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Using social technology in professional development: a literature review

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Using social technology in professional development: a literature review

Abstract

Due to unprecedented pressure to improve teaching practices and student achievement, professional development has become the focus of much scrutiny. This paper reviews twenty-six peer-reviewed journal articles that discuss the effects of integrating social technologies in professional development activities. The review examines the traits of effective professional development, the ways social technologies are being incorporated into professional development, the impact of this integration, and what problems may arise using social technology. Final discussions indicate that social technologies have great potential to encourage collaboration and professional growth. Further research is needed, however, to determine if using social technologies in professional development will improve student achievement.

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A LITERATURE REVIEW

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Abstract

Due to unprecedented pressure to improve teaching practices and student achievement, professional development has become the focus of much scrutiny. This paper reviews twenty-six peer-reviewed journal articles that discuss the effects of integrating social technologies in professional development activities. The review examines the traits of effective professional development, the ways social technologies are being incorporated into professional development, the impact of this integration, and what problems may arise using social technology. Final discussions indicate that social technologies have great potential to encourage collaboration and professional growth. Further research is needed, however, to determine if using social technologies in professional development will improve student achievement.

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Introduction

Today public schools are facing unprecedented political pressure. The federal government's No Child Left Behind Act passed in 2001 demands that schools submit a "report card" showing all students are performing at grade level. Schools who do not show such performances face serious consequences. The U.S. Department of Education's website states the following:

> Schools who do not make progress must provide supplemental services, such as free tutoring or after-school assistance; take corrective actions; and, if still not making adequate yearly progress after five years, make dramatic changes to the way the school is run. (U.S. Department of Education, 2011)

In the state of Iowa, the number of schools listed on the government's Schools In Need Of Assistance, or SINA, document has grown from 12 in 2002-2003 to 151 in 2007-2008 (Iowa Department of Education, 2011).

This perceived decline in student achievement may be tied to the lack of quality professional development available to teachers. Many believe quality-learning opportunities for America's teachers are rare. Richard Elmore, a professor of educational leadership at Harvard, argues the following:

> School structures make learning for adults unlikely at best and nothing short of impossible at worst...As expectations for increased student performance mount and the measurement and publication of evidence about performance becomes part of the public discourse about schools, there are few portals through which new knowledge about teaching and learning can enter schools; few structures or processes in which teachers and administrators can assimilate, adapt, and polish new ideas and practices; and few

sources of assistance for those who are struggling to understand the connection between

the academic performance of their students and the practices in which they engage.

(Elmore, 2002, as cited by Ferriter, 2009, p. 34)

Repeated exposures to such poor professional development experiences alluded to by Elmore have left many educators jaded as they bring stacks of papers to grade during time supposedly reserved for teachers' professional growth. Ferriter (2009) later asserts that adult learning is further ignored as schools focus on avoiding consequences of failing to achieve standards established by NCLB instead of elements of effective professional development.

There is much agreement that the key element in a child's education is the teacher (Darling-Hammond & Bransford, 2005). Thus, if student achievement is to improve, the majority believes it must begin with the teacher. Many argue that in order to improve teaching methods, educators must move "from isolation to colleagueship" (Lieberman & Mace, 2010, p. 77). Little's research (1986) showed that collaboration was key to teacher growth and found that allowing collaboration among teachers established a new commitment to their colleagues and furthered individual learning. To increase the quality of professional development, there is significant reason to believe that collaboration should be an included element as teacher-learning opportunities are designed.

One collaborative tool to be explored, especially with consideration given to social learning theory, is the learning potential inherent in social technologies. Hill, Song, and West (2009) said, "From a social learning perspective, knowledge is constructed in engaging in activities, receiving feedback, and participating in other forms of human interaction in public, social contexts." According to social learning theory, continual communication and discussion builds a strong sense of community that is central to learning," (Hill et al., 2009, p. 23). Social

technologies seem to provide an excellent vehicle for this social learning and collaboration to occur. Laura Brooks (2009) stated the following:

> Social technologies are the lead tools for sharing knowledge...Social technologies have revolutionized the idea of learning in a social context...By understanding how social media impacts our learning ecosystems, we will enable student learning to reach its full potential. (p. 59)

Thus, it seems important to examine the potential of social technology in professional development.

This summary of 26 peer-reviewed journal articles examines the use of social technology and its possible impact on secondary professional development and in pre-service teacher education. This review will attempt to answer the following questions:

- In what ways, and with what tools, is social technology being used in professional development?
- What impact does using social technology have on professional development?
- What may be some problems with incorporating social technology into professional development?

Methodology

Finding relevant and reliable sources on social technology's use in professional development and its impact on student achievement was a challenge for this researcher. Accessing information involved using the University of Northern Iowa's *Panther Prowler* and Area Education Agency 11's *Iowa AEA Online* service to locate numerous online databases and find scholarly articles. These online databases included *ERIC (EBSCOhost Academic Search*

Elite), EBSCOhost Professional Development Collection, GALE Academic OneFile, Education Full Text (Wilson Web), and *PsycINFO.*

A variety of keyword descriptors were used within these databases. These keywords included the following: *professional development, social technology, secondary professional development, social networking, effective professional development, student achievement, adult learners, social learning theory, effective teaching, blogging in education,* and *teacher improvement.*

In searching for applicable articles, the search engines were limited to peer-reviewed journals only. The *Advanced Search* feature was used in EBSCOhost Professional Development Collection and ERIC to get the most relevant information, using the basic Boolean search operator "AND" to narrow search results. For example, "professional development" AND "social technology" were used to retrieve articles that met both parameters.

