

The following analysis shows how effective Twitter use for PD was for the participants according to these nine characteristics.

Effective when providing choice and alignment. The first two characteristics of effective PD involve a *focus on student and teacher learning* (characteristic 1) and an *emphasis on content and pedagogy essential to authentic teacher activities* (characteristic 2). Through Twitter, Participant Two, Participant Three, and Participant Four were able to choose content and activities that related directly to their own learning. As a social media platform, Twitter is not usually thought of as a professional learning tool. During the workshop, the researcher helped participants focus on their own professional goals and how Twitter could be used as a tool to connect to other educators and experts in their specific fields. Tweets from each participant show specific information related to her stated professional goal. Both tweets posted (or retweeted) and groups followed by the participants reflect interest in content and authentic teacher activities such as learning from others and learning by considering one's own teaching (Birman et al, 2000; Desimone, 2009; Richter et al, 2011).

Because of the freedom of choice within the Twitter domain, teachers who participated were able to *align their choices to their personal and professional beliefs* (characteristic 3). Participant One was the exception since she was not convinced of the importance of social media to her professional growth and so she did not continue to participate. This difference in beliefs can affect a participant's willingness to engage in PD as noted by Glazer and Hannafin (2006). The other three participants expressed a willingness to learn and actively sought out resources that reflected their beliefs. Participant Four especially shared a great deal of resources with the rest of the study group.

All of the participants were considered as being in the late career stage (over 20 years of experience) and for the most part, reflected the characteristics of that stage. Late career professionals seek new PD experiences that might work in their classrooms and value technology that helps them find and join others to share experiences and knowledge (Masuda et al., 2013). The fact that the participants volunteered to engage in the use of a technology that was relatively new to them and move out of their comfort zones to improve their practice speaks volumes (characteristic 3: *aligns with career stage*).

More time needed for making connections and sustaining change. Since Twitter is most often an asynchronous experience, participants were able to use the technology at their convenience and across various platforms. The fourth characteristic of effective PD *provides for time for thinking, making connections, and sustaining change*. Participant Two, although she used Twitter for only one week, expressed the desire to go back to Twitter on her own. Participants Three was engaged in using Twitter for five weeks before succumbing to the summer vacation disconnect. Although Participant Four discontinued her use of the study Twitter account after five weeks, she did begin using her personal Twitter account for

professional learning once she returned to school and became involved in her new leadership role. Research shows that much more time needs to be spent on PD: an average of 49 hours over 6 to 12 months (Scarloss & Shapley, 2007). Continued use of the tool is essential to the success of the PD experience. Only Participant Four continued to use Twitter. Discontinued use of the tool by the other participants proved its use ineffective for them.

The fifth characteristic of effective PD involves *collaboration both inside and outside of school communities*. Participants Two and Three began developing some collaboration with other members of the Twitter community, but discontinued their Twitter use before fully using the networking power of the technology. Participant Four, on the other hand, shared over 29 resources with the study group and made powerful connections with several members of the online community.

Because of the timing of the study during summer vacation, Participant Four felt unable to share with more members of her faculty and staff. This disconnect did not foster collaboration inside the school community. She did share with members of her family. Again, discontinued use did not allow Participants One, Two, and Three to effectively collaborate within their community or beyond.

Difficulty providing support. While *sustained support, mentoring, scaffolding, and formative assessment is necessary for growth,* (characteristic 6), the researcher found that providing this support through Twitter itself was a difficult task. She provided over 420 tweets or retweets over almost four months focused on: individual teacher goals, self-assessment, Twitter use for teachers and students, professional learning, classroom practice, technology integration, educational humor, and inspirational quotes/stories. Only Participant Four responded to the

online support. Direct messages through Twitter were not responded to by Participant One or Participant Two. Participant Three responded only once.

Difficult to provide close alignment to school culture and community. Another less effective use of Twitter for PD involved characteristic 7: *the need for a close alignment of the PD to school culture and community* (Elmore, 2002; Jurasaite-Harbison & Rex, 2010). This important context may have been missing since the study was conducted over the summer. Although participants were able to choose resources and groups that reflected their own personal beliefs and those of their school culture, they were unable to immediately connect to their school community and classrooms. Working out of sync with the school year may have affected the success of the PD experience.

Ineffective as a reflective and evaluative PD tool. The use of Twitter for PD became much less effective in *providing mechanisms for reflection and self-assessment,* (characteristic 8) and in *providing procedures to evaluate the PD and its impact on teacher learning and student achievement* (characteristic 9). These characteristics of effective PD have to be structured within the framework for Twitter use as PD. They do not appear as a natural result of Twitter use. Although the researcher provided many tweets of articles and links to self-assessment blogs and activities, participants did not report using them. The only evaluative processes during the study were external ones such as the study survey and peer group interview at the end of the Twitter experience.

Figure 2 shows a visual summary of the effectiveness of Twitter use based on the discussion above. The rating of effectiveness ranges from 0-10 with 10 being the most effective. Participant One did not continue using Twitter after the workshop so her rating of effectiveness is zero in each category.

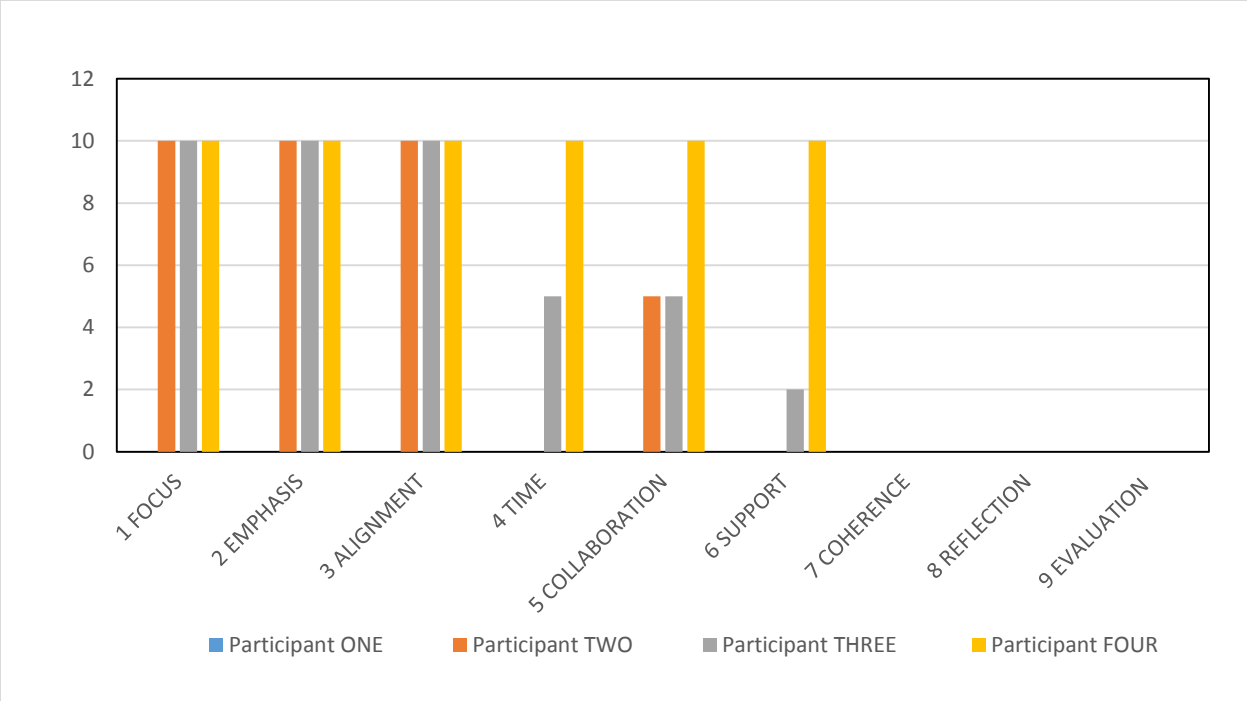

Figure 2: A visual representation of the effectiveness of the Twitter PD experience by participant.

