Teachers Perception in a Technology Integration Workshop: Implications for Professional Development in the Digital Age

Kele Anyanwu
University of Wisconsin – Stevens Point

Abstract

School districts are embracing innovative technology applications by increasing the accessibility of Web 2.0 applications from district networks. Workshops on these applications have become the favorite type of professional development workshop among in-service teachers. While there are studies using self-report instruments to examine in-service teachers' perceptions and attitudes about integration practices involving Web 2.0 tools and professional development, few studies report details of in-service teachers' lived experiences of these professional development sessions. A gap in understanding the meaning in-service teachers place on Web 2.0 professional development workshops exists. Five themes were established to understand participants' Web 2.0 workshop experiences. The findings from the study suggest that breaking professional development for teachers into two segments, that is, an online segment where the basics are delivered online and a face-to-face segment dedicated to modeling Web 2.0 tool integration m with hands-on collaboration are considered most effective by teachers.

Keywords: *Professional development, Web 2.0, technology integration, workshop, qualitative analysis.*

A top priority for teachers today is to remain current and successful in an ever-changing global educational landscape mediated by innovative technology (Ashton & Newman, 2006; Clarke & Hollingsworth, 2002; Grundy & Robinson, 2004). One innovative technology that is changing instruction, especially in secondary schools, is Web 2.0. A recent national survey of district technology directors conducted by Interactive Educational Systems Design (IESD) revealed that district acceptance of Web 2.0 is on the rise. While 64% of technology directors reported that more than 25% of teachers used Web 2.0 tools in classroom instruction in 2009, the number reported by technology directors rose to 76% in 2010 (IESD, 2011).

School districts are offering professional development programs to help teachers improve their technology skills. The positive impact that Web 2.0 is having on teachers was also noted in a national survey indicating that school districts are using or planning to use Web 2.0 tools in professional development. Seventy-six percent of respondents reported using Web 2.0 tools in professional development to show educators how to

post content online. Examples of content include lesson plans, online communication and collaboration tools like blogs and wikis, online professional development enrollment, and district sharing of podcasts, streaming videos, and examples of best practices (IESD, 2011). As interest in Web 2.0 tools continues to grow, there is a need to re-examine traditional professional development practices and policies with a view toward improving the professional development of innovative technology tools like Web 2.0. Even more compelling for sustained professional development is the fact that the majority of teachers graduated from college well before these technologies became available. Professional development is expensive; most school districts spend the equivalent of $200 per teacher to offer these programs (Dede, 2006). The International Society for Technology in Education (ISTE) provides teachers with a pedagogical model on which to base their professional practice. To support technology-enriched learning, ISTE has delineated five key concepts that should be implemented during instruction under an umbrella standard called the National Educational Technology Standards for Teachers (NETST) (ISTE, 2008):

a) Facilitate and inspire student learning and creativity

b) Design and develop digital-age learning experiences and assessments

c) Model digital-age work and learning

d) Promote and model digital citizenship and responsibility

e) Engage in professional growth and leadership

Professional development for in-service teachers must invariably be tailored according to this model to make a positive impact on teachers' professional practice.

Literature Review

Web 2.0 Applications

Web 2.0 technology-based tools have made considerable inroads into our classrooms such that they can no longer be ignored in professional development for teachers. But what exactly are Web 2.0 applications? According to O'Reilly (2005), who is often credited as coining the term, Web 2.0 applications possess unique characteristics based on the way they are designed.

From an educational perspective, the Consortium of School Networking (2011) defines Web 2.0 as online applications that elicit participation, collaboration, and interaction. Lemke and colleagues (2009) have noted that the "creation and sharing of intellectual and social resources by end users" (p. 5) is an important characteristic of Web 2.0 applications. Orr (2007) also describes Web 2.0 applications as a collection of tools

that are user-centric. Web 2.0, being user-centric, implies some form of transformation of the original read-only web to a reading–writing web in which the power of creating and publishing content has been transferred to anyone with access to the Internet (Richardson, 2007). Web 2.0 technologies have brought about innovative web-based applications that offer alternative platforms from which professional development can be offered to teachers so that learning can take place anytime and anywhere (Dalgarno & Lee, 2010). A professional development session in a school district is often made up of both young and old teachers, and as a result of this generational difference, older teachers may experience difficulty when it comes to learning new technologies like Web 2.0 applications (Oberauer & Kliegl, 2001). To close this performance gap between younger and older attendees, Wolfson (2010) found that advanced organizers, which are a form of outline that details in advance activities that will take place in a professional development session, have proven very helpful (Wolfson, & Cavanagh, 2011). Training in Web 2.0 applications during professional development is like a simulation exercise because there is nothing to install or that can go wrong. Training in a Web 2.0 professional development environment enables engaging, experimentation, and immersive learning activities to take place (Salas, Wildman, & Picocolo, 2009; Nyirenda, 2015)). As a result, we are beginning to see a lot of research focused on Web 2.0 applications (Anderson, 2007; Solomon & Schrum, 2007).