Journal articles were analyzed to determine the validity of the research they presented by examining research study methods including how data were collected, the size of the sample studied, and methods of data analysis used. The evaluation of resources determining their inclusion into the review also involved their relevance to social technology's use in professional development. Additional studies and journal articles were included if discussion incorporated an examination of elements of effective professional development, characteristics of adult learning, and/or a discussion of social learning theory.

Analysis and Discussion

This researcher sought to discover what social technology tools are being used, what impact is evident when social technology is used in professional development, and what problems arise when using social technology as part of a professional development plan. A

number of case studies designed to examine the impact of social technologies were found, along with research to address the traits of effective professional development. Also considered in this discussion is research discussing professional development, social learning theory, adult learning traits, and how these factors impact social technology's use in professional development.

Important Factors Affecting Professional Development

Before examining social technology, it seems important to discuss significant factors that affect professional development. It seems equally important to examine how these elements interact with social technologies.

Effective Professional Development and the Adult Learner.

Dr. Jean Hunzicker (2010), Assistant Professor for the Department of Teacher Education of Bradley University, summarized what current research indicated were the traits of effective professional learning opportunities. She stated powerful professional development..."engages teachers in learning opportunities that are supportive, job-embedded, instructionally-focused, collaborative, and ongoing" (Hunzicker, 2010, p. 4). In examining the role of collaboration more closely, Hunzicker (2010) found teachers valued opportunities to learn from one another toward common goals. Similar information was found in other studies. Quick, Holtzman, and Chaney (2009) found that teacher-to-teacher collaboration, specifically coaching and mentoring, was more likely to result in powerful learning experiences for teachers than traditional professional development. Social technologies could be effectual in facilitating this collaboration that has proven impressive in professional learning activities (Hargadon, 2010).

The study of adult learning theory, or andragogy, should also be considered. Malcolm Knowles' theory on adult learning identified five characteristics that distinguish adult learners from child learners: *self-concept* has shifted from dependency to self-directed, *experience* has

shifted to become a much larger resource for learning, *readiness to learn* has shifted from

distraction to a strong desire to the task of the adults' social role, *orientation to learning* has

shifted from self-centered to problem centered, and finally, the *motivation to learn* has shifted

from external to internal (Baird & Fisher, 2006). Baird and Fisher (2006) also assert, "Learning

should be organized around experiences which support the performance needs of the adult

learners" (p. 7). Social technology may assist this learning process, empower these adult

learners, and provide the opportunity to move social interaction to deeper, more meaningful

levels. Conole, Galley, and Culver (2011) assert social technology tools have enabled teachers to

connect and interact with a much broader audience than ever before, and this continuous,

ubiquitous connection addresses the specific learning styles the adult learner brings to his/her

training.

Social Learning Theory and the New Teacher-Learner.

Consideration of social learning theory seems warranted. According to social learning

theory, learning is not an individual event or process; it is shaped by the interaction the

individual has with others and the context in which these interactions occur (Henning, 2004).

Henning (2004) asserts, "From a social learning perspective, knowledge is constructed while

individuals are engaging in activities, receiving feedback, and participating in other forms of

human interaction in public, social contexts (p. 44). Other researchers agree. Wenger (1998)

asserts that learning is accomplished through participation with others, and that most people

learn best in these "communities of practice" (p. 37). Another study, conducted by Vonderwell

(2003), concluded, "The ability to socially construct knowledge and share experience, central to

social learning theory, enabled learners to create and distribute knowledge to promote

understanding" (p. 28). This seems to coordinate with the Hunzicker (2010) study of effective professional development, as it stated collaboration was an important factor in its success.

Lieberman and Mace (2010) claim social learning theory has powerful implications for the professional development of teachers. They state that participation in professional learning communities is vital so that educators may create their professional identity. Lieberman and Mace (2010) assert that by interacting socially with other educators, teachers can develop a clear identity as an educator and then identify if and how they wish to change. This social component of professional development "calls attention to the fact that learning, rather than being solely individual, is also social and as such helps us understand why and how practice becomes a public contribution to be shared, used, shaped, and understood by the community" (Lieberman & Mace, 2010, Understanding that Learning is Social Within Communities of Practice section, para. 2). The recent emergence of professional learning communities and personal learning networks in professional development seems to support the premise that the social component of adult learning deserves a significant role in the design of professional development of teachers.

Another factor affecting professional development effectiveness is the learning style of today's young teachers. Those newest to the profession are digital natives and bring different demands to their teacher training. Baird and Fisher (2006) classify these learners as the "neomillennial" user, and they believe social networking tools provide the support necessary to their "always on" learning style. Baird and Fisher (2006) theorize that today's young professionals have grown up surrounded by the digital world, and thus an approach that blends current adult learning theory and social technologies would be most effective in designing professional development opportunities for them. Lieberman and Mace (2010) also addressed the concern that digital natives are now entering the teaching profession, and current professional

development is "poorly positioned to capitalize on these teachers' talents and interests"
(Lieberman & Mace, 2011, Making Practice—and Communities of Practice—Public section,
para. 1). This potential conflict deserves the attention of those designing professional learning for
school districts, for frustrations with professional development may lead more young teachers to
abandon the teaching profession.