Additional factors. There were several additional factors affecting the effectiveness of the PD experience. The participants in this study volunteered to learn to use Twitter as a PD tool. Although the study encouraged a connection to the participants' professional learning goals (Keengwe & Onchwari, 2009), at times the lack of fluency with the technology impeded attainment of these goals. Participant Two expressed a fear "that you might push the wrong button and damage something." Although she added, "but you can't let that…you have to…I am not an enemy of technology. I am in favor of technology use, but there needs to be a balance between technology and writing." Participant One was reluctant to use any social media. "I just don't gravitate to social media. I have a Facebook account that I never look at. The thing with me is I get stressed out because I know I'm missing out."

Reliability and quality control can affect technology integration as well. Although the study group used the hashtag to consolidate tweets during the PD experience, the hashtag was not always reliable and often omitted tweets by the researcher and participants. The purpose of the hashtag use was to provide an overview of all the tweets of the group in one spot. The hashtag option was not consistent across platforms (phone, tablet, and computer). This quality control issue also occurred during the piloting of the Twitter game.

Summary of the Findings

This qualitative study took a look at how participants used Twitter for professional learning during a 12-week study period by analyzing their Twitter use during that time. The study also examined their perceptions about Twitter as a PD tool as expressed in a peer group interview. Two of the participants, Participant One and Participant Two, stopped using the tool before becoming proficient in its use, as evidenced by the small amount of tweets and groups followed in their twitter accounts and their expressed hesitancy in continuing their Twitter use. Although the researcher continued to tweet and direct message information to them, they were no longer on Twitter and did not receive the scaffolding or support the researcher tried to provide. Fluency in the technology was of utmost importance for their experience to be effective. The third participant produced a few more tweets and followed a few more groups, but she also stopped using the tool after five weeks. Participant Four was very fluent in Twitter, produced 49 tweets and followed 33 groups, and expressed her satisfaction with the PD experience.

Personal beliefs about social media and technology had an effect on participants' engagement with the technology. Although participants were able to choose whom to follow and the types of resources they found important, aligning their experiences to their professional beliefs and goals, in some cases the lack of experience with the technology of Twitter itself

caused them to discontinue use of the tool. Individual learning approaches also affected the outcome of the study. Participant One and Participant Two both stressed the need for more practice using the technology before embarking on their own.

Participant Four, who began the PD experience with a prior knowledge of Twitter, was able to maximize her experience and found Twitter to be an effective tool. The other participants did not reach such a level of effectiveness.

Most participants, especially those with less fluency in the use of Twitter, needed a different platform for support. Twitter use by itself did not provide the mechanism that was well known enough and seamless for participants in order to provide sustained support, scaffolding, and motivation to continue practicing with the technology.

The timing of the PD experience was crucial to its success or failure. Conducting the study during the summer was detrimental to the learning process. During the peer focus interview, each participant acknowledged a disconnect, especially during the month of July. Offering the workshop and follow up during the summer was not an effective use of the participants' time. The workshop and follow up should have been done when school was in session to facilitate the connection between Twitter use and the teacher's ongoing learning goals and classroom practices. Collaboration with other faculty and staff is also facilitated by proximity and the ability to share with others face to face, and this environment was not available to the participants while out of school.

Twitter as a PD tool did not provide a framework for reflection or self-assessment nor did it include a process for evaluation of the PD experience or student/teacher learning. Any evaluative process would need to be added to the framework of the experience.

A technical glitch with the group hashtag was also reported as some tweets were dropped from the group by the Twitter application itself. The purpose of the group hashtag was to consolidate all of the posts in one easily accessible spot. The use and purpose of the hashtag was not clear to all participants and the technical glitch only added to their confusion.

A variety of data sources: participant tweets, experts and groups followed by participants, researcher's notes, open-ended survey answers, and peer group interview expressions, allowed the researcher to observe how the participants used Twitter during the 12-week PD experience and what their perceptions were of Twitter as a PD tool. The next chapter summarizes the dissertation, discusses the findings, and makes recommendation for practice and future research.

Chapter 5: Discussion of Findings

This final chapter offers a discussion of the context of the study, a summary of the study, the researcher's findings, implications for practice, and recommendations for further study. Although this study had a small participant base and results cannot be generalized to a larger population, the findings do offer a view of the experience of this particular group with Twitter and reveals weaknesses in their use of Twitter for PD. Acknowledging these weaknesses can help PD professionals and individual teachers make better use of Twitter as a PD tool.

The researcher focused on two research questions: *How were participants using Twitter during the 12-week experience* and *What was their perception of Twitter as a PD tool*? A comparison of these participants' use of Twitter as PD to nine characteristics of effective PD allowed the researcher to identify areas of effectiveness as well as several areas that were less effective.

Context of the Study

The importance of effective PD is well established in the literature (Darling-Hammond & McLaughlin, 2011; Desimone, 2011; Lawless & Pelligrino, 2007). Effective PD helps educators meet the challenge of incorporating new information within a networked society (Thomas & Brown, 2011). Effective PD helps teachers keep up with student performance standards and new ways of learning in different content areas while meeting the challenges of changing school settings and multi-ethnic populations with varying skills, languages, and backgrounds. Teachers need the best tools to work with (Darling-Hammond et al., 2009; Lawless & Pellegrino, 2007; Wei et al., 2010). Educators must maintain their value in a rapidly changing world, be connected, and be involved in their own improvement (Whitby, 2013). A long term investment in PD increases the ability of schools to solve persistent problems (Elmore, 2002).

Theoretical perspectives. In order to test the effectiveness of Twitter as a PD tool, this study was framed around three theoretical perspectives: situated, socio-cultural, and constructivist learning (Lave & Wenger, 1991; Von Glasersfeld, 1989; Vygotsky, 1978). Theoretically, through using Twitter, the participants would be able to learn by choosing their own groups and experts to follow based on their personal beliefs and expressed learning goals for their current work (situated learning). They would participate as members of an online Twitter community as well as study group members in the workshop (socio-cultural learning), and create and reassess their own knowledge through voluntary connections with other educators (constructivist learning).

The effective teacher and ideal school environment. In order to judge the effectiveness of the PD experience, it is essential to understand the goal of the activity. Effective PD needs to contribute to the continuing development of an effective teacher. Shulman and Shulman (2004) are very clear in their description of what makes a teacher effective: "an accomplished teacher is a member of a professional community who is ready, willing, and able to teach and to learn from his or her teaching experiences" (p. 259). Missing from their description is the end result of effective teaching: a positive effect on student learning (Earley & Porrit, 2013; Wei et al., 2010) and the creation of a learner-oriented environment and context for learning (Baviskar, Hartle, & Whitney, 2009). An ideal school environment promotes teacher professional growth through a variety of opportunities (Darling-Hammond et al., 2009).