Professional Development

In recent years, there have been increasing calls for reform to improve schools, the quality of student learning outcomes and teacher quality. This has resulted in greater attention to teachers' professional development as a means for accomplishing these goals (Opfer & Pedder, 2011). Professional development (i.e. formal or informal in-service training to upgrade teachers' content knowledge and pedagogical skills) has evolved over the years as new research and technology emerge. The changing educational landscape that emphasizes teachers' continual professional learning has led to a redefinition of professional development. Wei, Darling-Hammond, and Adamson (2010) redefine professional development as "a comprehensive, sustained, and intensive approach to improving teachers' and principals' effectiveness in raising student achievement" (p. 4). Professional development is regarded as highly effective if it culminates in improvement of a teacher's knowledge and instructional practice and concurrently leads to improved student outcomes (Wei, Darling-Hammond, Andree, Richardson, & Orphanos, 2009).

However, research has shown that professional development has been ineffective and the outcomes disappointing (Hanushek, 2005; Sykes, 1996). Timperley and Alton-Lee (2008) assert that part of the problem is an overly simplistic view of teachers' professional learning that fails to account for teachers' professional lives and working conditions. Professional development within the teaching community follows the usual pattern of external experts coming to hand down information and instructions to teachers on how best to teach in their classrooms. Teachers are looked upon as curriculum implementers without the intellectual capability to be curriculum creators. It is therefore not surprising that these types of professional development sessions fail to achieve the desired

outcomes. Professional development programs are unsuccessful because they do not take into account teachers' abilities, how teachers learn in professional development and other situational influences that are counterproductive to learning (Borko, 2004; Clarke & Hollingsworth, 2002). Inadequate time spent in professional development does not allow enough time to model classroom practices or engage in meaningful hands-on activities that can bring about desired change in classroom instructional strategies (Loucks-Horsley, Hewson, Love, & Stiles, 1998; Garet et al., 2001). Professional development is most effective where best practices are modeled as closely as possible to what is obtained in the classroom and when teachers work collaboratively to address challenges they are facing (Darling-Hammond, Wei, Andree, Richardson, & Orphanos 2009). Another important fact that has emerged from research about teachers' participation in professional development involves grade level differences. A study on collaborative learning showed that middle and elementary school teachers were more likely to collaborate among themselves to address instructional concerns than secondary school teachers (Metlife, 2010; NCES, 2009).

Knowles (1984) succinctly delineated adult learners as being self-directed, ready to learn, experienced, task-centered, and intrinsically motivated. When viewed in this context, professional development as it is currently implemented fails to make use of any of these characteristics. Miles (1995) also observed that the pedagogical features of professional development are inadequate: under-resourced, too brief, untargeted, coercive, lacking intellectual rigor, and mired in bureaucracy. Miles' view of professional development fifteen years ago still holds true today, with a plethora of different models of professional development that still lack intellectual quality (Borko, 2004).

In the area of educational technology and professional development, Gray, Thomas, and Lewis' (2010) investigation, "Use of Educational Technology in US Public Schools," found that 78% of teachers considered independent learning activities as adequately preparing them to use educational technology in schools; this is compared to the 61% of teachers who considered formal professional development as having the same effect. Online professional development programs are being implemented to take advantage of innovative technologies such as affordable broadband connections and Internet connectivity, which have recently become available to schools. Professional development offered online provides teachers with resources and enhances collaborative participation among teachers in ways traditional professional developments are unable to accomplish (Schlager et al., 2003; Dede et al., 2009). Some of these online professional development initiatives, in most cases, are not very different from traditional face-to-face programs. However, some advantages of these courses are that they are available to teachers at their convenience and provide access to specialists and archival resources that otherwise would not have been possible (Dede, 2006; Cooper& Johnson, 2013).) To address these inadequacies inherent in the manner professional development is executed especially with regard to technology, there is a need to reengineer professional development offerings in ways that make the experience for teachers more meaningful, engaging and in tune with the 21st Century leaning environment (Johnson, Adams Becker, Estrada, & Freeman, 2014).