Professional Development and Student Achievement

Martin, Strother, Beglau, Bates, Reitzes, and Culp (2010) designed a study of the
professional program eMINTS, enhancing Missouri's Instructional Networked Teaching
Strategies. The focus of their study was to "determine whether variations in program
implementation had an impact on teacher outcomes, and then look at whether variations in
program implementation and teacher outcomes had an impact on student of achievement"
(Martin et al., 2010, p. 53). The study used a three-phrase approach to evaluate the program's
effectiveness to examine the following elements: the program's core components, teacher
perceptions and understandings of the program, and how variations in professional development
fidelity and teacher perceptions compared to student outcomes over two years (Martin et al.,
2010). Data were collected at three levels, and over 50 observations by 31 different instructional
specialists were collected. Researchers gathered some data from 269 teachers from 71 schools in
10 total districts. Participants mainly taught elementary or middle grades, with 9 high school
teachers involved (Martin et al., 2010, p. 59).

Correlation analyses were run to determine relationships between the following elements:
professional development fidelity and classroom activities, lesson plan quality and student
achievement, and student achievement and professional development fidelity. Researchers found
there were no significant correlations between professional development fidelity and classroom

visit activities; evidence from these studies suggested, "Teachers who experience higher-quality professional development in the less comprehensive program spend more time with instructional specialists on reflective practice, problem solving, and lesson planning, rather than on technology" (Martin et al., 2010, p. 64). Results did indicate, however, a positive correlation to higher-quality lesson plans and student performance (Martin et al., 2010). Finally, correlation studies found "positive relationships" between student achievement and higher PD fidelity. Researchers could not determine, however, which aspects of the program appeared most effective for student achievement (Martin et. al, 2010, p. 65). In their discussion researchers stated the following:

> Lesson plan quality was significantly associated with higher student
> achievement in third grade both years. This finding completes the chain of
> reasoning that suggests that high-quality PD leads to improved teacher
> knowledge, which can then lead to higher student achievement.
> (Martin et al., 2010, p. 69)

Thus, evidence does exist to support the claim that high quality professional development will have a positive impact on student achievement. Will social technologies, however, constitute high quality professional development?

Digital Social Networks

One tool frequently examined in the studies found in this literature review is a digital social network. *Digital social networks* are defined as "software that enables people to collaborate, interact and connect with each other using software whose source code is public and so can be used, modified or re-distributed by its user" (Ozkan & McKenzie, 2008, p. 3). Characteristics of social networks include the following: they provide multiple services to the

users such as email, instant messaging, chat, video, blogging, file sharing, and photo sharing; most social networks allow the users to create an online profile and the user can "friend" others based on requests; the majority of these networks are free, helping strangers connect based on shared interests, and most services allow users to set up their own privacy settings (Ozkan & McKenzie, 2008).

There is some debate over which term should be used to describe these tools. Steve Hargadon, founder of the Classroom 2.0 social network, which specializes in connecting teachers and other educators, believes that the term social networking..."carries so much baggage that it would actually impede its productive use in the context of education" (Hargadon, 2010, p. 11). He proposes using the term "educational networking," for it eliminates the negative preconceptions, and it more accurately describes "the hybrid form of social networking that is being built for education" (Hargadon, 2010, p. 11). Hargadon believes educational or social networking is the perfect environment for professional development to thrive. He cites the example of the online network Classroom 2.0, which has grown to tens of thousands of members since its creation in 2007, to support his claim that these educational networks are the most powerful tools for professional development's future. He believes these social or educational networks allow educators to build on their natural desire to share what they know and to learn from their colleagues, reducing the isolation many educators feel. Hargadon (2010) states, "Educational networks are, bar none, the most likely web platform for facilitating" meaningful professional development (p. 12).

Robert Strathdee, professor at Victoria University of Wellington in New Zealand, agrees. He states, "Network creation makes sense because it is a highly effective way of transmitting what has been termed 'sticky information'...Sticky information is defined as tacit knowledge that

is difficult to transfer between individuals" (Stratthdee, 2007, p. 24). Strathdee (2007) asserts innovation typically occurs due to social relationships where innovative knowledge and 'sticky information', can be passed more easily. Social networks make these relationships possible.

Case Studies of Social Networks in Professional Development

This researcher was able to find a number of case studies that examined various social networks and their impact on professional practices. These case studies examine social technology's use in both the school setting and in professional development workshops. Each study notes some positive impact on professional development, but also notes some problems with their adoption and use.

Cloudworks Case Study.

Cloudworks is a social networking site created by professors of education at Open University in the United Kingdom using a design-based research approach. Design-based research is..."an approach for studying learning in context through systematic design and study of instructional strategies and tools" (Conole et al., 2011, p. 122). Cloudworks was built to facilitate the sharing of learning and teaching ideas. It incorporates many of the features of social networks: multi-user blogs, discussion forums, social bookmarking sites, tagging, favoriting, RSS feeds, and even Twitter-like follow-and-be-followed options (Conole et al., 2011). Conole and fellow researchers used a four-pronged strategy to evaluate the effectiveness of the site. One phase evaluated online discussion forums using the Community of Inquiry, or CoI, model developed by Garrison, Anderson, and Archer. The CoI framework allowed researchers to analyze student learning in the context of social networking. The other phases included data gathered from Google analytics, the collation of references to Cloudworks on other social media, and use and evaluation of the site at teacher workshops. In this case study, researchers found that

Cloudworks did support teachers who were seeking advice. They also found evidence of evolving communications across subject matter and connected those with shared interests. For example, researchers found one group established "coffee mornings" to discuss a shared enthusiasm in new technologies. Researchers found Cloudworks enabled the focus to be on the connectivity across and beyond physical locations (Conole et al, 2011). Google analytics found the number of active contributors to the site--2,935 were registered-- was less than the number of unique visitors, which included 87,325 visits from 167 countries. The monthly statistics showed a steady growth in both visitors and regular contributors. However, researchers found the site struggles to achieve the critical numbers to be self-sustaining and thus still needs the active involvement of the creators (Conole et al., 2011).