Traditional model versus reform model. The traditional model of PD measures "seat-time" and hours attended by teachers rather than the effect of the PD on teacher and student learning. Ninety percent of PD in the US consists of short-term workshops and conferences even though neither has been shown as effective as longer duration, intensive PD. In 2009, over 57%

of US teacher reported no more than 16 hours of PD in an entire year. Traditional PD focuses on a product rather than the process of teacher learning. (Darling-Hammond et al., 2009; Wei et al., 2010). Reform PD takes into account how teachers learn and the context of that learning (Ebner et al., 2010). This reform approach fosters a wide range of learning opportunities and subsequent engagement in reflection in the learning process (Ebner et al., 2010; Baviskar et al., 2009). The use of Twitter for PD allows teachers to invest the amount of time they need, when they need it, with whom they feel connected, about content they are interested in, for as long as they deem necessary. In this sense, Twitter as PD meets the requirements of reform PD, although there are very few programs incorporating the use of Twitter. However, it is up to the teaching professional to make the most of the PD opportunity.

Factors that affect teacher learning. There are many factors that can affect a teacher's success at learning. Personal factors such as the significance of the activity to the teacher's classroom, the practicality of the experience, and the emotional levels of the teacher while involved in the activity all affect the outcome. There are task related factors as well. If the task increases the teacher workload, makes emotional demands on the teacher, or does not provide for easy availability, the outcome is also affected (Kwakman, 2003).

Characteristics of effective PD. There are nine characteristics of effective PD as gleaned from the literature (see discussion in Chapter 2) and validated by experts in the PD community:

1. Focus on student and teacher learning
2. Emphasis on content and pedagogy essential to authentic teacher activities
3. Alignment of teachers' beliefs, career stages, and ownership through choice
4. Provision of time for thinking, making connections, and sustaining change over time

5. Encouragement of collaborative activities within and outside of school environs
6. Sustained support, scaffolding, and formative assessment necessary for growth
7. Close alignment or coherence to school and community standards and culture
8. Provision of mechanism for reflection and self-assessment
9. Procedure to evaluate the PD and its impact on teacher learning and student achievement

Effective PD first and foremost focuses on student and teacher learning. Darling-Hammond and McLaughlin (2011) described effective PD as engaging, grounded, shared (focused on communities of practice rather than individuals), connected to the classroom, ongoing and supported, and connected to school change. Teachers need to be builders of their own knowledge (Polly & Hannafin, 2010) and able to put this knowledge into practice. Effective PD is based on authentic teacher activities (Darling-Hammond & McLaughlin, 2011) and its content focus connects student learning to the subject matter (Desimone, 2009). Effective PD involves active learning activities for the educator (Hoekstra et al., 2009).

Teachers' beliefs also affect the teachers' willingness to participate in PD and its effectiveness (Elmore, 2002). Teachers need to believe that what they do can positively affect students' lives (Day & Gu, 2007). Effective PD also provides for ownership of the process through collaboration (Glazer & Hannafin, 2006). PD that aligns with the teachers' beliefs about his/her own practice is more effective.

Wei et al. (2010) stress the importance of time for PD to be effective. Extended time to reflect on practice, collaborate for change, design curriculum, create action plans, and share skills and classroom practice, are all needed for effective use of PD. Yoon et al. (2007) found

that an average of 49 hours of PD over 6-12 months had a positive impact on student achievement.

Bybee (2001) underscores the effectiveness of PD that supports collaboration. The provision of support and mentorship during the PD undertaking also adds to its effectiveness (Elmore, 2002; Signer, 2008). This additional support also lessens stress during the learning process (Kwakman, 2003). The culture of the school community also affects the outcome of the PD (Jurasaite-Harbison & Rex, 2010).

Reflection and evaluation are also important factors in the success of a PD opportunity. Thinking about one's own thinking, or metacognition (Flavell, 1979), is vital to the process of acquiring new knowledge. Teachers need a mechanism for reflecting on what they are learning in order to fully benefit from the experience (Pareja Roblin & Margalef, 2013; Steffy & Wolfe, 2001). Evaluation also plays a large role in the effectiveness of a PD activity, although researchers find effective evaluation is difficult to determine. They do agree that evaluation is a complex process and should be used to facilitate action (Lawless & Pellegrino, 2007; Pellegrino & Quellmalz, 2010).

Methodology and Summary of the Workshop

Using a developmental evaluation design and qualitative approach, the researcher developed a workshop and 12-week follow-up experience to study how teachers would use Twitter for PD (Research Question 1) and their perceptions of its effectiveness as a PD tool (Research Question 2). The researcher also compared the participants' experiences to the characteristics of effective PD. The list of characteristics of effective PD was gleaned from the literature and validated by professionals in the field of teacher professional development. The workshop and learning activities were guided by the literature and also validated by a judges'

panel of professionals who work actively in giving and developing PD workshops. An introductory Twitter game was developed, piloted, and used in the workshop by the researcher as well.

Research design. The researcher chose a developmental evaluation design which focuses on what happens during a process and how the participants experience it. This research design is best used when innovation and flexibility are need to actively shape the process. When real-time and collaborative learning are required, development evaluation is the best fit (Patton, 2011). Developmental evaluation is an ongoing evaluation with the evaluator immersed in the proceedings in order to learn, not judge (Brodhead as cited in Dozois et al., 2010).

Developmental evaluation evaluator. The effective evaluator is embedded in the learning process. The researcher in this process provided online coaching to the study members through Twitter with links to resources, websites, learning communities, videos, and other support materials. She actively followed her study group and suggested experts and resources based on each participant's stated professional learning goals.

Participants. Volunteers from a private K-12 English language school were the participants in this study. A workshop on using Twitter as a PD tool was offered free of charge to the participating school and its faculty. Ideally, 15 participants would have been involved in the workshop, however only four participants joined. The workshop was offered twice to try to increase participation. A second workshop was offered four weeks after the first, during summer school, again as two four-hour sessions on two separate days. In the first workshop there were three participants and in the second there was one. The second workshop was abbreviated somewhat since the attendee was already familiar with the use of Twitter and did not need extensive practice. The researcher went to the school to conduct the workshops, in order to reap

the benefits of a shared school community and the context around it, but this benefit was diminished by the fact that the study was conducted during the summer and participants did not have ready contact with each other.

Professional development workshop. Participants in the workshop worked through a series of activities that helped them recognize effective forms of PD and factors affecting professional learning. Participants looked at Twitter as a viable form of effective PD and then focused on developing personalized professional learning goals. The PD Workshop consisted of four basic activities divided into 1.5 – 2.5 hour slots delivered over the course of two days. As discussed above, the full workshop was offered twice. The first workshop was given at the end of the school year as two 4 hour sessions on separate days. Participants in the first workshop offering were introduced to Twitter through various forms: video, hands on practice, and a group game. The game focused on being able to use Twitter effectively by researching and posting information, photos, and links related to different educational topics. All of the participants were able to complete the game during the workshop.

In an attempt to obtain more participants, a second workshop was offered four weeks after the first, during summer school, again as two 4 hour sessions on two separate days. The second workshop was abbreviated somewhat since the attendee was already familiar with the use of Twitter and did not need extensive practice.

Data sources. The researcher relied on several data sources for her study: participant tweets, groups followed by participants, peer group interview responses and the researcher's notes. She also created a survey in *Qualtrics* based on her research questions and the nine characteristics of PD. The survey was piloted before being distributed to the participants after the 12-week follow-up period. However, because the survey was answered by only one participant,

only the qualitative open-ended question answers were used for analysis. The proposed quantitative analysis of the survey results had to be eliminated as a data source. This change did not affect the overall results of the study since various other sources were available to the researcher: The developmental evaluation design allowed the researcher to take this negative consequence and adjust the data analysis accordingly.