Purpose of the Study

As Web 2.0 applications continue to gain prominence in schools, school district professional development departments increasingly offer workshops on them for teachers. Although the majority of teachers have availed themselves of this opportunity, the effectiveness of these workshops remains questionable. Teachers continue to struggle with how these tools can be integrated effectively into everyday instruction in the classroom. The strong influence professional development has on how teachers integrate new technology into their classrooms is well documented (Chen, 2008; Wells & Lewis, 2006). Having personally participated in some of these Web 2.0 workshops, the researcher is left wondering if a teacher new to the world of Web 2.0 applications will benefit much from workshops of short duration with little or no hands-on activity. Research on professional development with emerging and innovative technologies like Web 2.0 applications has focused mainly on quantitative research designs where participants illustrate best practices and the design of professional development offerings via self-report surveys or questionnaires. Evaluating the effectiveness of professional development programs in this way yields an incomplete picture because it does not allow participants full reflection on their experiences. According to Dewey (1933), critical reflection is a powerful professional learning tool that brings about "a state of doubt, hesitation, perplexity, or mental difficulty, in which thinking originates" (p. 12). Because previous quantitative analysis has provided limited benefits, the purpose of this study is to employ a qualitative research method to gain insight on how beneficial in-service teachers considered their experience during technology integration professional development workshops using Web 2.0 tools as a test case. This study also sought to find out the extent to which the knowledge gained in these workshops is integrated into the classroom.

Research Questions

The following research questions guided the study:

1. What were teachers' perceptions of being able to translate the skills they acquired in Web 2.0 professional development workshops to the classroom?

2. What factors did participants perceive impeded or enhanced their ability to integrate Web 2.0 applications into the classroom following professional development?

3. How beneficial was the professional development to the participants?

Theoretical Framework

The theoretical framework of this study was based on a phenomenological approach that has its roots in psychology and over the years many variants of it have emerged that address diverse thinking about the way we make meaning of our everyday experiences. Transcendental phenomenology seeks to understand what meanings individuals make

of their everyday experiences. Phenomenology, according to Van Manen (1990), is a "systematic attempt to uncover and describe the structures, the internal meaning structures, of lived experience" (p. 10).

This research took a phenomenological approach to professional development in a specific area of teachers' work in understanding their experience in a training workshop and its lasting effects. This approach can lead to a better understanding than purely quantitative approaches, such as counting hours of training or numbers of teachers who follow up on training. The research study examined the experiences of in-service teachers who attended technology professional development workshops on various Web 2.0 applications and how these tools can be integrated into the classroom. Understanding participants' lived experiences in these settings leads to identification of shared themes and better understanding of the impact of Web 2.0 professional development in instruction (McDuffie & Scruggs, 2008).

Transcendental Phenomenological research generally has been found to be effective in bringing to light individual experiences and perceptions of events from participants' own standpoints, which could be quite different from what is commonly assumed and could lead to positive changes in the way the training is done (Lester, 1999). This form of phenomenology provides the theoretical framework for this study.

Methodology

The qualitative research approach of this study is phenomenological: participants' lived experiences were investigated to identify and provide a detailed account of their perceptions and reactions (Merriam, 2009). This method attempts to discover how people interpret their experiences through more in-depth textual descriptions. Shank (2002) refers to such detailed description as *soft data* that gives insight regarding what meaning people make of an experience or phenomenon. In such cases, a qualitative design is the desired approach (Cheek, Onslow, & Cream, 2004; Merriam, 2009; Shank, 2002).

The phenomenon of interest in this study was the lived experiences of in-service teachers that attended professional development training sessions about Web 2.0 applications offered in a school district or other settings. These research questions formed the basis of the protocol that was used for the semi-structured, open-ended, in-depth interviews.