New Zealand Social Networking Initiative Case Study.

Strathdee (2007) investigated the effectiveness of social networks' use with a reform movement in New Zealand labeled Extending High Standards in Schools, or EHSS. EHSS is an attempt to improve the quality of teaching by funding schools to share their strategies with the broader educational community. According to Strathdee, network creation is a key policy for New Zealand's and England's political efforts in education, with some departments actually creating mandates to create networks. Strathdee found the results of these efforts are mixed. He found network creation does emphasize social connectedness and cooperation and does loosen administrative attempts to control professional development's content. However, he also found, as did Conole et al., that the networks were not self-sustaining and needed some administrative intervention to be effective. Strathdee concluded that the..."creation of networks holds the key to school improvement. Networks can be an effective method of dispersing best practice because

they provide a trusted way to spread tacit knowledge...[However], it is very difficult to transmit practices found effective in one setting to another (Strathdee, 2007, p. 23).

Middle School Portal 2 Math & Science Pathways Case Study

Lightle (2010) discussed an effort in using social networks for professional development conducted by a team from Ohio State University, the National Middle School Association, and the Educational Development Center, Inc. They collaborated to build an online professional network that would "provide meaningful opportunities for individualized professional growth" (Lightle, 2010, p. 50). For its home platform, the team used a Ning, an online service that allows users to create their own social network. The team then designed an extensive social network that included many features such as links to online information and events, links to wikis where participants could contribute to the knowledge base, and links to blog spaces where teachers could post blogs and participate in comment streams. Lightle (2010) found members were more interested is using the social networking site to discuss issues of technology more than issues of science education. Lightle (2010) claims, "Mathematics and science content and resources draw teachers into the site, but their active participation is encouraged by the conversation and opportunities to extend learning around integrating technology and digital tools" (Lightle, 2010, p. 52). Additional examination of the group's wiki revealed members do little to modify the wiki's content (Lightle, 2010). Lightle provided no explanation of methods used to study the site or methodology used to evaluate its effectiveness; this must be considered as readers weigh the value of this study.

EduCamps Case Study

The effectiveness of using social technology has also been studied in a workshop setting. One example of this is a series of workshops called EduCamps held in Colombia. These

workshops were created by the Vice Ministry of Higher Education of Colombia to encourage the use and adoption of information and communication technologies, or ICTs, and incorporated a broad set of social technology tools to do so (Fonseca, 2011). Often called an "unconference", these workshops allow adult learners to choose their learning interest and use social technologies to connect with those with similar learning interests. This structure may be termed as chaotic by some; however, it aligns with the social learning theory described earlier. Evaluation of these EduCamps was generally positive. Of the 1,054 participants, 62 percent qualified the experience as "excellent" and 32 percent qualified it as "good." This pattern is seen in other aspects of the survey where the "excellent" and "good" ratings combined to include 85 percent of the participants surveyed (Fonseca, 2011). The author notes, however, that it is unknown if this experience can actually transform teaching practice.

Colton Symposium Case Study

Jacobs and McFarlane (2005) examined the social technology 'back-channelling' at the 2004 Colston Symposium entitled 'The Evolution of Learning and Web Technologies: Survival of the Fittest?' The benefits of back-channelling, as described by these authors, are "the ways in which the viewer or listener can legitimately input into the program at hand" (Jacobs & McFarlane, 2005, p. 318). This symposium was designed to include an IRC, or Internet relay chat, and a conference blog to facilitate back-channel discussions, allowing conference participants to communicate with presenters and other conference attendees. The IRC and the blog were projected live on screens in the main auditorium. Additionally, each breakout session appointed a note taker who posted group questions to the conference blog; the questions would be available at later panel discussions (Jacobs & McFarlane, 2005).

Even though the conference attendees were professionals active with technology

integration in education, only a very small percentage used the IRC back-channel and/or

contributed to the conference blog (Jacobs & McFarlane, 2005). Additionally, symposium

members discussing technology issues related to running the conference dominated the first

day's use of the IRC. Use of the IRCs did evolve during the second day. A 'scribe' emerged,

posting comments that shifted the conversation from technology issues to thoughtful questions

and comments concerning presentation topics. However, the authors noted, "There appeared to

be a limit to the depth of interaction that could be achieved within this relatively short time-scale

in this medium" (Jacobs & McFarlane, 2005, p. 324). The conference blog was used more

effectively due to the designated note-taker in each breakout session. Outside of these structured

uses, there were few other contributions to the blog. Jacobs and McFarlane (2005) concluded,

"Overall, use of the IRC and blog remained a minority activity" (p. 325).

Examining Blog Use in Professional Development

Blogs, also named weblogs, are emerging as popular social technology in education.