Data analysis. The researcher looked at both the number and types of tweets posted by the participants as well as the groups and individuals the participants chose to follow. The analysis showed that Participant One did not continue to use Twitter after the initial workshop. The other participants varied widely in their use of the tool: Participant Two continued for one week and produced 14 tweets; Participant Three continued for five weeks and produced 17 tweets; Participant Four was actively involved for five weeks and produced 49 tweets. All of the participants stopped using Twitter during the summer "disconnect," although Participant Four reported using her personal Twitter account for professional learning once returning to school in a new position in August.

The results of manual coding of the types of tweets produced by the participants revealed that participants echoed the research: their tweets showed concern for others, a great deal of shared information and resources with the group, political/social comments, and motivational statements (Veletsianos, 2012). An additional coder verified this analysis. Each participants' tweet was first labeled as to what the tweet was communicating; then each coder identified the purpose of each tweet. A discussion of the few discrepancies in the coding allowed the researcher and co-coder to come to an agreement. The participants also followed a variety of groups and individuals related to their areas of professional interest. This practice shows they were using Twitter for professional learning.

The researcher created questions and follow-up probes for the peer group interview which was held in October for both workshop groups together, after all participants had completed the 12 weeks. Three of the four participants were able to attend the peer group interview. The researcher, after transcribing the interview, divided the statements of each participant into one of two categories: how she used Twitter or what she thought of it as a PD tool.

The researcher's notes were used to confirm both what the posted tweets revealed and what each participant said about her Twitter use.

Validity. In order to provide validity and reliability to the study, the researcher used a co-coder for the analysis of participant tweets. The list of effective characteristics of PD was also validated by experts in the PD community. Additionally, the researcher took the results of the study back to the group for member checking (Creswell, 2009).

Summary of the Findings

In answer to the first research question, *How did participants use Twitter?* the actual participant use of Twitter for PD during the 12-week experience varied widely. An analysis of the posted tweets and groups followed by each participant revealed that Participant One did not continue using Twitter after the initial workshop. Participants Two and Three produced a small number of tweets over a short duration, one week and five weeks respectively, and followed a few groups/individuals other than the study participants. Participant Four actively tweeted and produced a relatively large amount of tweets, 49, and followed 33 groups/individuals over the short duration of five weeks. In answer to Research Question 1a, *What does the participants' experience look like in terms of learning communities?* only Participant Four's online activities resembled any type of community. The researcher asked if the community resembled a collaborative team, a learning community, a network of practice, a community of practice, or a

collective. Participant Four's online participation in Twitter resembled a collective with its emphasis on peer-to-peer learning of various levels and lengths of time (Thomas & Brown, 2011). Participant Four was unable to interact with other members of her own school because they were not active on Twitter, but she did find other people in Twitter. None of the participants continued with the study past the five-week disconnect of summer vacation, however. Participant Four began using her personal Twitter account for professional learning when she was given a new position at the school. In answer to Research Question 1b, *What evidence is there of participants using Twitter to improve their practice?* only Participant Four showed some evidence of using Twitter to improve her practice by reaching out to other Twitter users who had expertise in her new field.

In answer to the second research question, *What were the participants' perceptions of Twitter as a PD tool,* the results also varied widely. Participant One, although recognizing the importance of social media and technology use for professional development, did not find Twitter effective for her particular needs and did not use the technology after the workshop. Participant Two expressed interest in continuing to experiment with Twitter, although she found the technology confusing at first and did not continue using Twitter during the summer after the workshop. Participant Three was unable to attend the peer group interview so there is no way to gather her impressions of the experience although she did produce 14 additional tweets and continue to use Twitter for 5 weeks. Participant Four found Twitter effective in providing a personalized professional development experience and was able to transfer her use of Twitter from her originally expressed professional goal to meet the needs of a new role within her professional community.

There are nine characteristics of effective PD as gleaned from the literature (see discussion in Chapter 2). The four participants showed varied experiences with the tool as shown in figure 3. The rating of effectiveness ranges from 0-10 with 10 being the most effective. Participant One did not continue using Twitter after the workshop so her rating of effectiveness is zero in each category. The participants' experiences are discussed:

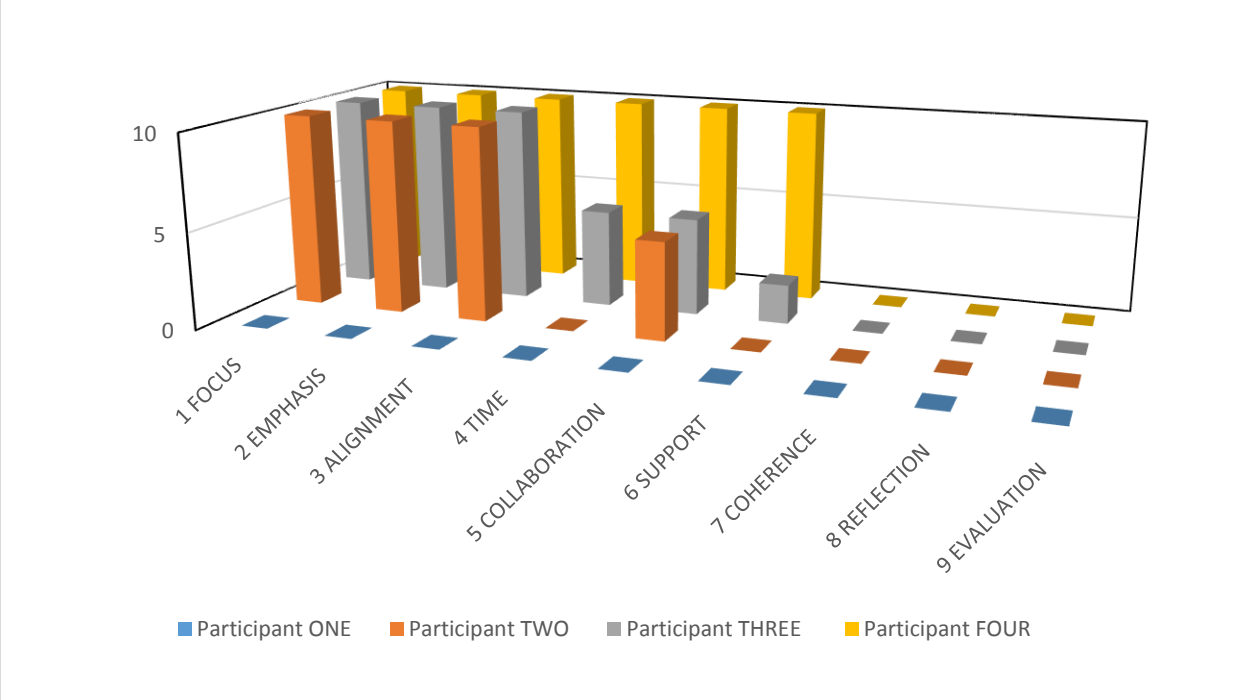

Figure 3: A visual representation of the effectiveness of the Twitter PD experience by participant.

Effective PD first and foremost focuses on student and teacher learning (characteristic 1). Through Twitter, three of the four participants were able to choose content and activities that related directly to their own learning. Tweets from each of the three participant showed specific information related to her stated professional goal. To be effective, PD must also emphasize content and pedagogy that are essential to authentic teacher activities (characteristic 2). The three participants' tweets also reflected interest in content, pedagogy, and authentic teacher activities.