Participants

Purposive sampling, a non-probability sampling method, was used to identify primary participants for the study (Onwuegbuzie & Leech, 2007; Patton, 2002). This study was carried out in a large K–12 urban school district in the southeastern United States. The district demographic profile is as follows: African American, 6.13%; Asian, 2.69%; Hispanic, 81.48%; and White, 8.15%, with an overall economically disadvantaged

population of 82%. All teachers serving in the district in the 2011–2012 school years were rated as highly qualified, meaning they held a bachelor's degree or higher, were certified by the state board of education and had demonstrated professional knowledge in their respective content areas (U. S. Department of Education, 2004).

Participants in this study were in-service teachers currently employed as schoolteachers in the district. The initial intention was to select participants using criterion sampling, a form of purposeful sampling from population of teachers that met certain criteria (See Appendix A).

The criteria for selection were:

a) The participants in this study had at least three years teaching experience.

b) The participants were currently employed as high school teachers in the district.

c) The participants had attended two or more Web 2.0 application professional development workshops offered in the district or other informal professional development courses.

d) The participants were using technology in the classroom.

Eduphoria is an online professional development management system software the district uses that streamlines staff course registration and completion. Course evaluations can be filled out online and staff members can even print their own certificates. Using Eduphoria, the district administrator selected teachers meeting these criteria and coded them to insure confidentiality. The district administrator emailed the selected participants the link to the recruitment questionnaire and consent letter. Using this approach, the administrator was able to identify twenty teachers who met the criteria to participate in the research study and forwarded them the recruitment letter, and letter of informed consent.

After an unsuccessful attempt to recruit participants from the twenty teachers identified by the district administrator for research and evaluation as meeting the criteria, a decision was made to use snowball sampling. Snowball sampling assumes that the behavior or trait under study can be conceived of as a social activity, where the target sample members are involved in some kind of network with others who share the characteristic of interest and subjects may be difficult to identify. Snowball sampling involves finding a few participants who meet the criteria and asking them to suggest or refer others (Merriam, 2009; Onwuegbuzie & Leech, 2007; Patton, 2002). The first respondent to my questionnaire study effort became the source from which the other four participants who met the criteria were recruited. The criteria for participation were three years of teaching experience, currently employed as a teacher, attended at least one Web 2.0 application professional development and use of technology in the classroom.

Participants represented the entire spectrum of the curriculum, which includes four main content areas: math, English language arts, science, and social studies. As the goal is transferability rather than statistical generalizability, a small sample of high-quality informants is adequate (Morrow, 2005; Morse, 1994; Creswell, 2005; Duke, 1984). Based on this line of thought, a semi-structured, face-to-face, in-depth interview was conducted with the five participants. Salient participants' unique characteristics needed to understand how some of their references in the interview transcript dominated most of the sub-themes, and are delineated in Table 1 and Table 2.

Table 1

Participant Teaching and Technology Experience

Participant	PT04	PS01	PP03	PH05	PD02
Teaching experience	11-15	0-5	6-10	16-20	6-10
Technology experience	6-10	26-30	6-10	16-20	21-25

Table 2

Participant's Web 2.0 Workshop Experience

Participants	PT04	PS01	PP03	PH05	PD02
Web 2.0 workshop attended	7	6	4	4	1
Web 2.0 workshop categories	Social networking, Video, Audio, Presentation, Collaboration, Screen capture, Productivity	Social networking, Video, Animation Presentation, Collaboration	Video, Presentation, Animation	Video, Audio, Presentation, Collaboration, Screen capture, Productivity	Presentation
Workshop duration (Hrs.)	1-2	1-2	1-2	1-2	1-2

Data Collection and Analysis

Semi-structured, open-ended, in-depth, face-to-face interviews were used as the data collection procedure. The questions were presented in no predetermined order or wording and were flexible enough to elicit elaborated responses from the participants

(Merriam, 2009). The interviews lasted on average about 30 minutes and were based on an interview protocol composed of five main sections, with each section having three to four sub-questions.

Although themes could be used in a research study that developed from examination of the data with the aid of NVivo 9.0, they can also be pre-determined and used in data analysis. The use of pre-determined or a priori themes in qualitative analysis was predicated on researchers' knowledge of the subject matter or phenomenon under study, sources from literature, and research questions, as is the case in this study (Saldana, 2009; Creswell, 2007).

This study employed an a priori approach to establish themes used in analysis of the data, which included interview transcripts, field notes, and memos. Using the interview questions and my own experience having attended a couple of these Web 2.0 application professional development workshops, I delineated five themes used in this data analysis.