According to Nardi, Schiano, and Gumbrecht (as cited in Sun, 2010), blogs have four key

characteristics: personal editorship, hyperlinked post structure, strong archival features, and

public access to content. With these features, many researchers believe blogs are a social

technology that hold strong possibility for educators for many reasons (Sun, 2010). Du and

Wagner (2007) also assert, "The effective use of blogs encourages the development of individual

and critical voices and prompts individual accountability in learning" (as cited in Sun, 2010, p.

370). Others claim blogging has the potential to support like-minded professionals to connect

and share better than other social technologies. Luehmann and Tinelli (2008) state,

"Blogging...can offer new avenues for professional learning by providing teachers with new

forms of participation and unique learning opportunities" (p. 325). They also claim blogging

creates a nurturing community where people "who share common perspectives, visions, and

commitments" (Luehmann & Tinelli, 2008, p. 325) can connect, support, and share.

Luehmann & Tinelli Case Study

Luehmann and Tinelli (2008) conducted a quantitative study examining how blogs may

work to encourage reform-based teaching practices in the science classroom. In this quantitative

study, Luehmann and Tinelli followed the blogging efforts of 15 science teachers enrolled in a

graduate course that required the participants to publish two posts and respond to classmates'

blogs every two weeks. Data was collected in two ways: by coding and examining the

participants' blogs and through a survey distributed at the end of the course. Researchers did

discuss how issues of credibility, transferability, dependability, and confirmability were

addressed to increase the trustworthiness of the qualitative research data (Luehmann & Tinelli,

2008).

Over the fourteen weeks of the study, students posted 395 blogs and 551 comments

(Luehmann & Tinelli, 2008, p. 326). Blog analysis involved coding blog posts and comments

into types of participation—cognitive work, affective work, and social work—and then tallying

the number of posts in each category. An in-depth analysis of one student's blog post and

comment stream was shared to illustrate the coding process and the level of thinking involved.

The authors claimed, "As we coded blog posts and comments, it became clear that teachers were

indeed learning through their interactions with other reform-minded science teachers"

(Luehmann & Tinelli, 2008, p. 327). The researchers pointed to the depth and richness of the

interaction and the high number of comments to support this claim. Another factor highlighted to

support their claim was the survey. It showed 11 of 13 participants 'agreed' or 'strongly agreed'

that blogging was a valuable piece of their professional learning. Additionally, survey responses indicated blogs were valuable in providing encouragement and for allowing personal reflection on teaching practices (Luehmann & Tinelli, 2008). In fact, 'encouragement' was the most common type of comment made, accounting for 29% of the total, with each person receiving at least three encouraging comments each week (Luehmann & Tinelli, 2008, p. 329). These data appear to illustrate that the crucial elements of social learning are present in blogging. For example, Wenger (1998) stated that learning is accomplished when participating with others. Blogs seem to facilitate this piece of social learning; the study's 395 blogs and 551 comments provided evidence that these participants were highly involved in the process. This teacher-to-teacher collaboration and communication were also listed in Hunzicker (2010) as an important piece if professional development is to be effective.

Yu-Chih Sun Case Study

Another study also seems to support the value of blogs in professional development. Yu-Chih Sun (2010) conducted a qualitative study to examine the learning facilitated by using blogs in teacher-education programs in Taiwan higher education. Participants were 12 pre-service teachers enrolled in the Master's program in Teaching English to Speakers of Other Languages, or TESOL, at the National Chiao Tung University in Taiwan. Students were required to submit at least 30 blog entries for a semester course in an attempt to enhance their learning (Sun, 2010). The research question Sun presented for this study was, "What sorts of learning behaviors did the pre-service teachers demonstrate during a blogging task" (Sun, 2010, p. 371). Thus, this study worked under the assumption that learning would occur.

Data-collecting methods included coding and analyzing blog entries, surveying participants, and conducting semi-structured interviews. Categories for coding posts and

comments included the following: activating prior knowledge, reshaping ideas, knowledge transmission, knowledge transformation, interaction, contextualization, and miscellaneous. A total of 523 blog posts were recorded. The number of entries per pre-service teacher varied from 23 to 98. A total of 575 comments were posted. Student participation in the commenting piece of the blog ranged widely, with one student posting just 6 to another posting 122 comments. Sun's study also examined the challenges impeding the blog efforts of these teachers. Time management, 'blogger's block', attracting outside audiences, and anxiety concerning the public nature of the writing were the most commonly cited problems (Sun, 2010).

In conclusion, Sun says, "The results of the study revealed that blogs provide powerful organizational forums for online expression" (Sun, 2010, p. 378). Sun (2010) also asserts, "Pre-service teachers made enormous efforts to establish their space in the blogosphere by making their blogs meaningful to others, not just to themselves" (p. 378). Sun (2010) later claims, "More frequent sharing and discussing about blog efforts could be beneficial not only for boosting motivation...but also serve as a strengthener of ideas" as teachers work to learn new concepts and teaching strategies (p. 378). Along with reinforcing individual accountability and effort, Sun suggests group blogs could be developed to foster a collaborative effort in building knowledge and problem-solving; thus, he contends, the roles blogs could play in teacher development deserve consideration (Sun, 2010).

These case studies seem to provide evidence to support the claim that blogging is a social technology that may be a valuable piece of future professional development. Furthermore, there are studies which provide evidence that other tools have value in the professional growth efforts of educators.