These same participants chose PD that aligns with their beliefs and career stages (characteristic 3).

Having enough time to think, make connections, and sustain change is essential to PD (characteristic 4). Continued use of the tool was essential to the success of the PD experience. Participant Three used the tool for five weeks, but only Participant Four continued to use Twitter. Because the other participants discontinued using the tool, it was not effective for them at this time. Effective PD must encourage collaborative activities both inside and outside of the school environment (characteristic 5). Participants Two and Three began developing some collaboration with other members of the Twitter community, but discontinued their Twitter use before fully using the networking power of the technology. Participant Four, on the other hand, made powerful connections with several members of the online community. However, because of the timing of the study during summer vacation, Participant Four could not share with more members of her faculty and staff. This summer disconnect did not allow participants to collaborate and share from twitter back to their school community.

To be effective, the PD experience must offer sustained support, mentoring, scaffolding, and formative assessment (characteristic 6). The researcher found that providing this support through Twitter itself was a difficult task. Although she provided over 420 tweets or retweets over almost four months, only Participant Four responded to the online support; the others had disconnected. Although the researcher continued to tweet and direct message information to them, they were no longer on Twitter and thus did not receive the scaffolding or support the researcher was trying to provide. Fluency in the technology was of utmost importance for the experience to be effective. The participants with less fluency in the use of Twitter needed a different platform for support. Twitter use by itself did not provide the mechanism that was well

known enough and seamless for participants in order to provide sustained support, scaffolding, and motivation to continue practicing with the technology.

A close alignment to school and community standards is also important to effective PD (characteristic 7). This essential context was missing since the study was conducted over the summer. Although participants were able to choose resources and groups that reflected their own personal beliefs and those of their school culture, they were unable to immediately connect to their school community and classrooms. Working out of sync with the school year may have affected the success of the PD experience.

The provision of a mechanism for reflection and self-assessment (characteristic 8) as well as a procedure to evaluate the PD and its effect on teacher learning and student achievement (characteristic 9) are crucial. These characteristics of effective PD do not appear as a natural result of Twitter use and have to be structured within the framework for Twitter use as PD. Although the researcher provided many tweets of articles and links to self-assessment blogs and activities, participants did not report using them. The only evaluative processes during the study were external ones such as the study survey and peer group interview at the end of the Twitter experience.

Limitations. There were several additional limitations to the study. Personal beliefs about social media and technology had an effect on participants' engagement with the technology. Participant Four, who began the PD experience with a prior knowledge of Twitter, was able to maximize her experience and found Twitter to be an effective tool. The other participants did not reach a high level of effectiveness. Individual learning approaches also affected the outcome of the study. Participant One and Participant Two both stressed the need for more practice using the technology before embarking on their own.

The timing of the PD experience was crucial to its success or failure. Conducting the study during the summer was detrimental to the learning process. Participants acknowledged that is common to "disconnect" especially during the month of July. Offering the workshop and follow up during the summer was not an effective use of the participants' time for two reasons, the disconnect as discussed above, and because of the inability to facilitate the connection between Twitter use and the teacher's ongoing learning goals and classroom practices. Collaboration with other faculty and staff at the school, facilitated by proximity and the ability to share with others face to face, was also not available.

A technical glitch with the group hashtag was also reported as some tweets were dropped from the group by the Twitter application itself. The purpose of the group hashtag was to consolidate the participants posts in one easily accessible spot. The use and purpose of the hashtag was not clear to all participants and the technical glitch only added to their confusion.

The low amount of participation was also a limitation of the study. Four participants versus the desired 15 limited the scope of the study.

Implications for Professional Development with Twitter

The problem with many technology integration PD opportunities for teachers is that they do not have a lasting effect and are not seen by teaching professionals as relevant either to their personal situations or their communities of teaching (Schlager & Fusco, 2003). With so many hours and dollars spent on PD, teachers need to be able to effectively take advantage of that time by relating directly to the experience and taking ownership of their professional learning. Many PD opportunities come with a hefty price tag as well. Twitter, with its free service and multi-platform availability, seems to be a viable tool for effective PD. However, based on this 12-week study group experience, there are several implications for its use as a PD tool.

The first implication for practice ties in with the first characteristic of effective PD: focus on teacher and student learning. The goals developed by teachers in the workshop need to be SMART goals: **S**pecific, **M**easurable, **A**ttainable, **R**elevant, and **T**imely and focused on student and teacher learning. In this study, the workshop participants did not have enough time to fully develop their goals, although they did express their professional interests. Three of the participants were able to find materials and resources related to their stated interests. More time spent on the front end developing more specific goals should lead to better results and a way to measure outcomes. With more specific goals, the facilitator can also do a better job of supporting and ferreting out resources for the teacher.

Twitter posts during the study reveal a great deal of emphasis on content and pedagogy. In response to Participant Three's interest in early childhood and reading, the researcher tried to engage that interest by posting tweets directed towards the participant and involving authentic teacher activities. Tweets from the researcher varied from announcements for professional learning communities for early childhood educators to hacks for creating the perfect elementary classroom on a budget.

The researcher tweeted more than 420 times in the four months following the workshop(s) to try to provide a balance of content, pedagogy, and technology related posts to support the participants. The researcher found that providing this support through Twitter was a difficult task.

One of the most important factors for the successful use of Twitter as PD is the element of time. The workshop was a total of eight hours over two separate days, but it barely gave the participants time to begin thinking about the use of Twitter for PD and what their specific needs were. The original thought by the researcher was that the continued use of Twitter would

substitute for the many contact hours needed as the learning would continue online and through coaching by the researcher; this only worked for Participant Four. The other three participants would have greatly benefitted from more hands on contact in the use of the tool for professional learning. The inclusion of assignments or small hands-on projects for the group from the very beginning would facilitate fluency and ownership of the technology. More time would give the researcher a chance to uncover and deal with individual attitudes toward learning and social media that were not apparent during the original workshop.

The need for close support, scaffolding, and formative assessment was obvious but was not provided by the Twitter platform unless the participant was actively using Twitter. Participant Four responded well to direct messages and tweets posted to/for her, but the other participants were not responsive or were no longer on Twitter. An additional platform to provide individualized support was needed to insure participants were in contact and necessary support was received. Check-ins and other formative assessment tools should be incorporated into the process.

The timing of the study was also a major factor against the success of the tool. The workshop and follow up should be done during the school year, not during summer vacation. The workshops should be expanded as needed during the school year to be sure that all of the participants are indeed fluent with Twitter and comfortable with online professional learning. Having the PD during the school year also facilitates collaboration within the school community.

Twitter use does not automatically provide for reflection and self-assessment. These aspects of effective PD must be integrated into the process and recognized as essential to the learning framework. Evaluation of teacher learning must also be woven in to the framework and tied to the original individual professional goals as developed by the teachers. If the teachers

have carefully developed SMART goals (**S**pecific, **M**easurable, **A**ttainable, **R**elevant, and **T**imely), there is already a built in measurement to be calculated.

Other factors that affect the implementation of Twitter as PD include the teacher's willingness to experiment and his/her acceptance of the affordances and risks of social media. These important elements need to be addressed during the workshop process as well.

Recommendations for Further Study

The researcher recommends that further implementation studies be done when additional time and different support are given to non-fluent participants or newbies to Twitter. The addition of more contact hours and more structured checkups with participants during the school year might be more effective. A completely different approach would be to limit a workshop and study to fluent users of Twitter who have not used Twitter for professional learning.