Pre-existing coding systems were used to establish five a priori codes that constituted five major themes for this study. Mindful of the fact that themes could emerge during actual data analysis, the researcher accommodated such situations by allowing for in vivo coding during data analysis, which constituted sub-themes. The themes and sub-themes included (Table 3): Workshop experience (duration, engagement, rigor and relevance, follow-up, participants collaboration); Integration into the classroom (parental concerns, communication with students and parents, collaboration among students); Hands-on experience (duration, engagement, show and tell); Knowledge of Web 2.0 applications (participants' knowledge, instructor knowledge, online workshop) and Problems and benefits of Web 2.0 tools (district policies, student achievement, culture of collaboration).

Table 3

Participants' Theme References & Coverage

	Hands-on experience	Workshop experience	Problems and benefits	Knowledge of Web 2.0	Integration in classroom
Coverage (%)	41.10	58.71	24.95	22.16	87.35
Number of references	56.00	59.00	24.00	21.00	56.00

In addition, actual words spoken by participants were included in formulating the codes, which resulted in a blended thematic analysis approach in analyzing qualitative data using NVivo 9.0 software (Creswell, 2007; Saldana, 2009).

Three fundamental tenets of phenomenological investigation used in the data analysis in this research study to identify themes and thereby ensure objectivity are bracketing, phenomenological reduction, and harmonization (Merriam, 2009; Moustakas, 1994). The

phenomenological data analytical process used here is an adaptation of the Stevick–Colaizzi–Keen method described by Moustakas (1994) as follows:

1) Obtain full experience of the phenomenon.

2) Using the verbatim transcript of the experience narrated by participants, complete the following steps:

    a. Consider each statement with respect to significance for description of the experience.

    b. Record all relevant statements.

    c. List non-repetitive, non-overlapping statements. They are the meaning units of the experience.

    d. Relate and cluster the meaning units into themes.

    e. Synthesize the meaning units into a description of the textures of the experience with verbatim examples.

    f. Reflect on your own textual description. Through imaginative variation, construct a description of the structure of the experience.

    g. Construct a textual-structural description of the meanings and essences of the experience. (pp. 121-122)

Validity and Reliability

A measure of the rigor or trustworthiness of a qualitative research study is determined by the validity and reliability of the methods used in the investigation. Validity in qualitative studies requires that a researcher take steps to ensure that the data collected represent what is being investigated. Reliability implies that the same study, if repeated over time, will yield consistent results (Frankel & Wallen, 2009). Lincoln and Guba (2000) described both as a measure of the trustworthiness of the research. Different actions taken during data collection and analysis to ensure validity and reliability include triangulation, member checking, and leaving a transparent audit trail. Five participants were interviewed, and their responses to the interview questions were digitally recorded. The audio files were then transcribed and formatted in a Microsoft Word document by a professional transcriptionist who signed a confidentiality agreement. The Word document was uploaded to NVivo 9.0 qualitative analysis software. Participants were assigned code names or pseudonyms: PS01, PD02, PP03, PT04, and PH05. The demographic profiles of the participants were made up of four males and one female. All participants were within the age range of 26–50 years old, three participants were high school teachers, and the remaining two participants were elementary and middle school teachers.

Results

Five themes were delineated in the data analysis to address the research questions. The number of references and coverage (that is, percentage of source text coded as a particular theme or node by each participant) were aggregated to generate sub-themes in the related a priori main theme. The numbers show that integration into the classroom (56.00, 87.35%), workshop experience (59.00, 58.71%), and hands-on experience (56.00, 41.1%) were of the utmost importance to the participants in their overall experience of the Web 2.0 workshop (see Table 3 and Figure 1).