Using Twitter in Professional Development

One other social technology receiving attention in the educational community is microblogging. Microblogging is based on the premise that a person can comment on various topics but must do so using 140 characters or less, and Twitter is the most popular microblogging tool in education today. Evidence suggests these "tweets" can be quite influential. Michael J. Petrilli (2011), in an article published in *Education Next*, stated the following:

> Once upon a time, the education war of ideas was fought on the battleground of the nation's op-ed pages. Then came blogs. But that was so two years ago. Who has time for 400-word missives anymore? If you've got a point to make, tweet it! (Petrilli, 2011, p. 90)

Petrilli (2011) argues the influence of Twitter on education by pointing to the power of individual contributors, such as Diane Ravitch. Petrilli quotes Alexander Russo, a freelance writer and blogger, who claimed, "a 72-year-old grandmother has won the Internet" (Russo, as cited by Petrilli, 2011, p. 90). Petrilli claims Ravitch has influenced thinking on education using Twitter to tweet "bumper-sticker style statements" that motivate large reactions among the public. In fact, Petrilli notes, Ravitch's tweets are so influential, an anonymous Twitter member uses the name @NOTDianeRavitch to present counter-arguments (Petrilli, 2011, p. 90). Another testimony to the influence of Twitter on education is that Klout scores now exist. Klout scores measure someone's overall online influence by evaluating a variety of factors, such as the user's number of retweets and @messages. Diane Ravitch's Klout score is 73 out of a possible 100. That makes her the "most influential tweeter in education" (Petrilli, 2011, p. 90).

Eric C. Sheninger, principal at New Milford High School in New Jersey, also uses Twitter. He used Twitter to form partnerships with a company that donated technology

equipment and training to the school. "I used to be the administrator that blocked every social-media site, and now I'm the biggest champion," said Sheninger (cited in Davis, 2010, p. 14). Sheninger believes, based on his experience, that Twitter is a powerful tool that will help teachers and administrators grow professionally, both formally and informally (Davis, 2010). Sheninger's Klout score is a 69, ranking him fourth on the list of Top 25 Educator Tweeters (Petrilli, 2011, p. 91).

EdChat is another example of how Twitter is used by teachers for professional development. EdChat is an online "conference" held each Tuesday evening on Twitter. On EdChat, moderators choose a topic and educators can ask questions or add information from anywhere in the world. All contributors use the hashtag #edchat to make sure they appear in the Twitterstream. These streams sometimes receive more than 2,000 tweets in an hour (Davis, 2010). Steven Anderson, an EdChat moderator and instructional technologist at Clemmon Middle School in North Carolina, says, "Twitter is like a giant conference that's on all the time. I always know I can find something I can use" (cited in Davis, 2010, p. 17).

Many professional journals feature articles instructing teachers how to use Twitter for their professional growth, testifying to its positive impact on professional development (Davis, 2010; Ferguson, 2012; Hargadon, 2010; Wright, 2010). "Twitter helps strangers come together to create a community built on communication and collaboration dedicated to making learning and education the best it can be," asserts Hadley Ferguson in her journal article featured in *Learning & Leading with Technology*, which lists pointers on how to use Twitter effectively (Ferguson, 2010, p. 13). Ferguson (2010) later testifies, "Using Twitter to tap into my PLN has made my teaching suddenly come alive...Join the flow of ideas and learning and watch it change how you see yourself as a teacher and your students as learners" (p. 15).

Nicole Wright of the University of Waikato in Hamilton, New Zealand, conducted a case study that examined whether Twitter assisted teacher education students in developing self-reflective practices (Wright, 2010). Wright studied eight volunteer graduate students who had never used Twitter. Participants were asked to tweet three times each workday, reflecting on their work in their second practicum experiences. Data was analyzed using thematic analysis, categorizing Tweets in the following categories: pedagogy, emotions, relationships, complexity/curriculum/planning, reflections and other. Additionally, a focus group discussion was conducted following the practicum to supplement data analysis (Wright, 2010). Following analysis, Wright concludes, "While they found the 140-character limit initially restricted their ability to explain ideas, it focused their thinking to reflect purposefully on their experiences...The small size of the case study is an added limitation, but may be a useful basis for future projects to build on" (Wright, 2010, p. 263).

Course Websites as a Social Technology Tool

Some researchers contend classroom websites have the potential to support and enhance student learning and thus deserve attention in professional development. Holcomb, Castek, and Johnson, 2007, as cited by Tingen, Philbeck, and Holcomb (2011) claim course websites can enhance students' interpersonal skills. Thus, Tingen et al. designed a research study which posed two research questions: one, how do classroom Web sites meet the needs of the 21st century learners, and two, how can educators support 21st century skills within their classroom Web site. Criteria were developed to evaluate sites' core elements, such as course overview and homework links, and their alignment with 21st century skills, such as literacy and communication skills. After screening more than 100 classroom sites and evaluating 25 in-depth, researchers found, "Web sites are not meeting the needs of the 21st century student" (Tingen et al., 2011, p. 89).

These researchers suggest professional development and teacher training include Web site development, as these sites are an important social technology where teachers and students can connect and communicate (Tingen et al., 2011, p. 90).