In addition to using SMART goals, future research could look into restructuring the Twitter as PD experience to include specific formative assessment and reflection exercises which are important elements of effective PD. The addition of structured evaluation tools for Twitter use to measure teacher learning and its effect on student achievement would also be an area for future investigation.

Researchers should take a closer look at the technology acceptance model (TAM; Davis, 1989 as cited in Cheung & Vogel, 2013) and Twitter use. In order to for teachers to be involved in a social network, it is imperative that they feel comfortable in the adoption and use of social networking technology. Smith and Sivo (2012) used an expanded model to predict the continued use of online teacher PD. The original technology acceptance model looks at the effect of *Perceived Usefulness,* and *Perceived Ease of Use* on a user's belief about and intention to use technology. Researchers Smith and Silvo added two more elements to expand the model: *Social*

Presence and *Sociability*. Social presence is the feeling that others online are real or present. Sociability deals with how much the online environment encourages engagement and teamwork. The findings of their study suggest that all four elements affect teacher beliefs and intent to continue using online PD.

Conclusion

The purpose of this qualitative study was to look at how teachers used Twitter, or micro-blogging, for their own personalized professional learning and how effective Twitter was as a PD tool. The variety of data sources: participant tweets, experts and groups followed by participants, researcher's notes, open-ended survey answers, and peer group interview expressions, allowed the researcher to observe how the participants used Twitter during the 12- week PD experience and what their perceptions were of Twitter as a PD tool.

For the four participants in this study, Twitter use was ineffective for one, somewhat effective for two and very effective for the fourth. When compared to the nine characteristics of effective PD, the most engaged participant showed evidence of effective PD in six of the nine categories. This is encouraging and suggests that for some teachers, Twitter use could be an effective place to turn for some forms of PD. However, there are several things that should be done to make the PD experience more effective. It should be carried out during the school year with both face-to-face support and an additional support platform (text, phone, chat) for the less fluent in technology. Carefully developed individual professional learning goals would help both the mentor and the participant get the most out of the experience. A careful framework of self-assessment, reflection, and evaluation needs to be added as well.

When combined with added evaluation and self-assessment processes, the use of Twitter as PD by a fluent practitioner has the potential to be a very effective PD tool. The low cost,

accessibility, and availability make it an attractive PD choice. In this study, Twitter as PD seems best used by teachers who are ready to embrace technology and find value in connecting with other educators through an online collective to construct new approaches to improve their practice.

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APPENDIX A:

Timeline of Study

TIMELINE OF STUDY	
July, 2014	Proposal Defense, Accepted
August, 2014	Letter from School Permitting Access to Subjects
November, 2014	List of Nine Characteristics of Effective PD validated
March, 2015	IRB Approval
April, 2015	Final version PD workshop: 12 page participants' manual, interactive tools, introductory game, PowerPoint presentation and presenter's manual
May, 2015	Workshop validated by Judges' Panel; suggested changes incorporated
May, 2015	Twitter game piloted; tweaked to improve game mechanics
May, 2015	First workshop series, two 4 hour sessions on separate days
June, 2015	Second workshop series, two 4 hour sessions on separate days
July, August, September, 2015	Follow up for 12 weeks each group; participant Tweets captured at the end of 12-week period
August, September, 2015	Survey piloted and administered through *Qualtrics*
October, 2015	Peer Group Interview at school site; transcription of interview
November, 2015	Data analysis; Co-coder used for tweets/recurring themes
December, 2015; January, 2016	Final analysis, findings, and conclusions
February, 2016	Member check of findings with participants at school site

APPENDIX B

Online Survey Questions via *Qualtrics*

Teachers will be provided with an **Information Sheet** (See Appendix I) before taking the survey online. The survey also contains a consent form.

1.	What is your "handle" on Twitter?					
2.	What is your age?	20-29	30-39	40-49	50-59	60-69
3.	What is your gender?	F	M			
4.	How many years teaching experience do you have?	0-3	4-6	7-15	16-24	25+
5.	What subject area(s) and grade level(s) do you teach?					
6.	What is the highest level of education you have obtained?	BA	MA	EdD	PhD	Post
7.	How would you rate yourself in terms of your use of technology in the classroom?	Novice 1	2	3	4	Expert 5
For the following items on the survey, please indicate to what extent you agree or disagree with the statement: 1-strongly agree; 2-agree; 3-disagree; 4-strongly disagree						
8.	The PD experience with Twitter allowed me to focus on how my students learn.	1	2	3	4	
9.	The PD experience was adaptable to my own personal learning preferences	1	2	3	4	
10.	Using Twitter for PD allowed me to focus on content for my specific subject area and grade level.	1	2	3	4	
11.	This PD experience allowed me to learn more about how to design and deliver lessons to help my students improve their knowledge	1	2	3	4	
12.	Using Twitter for PD allowed me to seek information directly related to my classroom needs.	1	2	3	4	
13.	By using Twitter, I was able to find support and information from other teachers who share my beliefs as an educator	1	2	3	4	

14.	Using Twitter as PD fit into my professional career stage; I was able to find support and information relative to my specific role in the classroom	1	2	3	4	
15.	Using Twitter for PD allowed me to take ownership and gave direction to my own personal needs as an educator	1	2	3	4	
16.	This PD experience gave me time to think about my professional goals	1	2	3	4	
17.	This PD experience gave me time to make connections with other like-minded educators	1	2	3	4	
18.	This PD experience gave me time to sustain change in my practice	1	2	3	4	
19.	The use of Twitter as PD allowed me to collaborate effectively with teachers within my school	1	2	3	4	
20.	The use of Twitter as PD allowed me to collaborate effectively with teachers and experts outside of my school	1	2	3	4	
21.	During the 12-week PD experience, I felt that I received sustained support for using Twitter for professional growth	1	2	3	4	
22.	During the 12-week PD experience, I received ongoing assessment of my progress	1	2	3	4	
23.	The use of Twitter for PD allowed me to align my professional growth to the standards of my school.	1	2	3	4	
24.	The use of Twitter allowed me to align my professional growth to my community and culture	1	2	3	4	
25.	Through the use of Twitter as PD I was able to reflect on my practice as an educator	1	2	3	4	
26.	The PD experience with Twitter provided a way for me to self-assess my teaching practice	1	2	3	4	
The following questions are open-ended. You may write as much as you want in answer to the question. Please use specific examples when possible.						
27.	In what ways did this PD experience improve your practice, if any? Explain.					
28.	What about this PD experience would you change or modify? Explain.					
29.	Do you plan to continue using Twitter for PD? If yes, in what ways? If no, why not?					
30.	How would you compare this PD experience to other PD experiences you have had?					

APPENDIX C

Focus Group Interview Protocol

Interview Questions

Q1: How has your participation in this study impacted your view of effective professional development?

Probe: *Based on response:* Could you be more specific?

Q2: How has your relationship with your peers within the learning community changed during the course of this study?

Probe: Are there any negative/positive examples you could give?

Q3: What are your thoughts on the use of the technology – Twitter – as a collaborative learning tool? As a personal learning tool? As a tool for student learning?

Probe: What was the hardest part of learning to use Twitter?

What was the easiest part?

Q4: Have you shared your learning experiences in this study with any other teachers outside of the learning community?

Probe: *If yes:* what did you share and what is their relationship to you?

If not: what might have kept you from doing that?

Q5: How do you plan to continue using Twitter since the study has ended?