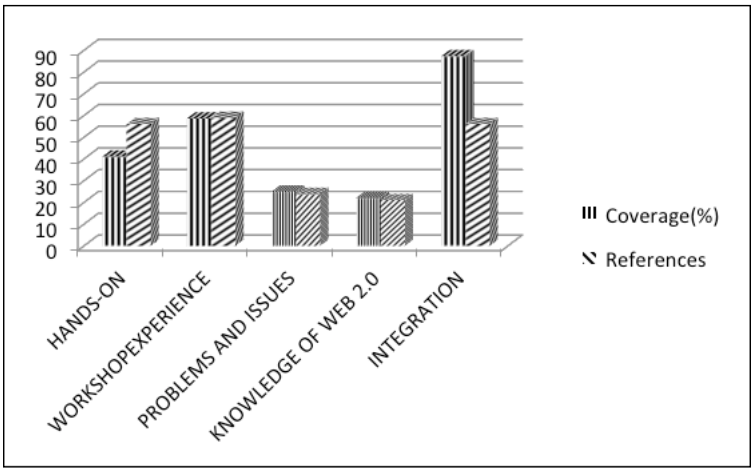

Figure 1. Participants' Theme References & Coverage

Theme Summary

Integration into the classroom. Teachers learn best classroom practices from those who have used the tools in the classroom. Although students love to use computers, the challenge for teachers is that they are not adequately prepared to integrate technologies like Web 2.0 tools into their instruction. Participants emphasized the need for collaboration among teachers so they can share their experience with Web 2.0 tools and be able to integrate them into instruction. By the particpants' account, only two Web 2.0 tools, Edmodo and Gaggle, are used extensively in their classrooms as tools for collaboration and communication. Teachers can only integrate Web 2.0 tools they are aware of; therefore, there is a need to create awareness of the many categories of Web 2.0 tools available on the Web with instructional implications.

Because Web 2.0 tool integration was not adequately covered, participants emphasized the need to make classroom integration of Web 2.0 tools the central theme of future professional development workshops on Web 2.0 tools (Table 4).

Table 4

Integration in Classroom Sub-themes

	Participants				
Sub-themes	PT04	PS01	PP03	PH05	PD02
Technology	9(5.95%)	10(19.25%)	8(16.78%)	3(2.58%)	1 (0.69%)
Communication	4(1.57%)	1(0.55%)	5(12.27%)	-	3(12.05%)
Collaboration	2(0.48%)	1(0.54%)	2(3.27%)	2(1.46%)	2(4.75%)

Note. The numbers represent coded references and the numbers in bracket the percentage coverage of the references by participants for each sub-theme.

Sample narratives from participants on the various sub-themes are as follows:

a) Technology

> I think that's what Web 2.0 has done for my classroom. It's taken the technical aspect out of it, to where we're focusing less on technical stuff and more on content. I think that's the beauty of Web 2.0…My kids are more productive. My kids are more productive, because—that's tough, but they are. (PT04)
>
> It's extremely effective in getting them engaged—It's a whole lot better than marbles because it's live. They love it. (PS01)

b) Communication

> I said—there was one student that was real popular and there was another student that wasn't real popular. And they started talking on Edmodo on the social wall, you know? And they would never talk and communicate out in the real—outside the walls. Because their social circles didn't match; she didn't want her friends to know that she was friends with him, but on the wall, it was awesome to see them talk back and forth and really communicate. (PT04)
>
> This year I really felt like I knew my kids and I knew the parents, because we were in that community of Edmodo... it has really helped my classroom. (PP03)

c) Collaboration

> I find the tools themselves, I'm not… impressed by almost all of them....the tools themselves are not what I'm looking for in a workshop. I'm looking for how people use them and what their reactions to the technologies are. (PH05)

> And if there was a way that what they already made could be collaboratively shared to everybody, just like when we have those on the meeting board, we have the slides that a lot of people have already made, and that's time-saving. Because I'm looking for something, there it is, boom, I'll bring it. And I can work with it. (PP03)

> And that is what Edmodo has done for me...engaged them...collaborate when they have questions, and...to communicate. (PP03)

Workshop experience. The high school teachers gave their Web 2.0 tool workshop experience a low rating, and one of them felt the workshops were too elementary, lacking both in rigor and relevance, to be impactful in their instruction. The elementary and middle school teachers in the study saw these tools as very useful but were more concerned about the times and settings of these workshops. The sub-themes reveal that apart from the usual completion of survey forms after a workshop, no attempts were made by the organizers to get feedback by following up with participants regarding implementation of what they learned in the classroom. All participants were concerned with the delivery strategies used in these workshops, as they considered them not to be engaging. Participants did not feel a sense of expectation regarding what should be accomplished, as there were no consequences, very much contrary to what they do in the classroom. The workshop duration was also considered very unfavorable to teachers. This present workshop is held at the close of the spring semester, and by the time schools reopen for the new academic year three months later, the majority of the teachers have forgotten what they learned during the workshop (Table 5).