TPaCK : Re-thinking Pedagogy in Professional Development

As all social technologies are considered for integration into professional development, some researchers contend that a changing approach to professional development's pedagogy must also be considered. The work of Koehler and Mishra (2005) addresses this need. They propose TPaCK, an approach that accounts for and combines the three crucial areas of knowledge: technological, pedagogical, and content knowledge (Koehler and Mishra, 2005). Researchers Archambault, Wetzel, Williams and Foulger (2010) contend, "In crafting professional development programs, the areas of pedagogy, content, and technology need to be addressed to ensure that the experience is as transformative as possible" (Archambault et al., 2010, p. 5).

Using this TPaCK framework, Archambault et al., designed a professional development opportunity for full-time faculty members at Arizona State University. The two goals of their professional development activity were to provide models for faculty to keep up with rapid changes in technology and to promote transformation of pedagogy. Using TPaCK principles, professional development focused on assisting the twenty participants to find and use technologies that best fit the needs of their curriculum, demanding extensive activity from the participants and less direct teaching (Archambault et al., 2010).

Web-administered surveys were given to faculty participants and then coded for analysis. Results showed 45% of the participants noted changes in their pedagogy as they worked to incorporate social technology into their courses. One participant stated, "The pedagogy changed

from more instructor led learning to students helping and leading each other...by using the social networking tools" (Archambault et al., 2010, p. 7). Twenty-five percent of the participants reported that they found their content changed in meaningful ways due to the work with social networking tools, and sixteen of the twenty participants believed the integration of social technologies had "positive impact" on student achievement (Archambault et al., 2010, p. 8). Researchers concluded the following:

> The benefits of integrating such tools in a meaningful way, mindful of how they fit within specific content areas and methods of teaching are important considerations, especially for teacher education programs. This study highlights the positive outcomes of creating professional development opportunities for faculty that center on the affordances of social networking tools to improve good teaching practices. (Archambault et al., 2010, p. 10)

Problems in Using Social Technologies

There are some problems with using social technology in professional development activities. Evidence does suggest that despite a surge of interest when first introduced, the social networks do struggle to maintain a critical mass of use so they can be self-sustaining (Conole et al., 2011; Lightle, 2010; Strathdee, 2007). The sheer number of networks can be overwhelming to teachers, also. Web sites do exist that will help organize these social networks in various ways, including popularity ratings, to assist teachers in finding the network best suited to their needs (Baird & Fisher, 2006), but the numbers can be overwhelming nonetheless.

Another concern is the lack of quantitative research to support social technology's use in professional development. Michelle Davis (2011) describes a collaborative effort between Nicholas Provenzano, an English teacher and technology curriculum specialist for a school in

Michigan, and an English teacher working in Van Meter, Iowa, whom Provenzano met on Twitter. Davis describes the projects these educators' students created as they collaborated online (Davis, 2011). The anecdotal evidence is interesting and seems impressive. However, there is no measurable evidence presented to support the claim that such collaboration boosts student test scores. Provenzano's Skype conferences and video projects that had students act out scenes from *Romeo and Juliet* may have been fun and even perhaps motivational, but no evidence is offered to support the claim that student reading or writing improved.

Others have noted this vital yet missing piece of educational research to support or deter the implementation of social technology into professional development. Filisko (2011) contends that perhaps the most over-cited element to attest to the power of social technologies is the number of participants. Consultants may emphasize that Facebook has 500 million active users and Twitter has 190 million monthly visitors (Filisko, 2011, p. 26), yet do these numbers automatically infer content value? Robert Bacal, a business consultant and author of the blog *Social Media Bust*, states, "Real research is hard to find, and the data does not support and substantiate the value of social media for business" (cited in Filisko, 2011, p. 26).

Another problem with integrating a new approach in professional development is addressing the teachers' need to accumulate credit hours to keep their professional credentials current or to advance on their salary schedule. Often traditional professional development sessions provide opportunities for teachers to earn graduate or completion credit to fulfill these requirements. Currently, time spent working with social technologies rarely offers this. Steven Anderson, Instructional Technologist at Winston-Salem Forsyth County Schools, stated, "Hopefully, if a teacher can document that they participated in Edchat for several months, they

can get credit, because it is meaningful" (cited in Davis, 2011, S14). However, this is not a possibility available to many teachers (Davis, 2011).

Conclusions and Recommendations

This researcher conducted this literature review of 26 peer-reviewed professional journal articles in an attempt to address three questions:

- In what ways, and with what tools, are social technologies being incorporated into professional development?

- What impact are these social technologies having on professional development?

- What problems might the implementation of these social technologies create?

After conducting the review, this researcher believes there is evidence that digital social tools seem to possess the potential to positively impact professional development, and in fact, are already doing so.

To begin, this examination revealed that social technologies are being implemented in professional development in various ways. Many educational networks already exist, such as Cloudworks, Extending High Standards in Schools, and Middle School Portal Two (Conole et al., 2011; Lightle, 2010; Strathdee, 2007). The entities that produce these social networks vary; for example, Cloudworks is the result of a government mandate to improve instruction, Middle School Portal 2 is the product of a partnership between various state entities to improve science education, and Classroom 2.0 is the product of one individual's vision (Conole et al., 2011; Davis, 2010; Lightle, 2010; Strathdee, 2007). Additionally, many professional conferences have implemented various social tools. Fonseca (2011) described EduCamps, a new type of professional conferences, as an "unconference" because of their lack of formal structure and reliance on social technologies. Other conferences are using back-channeling tools, such as

Twitter, because they allow participants to function in a more collaborative role during a conference (Jacobs & McFarlane, 2005). Although Jacobs and McFarlane found back-channeling to be a minority activity in 2005, the number of peer-reviewed journal articles advocating for such uses of social technologies leads this researcher to believe it soon will become a majority activity. Thus, there was much evidence to show that social technologies are being incorporated into today's professional development in a plethora of ways.