Probe: *If positive response:* what specific hashtag groups might help you continue to grow professionally?

Probe: *If negative response*: what obstacles do you see to your continued use of Twitter for professional growth?

APPENDIX D

Pre-Workshop Questionnaire

(Sent via email prior to workshop dates)

Instructions: The purpose of this pre-workshop questionnaire is specifically for the workshop facilitator to get a better idea of your needs, interests and technology skills in order to provide a more customized experience. Please feel free to explain any of your answers as completely as possible. There is no space limit on this electronic form.

Name:

Grade(s) taught:

Subject area(s):

Professional Learning

1. What areas of expertise do you have? What are your strengths? What do you feel you do very well?
2. In what areas do you feel you need improvement? (Content knowledge, pedagogical practice, technology integration, classroom management, students with learning differences, other). Explain.
3. What do you think about collaborative learning and group work?
4. What professional readings do you do? What journals, blogs, websites or e-zines do you prefer? Do you belong to any professional organizations?
5. How would you describe your career stage (beginning, mid-career, late-career, other)?

School Context

1. Do you have time during school to observe other teachers' classes or plan a unit (lesson) together? Explain.
2. Do you have available student data for designing and improving lessons?
3. Do you have time to reflect on your own practice and assess student outcomes?
4. Do you align your classroom environment and learning activities to the culture of the school?

5. Do you feel comfortable experimenting with a new approach to teaching a unit even if you are not sure it will work?

Technology Integration

1. What technologies (hardware, software, applications, etc.) do you currently use the most in your classroom with students?
2. What technologies (hardware, software, applications, etc.) do you currently use the most for professional duties?
3. What technologies do you use most in your personal life (smartphone apps, digital camera, etc.)?
4. Are there technologies you would like to have in your classroom but do not have at present? Explain.
5. Are there technologies available to you that you do not know how to use and would like to learn?

Please return this completed questionnaire to saress.smith@pepperdine.edu. You may answer directly on this email as a ***reply*** or you may copy and paste the document to Word and then attach the completed form to your email.

APPENDIX E

Professional Development Workshop Design

Activity	Topics	Duration
Introduction	Overview of Study	.5 hours
Activity One	Effective Teacher Professional Development Past Experiences Negative Characteristics Positive Characteristics Pedagogy and Teachers' Beliefs about PD	1.5 hours
Activity Two	Learning Communities Team Building Exercises Recognizing School Culture Identifying existing learning teams Alignment of PD to school goals/values	2 hours
Activity Three	Twitter Use Demonstration and Set-Up Game for Practice and Collaboration Exploring Twitter for Professional Growth Safety and Identity Issues	2.5 hours
Activity Four	Reflections / Making Connections Self-Assessment Development of Personalized PD Goals for school year – Designing a Plan	1.5 hours

APPENDIX F

Panel of Judges for Workshop Structure and Activities

The following professionals are experts in the areas of professional development and teacher learning. They are colleagues of the researcher in *Learning Alliances*, a provider of professional development workshops for the island of Puerto Rico both in public and private education.

Professor Ana M. Cruz

Professor Celia R. Pastrana

Professor Ana M. Pérez Rivera

APPENDIX G

Letter from School Permitting Access to Subjects

COMMONWEALTH-PARKVILLE SCHOOL
OPERATED BY CARIBBEAN CONSOLIDATED SCHOOLS, INC.
PO BOX 70177, SAN JUAN, PUERTO RICO 00936-8177
787 765-4411 fax 787 764-3809
Website: www.cpspr.org

COMMONWEALTH CAMPUS
Middle School/Grades 7-8
High School/Grades 9-12
URB ROOSEVELT – CALLE CASTILLO 100
SAN JUAN, PR 00918
Tel 787 765-4411 - Fax 787 764-3809

PARKVILLE CAMPUS
Lower Elementary School/Grades PPK-
Upper Elementary School/Grades 3-6
URB PARKVILLE – CALLE ALABAMA FINAL
GUAYNABO, PR 00969
Tel 787 720-3993 - Fax 787 272-8150

August 21, 2014

Pepperdine University
Graduate School of Education and Psychology
6100 Center Drive
Los Angeles, CA 90045

RE: PERMISSION TO GAIN ACCESS TO POTENTIAL PARTICIPANTS

To Whom It May Concern:

I hereby grant permission to Saress E. Smith access Commonwealth Parkville teaching staff to develop potential teacher participants from the faculty for her doctoral dissertation.

Please do not hesitate to contact me if you have any questions.

Sincerely,

Thomas Quinn
Headmaster

APPENDIX H

Participant Informed Consent for Participation in Research Activities

INFORMED CONSENT FOR PARTICIPATION IN RESEARCH ACTIVITIES

Participant: _____

Principal Investigator: Saress E. Smith

Title of Project: The Use of Micro-blogging for Teacher Professional Development (PD) Support and Personalized Professional Learning

1. I _____ , agree to participate in the research study being conducted by Saress E. Smith under the direction of Dr. Judith Fusco-Kledzik.

2. The overall **purpose** of this research is to evaluate the use of situated, social, constructivist, interactive online professional development. Teachers in this study will be involved in a professional goals workshop that includes the introduction of the use of micro-blogging (in this instance, Twitter) as a tool for personalized PD. This study is being conducted in partial fulfillment for the requirements of a doctoral degree (Ed.D in Learning Technologies).

3. My **participation** will involve the following: participation in a 8 hour initial workshop with 12 weeks of follow up and support. I will be asked to fill out a pre-workshop questionnaire on professional and technology skills/goals in order for the researcher to customize the workshop activities and content emphasis. I will also be invited to engage in the use of Twitter, a microblogging social network tool, over the course of 12 weeks. At the end of the 12 weeks, all participants will be asked to evaluate the PD experience through an approximately 30 minute online survey. I may also be invited to an approximately 60 minute focus group discussion at the end of the 12-week study.

   My individual posts (tweets), survey answers and focus group responses will be kept **confidential** and combined with all other participants' answers to be reported in a doctoral dissertation. As a member of the focus group, my responses to the group discussion will be videotaped. I understand that I must keep both my own responses and those of other participants in the group in strict confidence.

4. My participation in the study will last for 12 weeks. The study will be conducted at Commonwealth-Parkville School.

5. I understand that a possible **benefit** to myself from this research is learning new techniques for personalized professional learning through the use of technology and collaborative tools. Findings from this study may add significantly to the literature on effective teacher professional development through technology use and online support.

6. I understand that there are certain **risks** and discomforts that might be associated with this research. These risks include boredom, fatigue and a possible breach of confidentiality.

7. I understand that my estimated expected recovery time after the study will be minimal.

8. I understand that I may choose not to participate in this research.

9. I understand that my participation is **voluntary** and that I may refuse to participate and/or withdraw my consent and discontinue participation in the project or activity at any time without penalty or loss of benefits to which I am otherwise entitled.

10. I understand that the investigator(s) will take all reasonable measures to protect the confidentiality of my records and my identity will not be revealed in any publication that may result from this project. The confidentiality of my records will be maintained in accordance with applicable state and federal laws. Under California law, there are exceptions to confidentiality, including suspicion that a child, elder, or dependent adult is being abused, or if an individual discloses an intent to harm him/herself or others. I understand there is a possibility that my medical record, including identifying information, may be inspected and/or photocopied by officials of the Food and Drug Administration or other federal or state government agencies during the ordinary course of carrying out their functions. If I participate in a sponsored research project, a representative of the sponsor may inspect my research records.