Table 5

Workshop Sub-Themes

	Participants				
Sub-Themes	PT04	PS01	PP03	PH05	PD02
Rigor and Relevance	7 (3.94%)	1(0.60%)	-	-	1 (2.52%)
Collaboration	3 (1.16%)	-	-	1 (1.85%)	-
Follow-up	1 (1.16%)	-	-	-	-
Workshop Duration	2 (1.16%)	1 (0.46%)	1 (1.17%)	4 (2.31%)	-
Delivery Strategies	9 (6.98%)	5 (11.60%)	4 (5.07%)	7 (7.78%)	3 (1.77%)
Engagement	4 (1.76%)	-	2 (2.2%)	3 (5.23%)	-

Note. The numbers represent coded references and the numbers in bracket the percentage coverage of the references by participants for each sub-theme.

Sample narratives on this theme from the participants follow:

a) Rigor and relevance

> Technology staff developments that I've been to, I'm not expected to think creatively...to problem solve in those developments. I'm expected sit and learn what they want to show me. I think we need to change it. We don't do that to our kids. We don't expect our kids to just go in and learn formulas, we want them to learn the formulas, and then apply the formulas in problems and real life situations. (PT04)

> I think most definitely the workshops need to be catered as much as they can be, to subject and grade level. I'm a secondary teacher...are too much at the elementary level, and I cannot see the application of it at the secondary level. (PD02)

b) Collaboration

> I would say at this point there are many more teachers who are engaged in the classroom type of scenario where they can come and interact with not just their teacher but with their colleagues so that they can actually see some of the products that are being generated by others, because inevitably, people come to class that already have some of the skills being offered and they either want to fine-tune them or find out how others are using them. (PH05);

> ...then when we meet as face-to-face, we're not covering "all right, everybody click here, everybody click here." We're creating, we're collaborating. We're working together on making a product, and coaching more than demonstrating; more coaching, coaching teachers on the problems. (PT04)

c) Follow-ups

> Email them like three or four weeks later, saying, "Hey, have you tried anything?" Just to follow up with them. I don't feel like our staff in development does anything like that for technology. They don't follow up with me to find out, "Hey, are you using it, how can we help you use it, what have you used?" (PT04)

d) Duration of the workshops

> I do think that one hour is not enough time...the concept of this new tool that you're teaching, and then developing the content...However, two hours is too long. (PT04)

e) Delivery strategies

> ...they just introduce it to everybody and tell them about it and show the examples. (PP03)

> The workshops that I've been to, they just go and they tell you "all right, you click here, you sign in, you click here"—they're telling me all the technical aspects, but they weren't modeling how I could use it with my class. (PT04)

> They're not offered at a convenient time for teachers. The biggest problem in training teachers is the timing...and I can tell you right now, there's not a teacher around who can concentrate after school on much. Additionally, we offer teachers the ability to train during conference periods...They have papers to grade, they have students to meet with, and they have parents to engage. So time crunches on teachers are the biggest limitation to when we train them. (PH05)

> Well, I do want to say that our district does a lot with workshops and preparing teachers. I've talked to other teachers about their workshops and seriously, they cannot compare to what we have. (PP03)

f) Engagement

> Web 2.0 tools have taken the technicalities out of applications and replaced it with content. (PT04)

> Well, I can see even in the teacher's reaction, they're excited about it...you hear them, you hear the buzz, "Oh, I could use this," "I could do this." (PP03)

> I have seldom attended one regarding 2.0 tools that weren't seen as—how to put it?—engaging. Teachers like these type of tools in the workshops. There's an "ooh" and "ahh" factor, like "wow, I could really do that?" And so they generally grasp attention very well. Because of the nature of the way we run workshops in our district, it's rare that you get a class that has a breakout of similar achievements, so much like in anybody's math class; you might have teachers who are at a low level of using tools and those who are accelerated. So because of that, your level of engagement after the initial "ooh, ahh" can fade, or be enhanced, depending on who's in the class itself. (PH05)

> When I go to a workshop, my expectation is to just sit there and feed me. And it's because there's no expectation from the training aspect to hold me accountable to actually learn, think creatively, and to problem solve. And I think we need to change our staff development in doing that, change the expectations of our participants. (PT04)

Hands-on experience. There were mixed reactions to the level of hands-on activities that took place during the workshop session arising from differing expectations among the participants. There appears to have been some hands-on activities that lasted anywhere from 10 minutes to the entire workshop session of about one hour; however, some participants did not consider them engaging because they could not produce a finished product or at least model something they could use in the classroom (Table 6).