Furthermore, this researcher has found evidence that the implementation of social technologies is having many positive effects on professional development. One positive impact is that these technologies allow for the self-directed learning that, according to adult learning theory, adult learners find most beneficial (Baird & Fisher, 2006). Strathdee (2007) claimed and provided evidence to show that social networks allow for an educator-led approach to become the new paradigm in professional development, replacing administrative mandates. The creation of Personal Learning Networks, or PLNs, by today's educators is strong evidence that teachers have taken control of their own learning. Aided by Twitter, blog feeds, and social networks, teachers are building their own learning centers to become stronger teachers (Brooks, 2009; Ferguson, 2010; Ferriter, 2010; Hargadon, 2010). Social technologies empower educators to create their own professional development that is "supportive, job-embedded, instructionally-focused, collaborative, and ongoing," the very traits listed by Hunzicker (2010, p. 5) as those vital to quality professional development.

Another impact social technology is having on professional development is that it enhances the reflective practices of teachers. The Luehmann and Tinelli study (2008) showed that blogs were an excellent tool to allow for "personal reflection" as teachers shared their stories on the web (p. 327). The public forum that blogs provide also helps reduce the isolation which

can plague teachers; this study found each participant received at least three encouraging comments each week (Luehmann & Tinelli, 2008). Twitter, a microblogging tool, also allows teachers to reflect and share things such as classroom success stories and links to helpful resources (Ferguson, 2010). As teachers move beyond simply finding helpful information to actually contributing to this public dialogue, they have then elevated these tools beyond a self-directed, reflective level to a collaborative level.

It is at the collaborative level where this researcher found social technologies having the greatest impact on professional development. Social technologies empower various types of collaboration, including teacher-to-teacher collaboration and mentoring, key elements in effective professional development (Hunzicker, 2010; Quick, Holtzman, and Chaney, 2009). Davis's account (2011) of Provenzano's collaborative work with an Iowa teacher demonstrates the unique teacher-to-teacher collaboration than can occur due to a social technology. Such professional connections made via social technologies have led to the formation of professional learning communities where educators work together to improve instruction (Conole et al., 2011). Steve Hargadon, creator of the social network Classroom 2.0, is hard at work developing Learn Central, an educational networking site that combines the elements of social networking and educational needs in an attempt to become a valuable tool for professional development. Hargadon believes these education networks are the future of professional development: "Where we have seen the immediate and overwhelming positive use of educational networking is in the professional development of educators" (cited in Davis, 2010, p. 14). This researcher has found in this review some evidence to give Hargadon's words credence.

This review did, however, uncover problems created by the integration of social technology into professional development. In the busy world of a classroom teacher, finding time

to peruse and contribute to these tools is problematic. Conole et al. (2011), Lightle (2010), and Strathdee (2009) all found that social networks struggled to survive if they did not have some organized support system, beside classroom teachers, to regularly add new information. Additionally, it is difficult for district leadership to accept time spent with social technologies as quality professional development. Traditional "sit and get" classes, planned by administration, are firmly entrenched in many areas of the nation. As Steven Anderson, Instructional Technologist at Winston-Salem Forsyth County Schools, stated: "We need to change the mind-set at the district [to recognize] that the teacher can get high-quality professional development anytime, anywhere, and in a wide variety of formats" (cited in Davis, 2011, p. S14). This researcher believes this is a formidable challenge faced by those who seek to integrate social technology into professional development

Future research on the impact of social technologies and student achievement is needed. This researcher could find no articles that discussed quantitative studies to show connections between the integration of social technology into professional development and student achievement. In fact, there were few quantitative studies to connect the infusion of social technologies to the classroom practices of teachers. Much research is needed to determine if social technologies' integration in professional development will have an impact on student achievement. More studies are needed to determine if a correlation exists between using social technology and improved teacher practices. Eventually, studies must be done to determine whether the integration of social technology into professional development leads to increased student achievement, the goal of all professional development.

This researcher also believes the work of Mishra and Koehler (2005) is of vital importance. If and when social technologies are included in professional development, full

consideration must be given to all three vital pieces articulated in TPaCK: Technology, Pedagogy, and Content Knowledge. If each element is given full consideration, decisions as to what social technology tool will be used in what way are likely to be very sound, and thus the learning opportunity is much more likely to be valuable. Archambault et al. (2010) provides evidence to support this supposition.

Additionally, this researcher does see great potential in the crossover of social technology's uses. Once teachers become participants in these social networks, it is possible they would share these activities and skills with their secondary students, as evidence in the Archambault et al., 2010, study. There is much potential in the integration of social technologies in the secondary classroom, and by utilizing social technology for professional learning, teachers may identify areas in which their students' learning could be enhanced by the use of these social technology tools. Again, more research is needed to determine if this crossover will happen and whether it will benefit student achievement.

Social technologies appear to be effective tools for professional development for many reasons. They include and/or foster the characteristics of effective professional development and adult learners. Additionally, they appear to allow for those elements articulated as important in social learning theory, adult learning theory, and the learning styles of Millenials. Due to these and other promising factors, this researcher believes social technology deserves educational researchers' attention.

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