11. I understand that the investigator is willing to answer any inquiries I may have concerning the research herein described. I understand that I may contact Dr. Judith Fusco-Kledzik (judith.kledzik@pepperdine.edu, XXX-XXX-XXXX), if I have other questions or concerns about this research. If you have questions about your rights as a research participant, contact Dr. Thema Bryant-Davis, Chairperson of the Graduate & Professional School Institutional Review Board at Pepperdine University, via email at gpsirb@pepperdine.edu or at 310-568-5753.

12. I will be informed of any significant new findings developed during the course of my participation in this research which may have a bearing on my willingness to continue in the study.

13. I understand that in the event of physical injury resulting from the research procedures in which I am to participate, no form of compensation is available. Medical treatment may be provided at my own expense or at the expense of my health care insurer which may or may not provide coverage. If I have questions, I should contact my insurer.

14. I understand to my satisfaction the information regarding participation in the research project. All my questions have been answered to my satisfaction. I have received

a copy of this informed consent form which I have read and understand. I hereby consent to participate in the research described above.

Parent or legal guardian's signature on participant's behalf if participant is less than 18 years of age or not legally competent.	Participant's Signature
	Date
Date	Witness
	Date

I have explained and defined in detail the research procedure in which the subject has consented to participate. Having explained this and answered any questions, I am cosigning this form and accepting this person's consent.

Principal Investigator	Date

APPENDIX I

Participant Information Sheet

Information Sheet

Dear CPS Teacher:

My name is Saress Smith, and I am a doctoral student in Learning Technologies at Pepperdine University, Graduate School of Education and Psychology. I am currently in the process of recruiting individuals for my study entitled, "The Use of Micro-blogging (Twitter) for Teacher Professional Development Support and Personalized Professional Learning." The professor supervising my work is Dr. Judith Fusco-Kledzik. The study is designed to investigate teacher professional learning, so I am inviting individuals who are interested in furthering their own professional learning to participate in my study. Please understand that your participation in my study is strictly voluntary. The following is a description of what your study participation entails, the terms for participating in the study, and a discussion of your rights as a study participant. Please read this information carefully before deciding whether or not you wish to participate.

If you should decide to participate in the study, you will be asked to attend a 10 hour workshop over the course of 2 days, with a follow up period of Twitter use and support for 12 weeks. At the end of the 12 weeks, you will be asked to answer an online survey. It should take approximately 30 minutes to complete the survey you will be asked to complete. Please complete the survey alone in a single sitting.

Although minimal, there are potential risks that you should consider before deciding to participate in this study. These risks include frustration, boredom and a possible breach of confidentiality. In the event you do experience frustration, the investigator will be available online for support and technical assistance. In the case of boredom, the investigator will be alert to the possibility and is customizing the workshop and professional learning to each participant's individual needs. No names are not being collected or used and pseudonyms will be used for all reports and findings in order to lessen the possibility of a breach of confidentiality.

The potential benefit to you for participating in the study is learning new techniques for personalized professional learning through the use of technology and collaborative tools. Findings from this study may add significantly to the literature on effective teacher professional development through technology use and online support.

If you should decide to participate and find you are not interested in completing the survey in its entirety, you have the right to discontinue at any point without being questioned about your decision. You also do not have to answer any of the questions on the survey that you prefer not to answer--just leave such items blank.

After 2 weeks, a reminder note will be sent to you to complete the survey. Since this will go out to everyone, I apologize ahead of time for sending you these reminders if you have complied with the deadline.

If the findings of the study are presented to professional audiences or published, no information that identifies you personally will be released. The data will be kept in a secure manner for at least three years at which time the data will be destroyed.

If you have any questions regarding the information that I have provided above, please do not hesitate to contact me at the phone number provided below. If you have further questions or do not feel I have adequately addressed your concerns, please contact Dr. Judith Fusco-Kledzik (judith.kledzik@pepperdine.edu). If you have questions about your rights as a research participant, contact Dr. Thelma Bryant-Davis, Chairperson of the Graduate & Professional School Institutional Review Board at Pepperdine University, via email at gpsirb@pepperdine.edu or at 310-568-5753.

By completing the survey online, you are acknowledging that you have read and understand what your study participation entails, and are consenting to participate in the study. Thank you for taking the time to read this information, and I hope you decide to complete the survey. You are welcome to a brief summary of the study findings in about 1 year.

Sincerely,

Saress E. Smith
Doctoral candidate
XXX-XXX-XXXX

APPENDIX J

IRB Approval Letter

PEPPERDINE UNIVERSITY

Graduate & Professional Schools Institutional Review Board

March 6, 2015

Saress Smith
[redacted]

Protocol #: E1014D02
Project Title: The Use of Micro-blogging for Teacher Professional Development Support and Personalized Professional Learning

Dear Ms. Smith:

Thank you for submitting your application, *The Use of Micro-blogging for Teacher Professional Development Support and Personalized Professional Learning*, for exempt review to Pepperdine University's Graduate and Professional Schools Institutional Review Board (GPS IRB). The IRB appreciates the work you and your faculty advisor, Dr. Kledzik, have done on the proposal. The IRB has reviewed your submitted IRB application and all ancillary materials. Upon review, the IRB has determined that the above entitled project meets the requirements for exemption under the federal regulations (45 CFR 46 - http://www.nihtraining.com/ohsrsite/guidelines/45cfr46.html) that govern the protections of human subjects. Specifically, section 45 CFR 46.101(b)(2) states:

> (b) Unless otherwise required by Department or Agency heads, research activities in which the only involvement of human subjects will be in one or more of the following categories are exempt from this policy:
>
> **Category (2) of 45 CFR 46.101**, research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: a) Information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and b) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

In addition, your application to waive documentation of informed consent has been **approved**.

Your research must be conducted according to the proposal that was submitted to the IRB. If changes to the approved protocol occur, a revised protocol must be reviewed and approved by the IRB before implementation. For any proposed changes in your research protocol, please submit a **Request for Modification Form** to the GPS IRB. Because your study falls under exemption, there is no requirement for continuing IRB review of your project. Please be aware that changes to your protocol may prevent the research from qualifying for exemption from 45 CFR 46.101 and require submission of a new IRB application or other materials to the GPS IRB.

A goal of the IRB is to prevent negative occurrences during any research study. However, despite our best intent, unforeseen circumstances or events may arise during the research. If an unexpected situation or adverse event happens during your investigation, please notify the GPS IRB as soon as possible. We will ask for a complete explanation of the event and your response. Other actions also may be required depending on the nature of the event. Details regarding the timeframe in which adverse events must be reported to the GPS IRB and the appropriate form to be used to report this information can be found in the *Pepperdine University Protection of Human Participants in Research: Policies and Procedures Manual* (see link to "policy material" at http://www.pepperdine.edu/irb/graduate/).

6100 Center Drive, Los Angeles, California 90045 ▪ 310-568-5600

Please refer to the protocol number denoted above in all further communication or correspondence related to this approval. Should you have additional questions, please contact Kevin Collins, Manager of the Institutional Review Board (IRB) at gpsirb@peppderdine.edu. On behalf of the GPS IRB, I wish you success in this scholarly pursuit.

Sincerely,

Thema Bryant-Davis, Ph.D.
Chair, Graduate and Professional Schools IRB

cc: Dr. Lee Kats, Vice Provost for Research and Strategic Initiatives
Mr. Brett Leach, Compliance Attorney
Dr. Judith Kledzik, Faculty Advisor