Table 6

Hand-On Experience Sub-Themes

	Participants				
Sub-themes	PT04	PS01	PP03	PH05	PD02
Show and tell	1(0.70%)	2(3.67%)	1(0.32%)	1(0.35%)	-
Engagement	3(2.13%)	2(3.17%)	2(1.84%)	6(4.24%)	4(20.47%)
Length of time	1(0.09%)	2(1.07%)	2(2.50%)	1(0.54%)	-

Note. The numbers represent coded references and the numbers in bracket the percentage coverage of the references by participants for each sub-theme.

Sample narratives from participants in this theme follow:

a) Show and tell

> It was kind of like where I sat, I saw theory, I saw how somebody else was using it…and it was just kind of like show and tell. So I have to say it was about half and half theory and hands-on. (PT04)

> They're pretty good about running the gamut of showing you, having you make one and then talking about using it. (PS01)

b) Engagement

> If people are allowed to bring a current problem they are having in the classroom or something they want to do in the classroom in mind when they attend the workshop, and allow time within the workshop to work on that individual problem or individual usage that they can see for that workshop tool, I think it would be better able to be implemented in the classroom. If people can be able to start the implementation of it within the workshop, that makes sense. (PD02)

> It's almost always a hands-on lab, so I haven't been to any Web 2.0 tool presentations that were not, that you were not, you didn't have the ability to log in. They've always been in a situation where you could either bring a laptop or there was a desktop unit available… Most of the classes I have

> attended, it's very much an opportunity given, not always taken, but given to experiment with the tool you've been taught. (PH05)
>
> They let us play around…it's just more play around. I would have liked for the half that was hands-on? We didn't have to produce a product, and I wish we …would've gotten more out of it. (PT04)
>
> I don't view training as a way to get them to do a finished product. It's much more about engaging them to see the benefit of something and to make it interesting, that they want to go and try to do something like that on their own with their class. (PH05)
>
> …but having a few pre-made ideas, a few examples of the utility of it for the classroom…But show me how it's been used and give me a jumping off point. (PS01)

c) Length of time

> You could have the hands-on maybe the last 10 minutes or so. Well, there were others where there were hands-on through the whole workshop, but the ones particularly I've gone through have just been, you know, they show you how it is, kind of try it a little bit, but then you have to go to the next one, or the time runs out. (PP03)

Knowledge of Web 2.0 applications. Participants talked about how they became aware of emerging technologies such as Web 2.0 tools and assessed the experience of their instructors' knowledge of Web 2.0 tools during the workshops they attended. From participants' accounts, their knowledge of Web 2.0 tools before attending district workshops was essentially informal and self-taught. They got to know about these tools mainly from technology magazines, discussion with colleagues, and attending conferences. Only one out of the five participants became aware of these tools through district sources. Their knowledge of Web 2.0 tools with instructional value are very limited to the four offered by the district, namely, Gaggle, Edmodo, Glogster, and Prezi. The participants were very impressed with the instructors at these workshops even though they had not learned the categories of Web 2.0 tools. Since Web 2.0 tools are Web-based tools, participants were not inclined to think they would be better served if they were all offered online because people learn differently. What was most important to them and what they would like to see in workshops was how to model integration into the classroom (Table 7).

Table 7

Knowledge of Web 2.0 Tools Sub-Themes

	Participants				
Sub-themes	PT04	PS01	PP03	PH05	PD02
Participants	4 (1.78%)	2 (4.76%)	2 (2.58%)	3 (1.39%)	1 (0.83%)
Online workshop	-	2 (3089%)	-	1 (0.61%)	-
Instructor	-	3 (4.44%)	-	2 (0.97%)	1 (0.97%)

Note. The numbers represent coded references and the numbers in bracket the percentage coverage of the references by participants for each sub-theme.

Sample narratives on this theme from the participants follow:

a) Participants

> Apart from the district, in the past couple of years, I'd say no. I used to attend workshops at the technology conference, the TCEA conference in Austin. (PH05)
>
> I heard about Web 2.0 tools through e-mail correspondence from our technology department. (PD02)
>
> One of the classes was working with learning management systems, in my master's degree, and they mentioned several. (PP03)

b) Online workshop

> They actually took us to the web site, where we were introduced to many Web 2.0 tools such as Edmodo, but there are others, dealing with video, audio, and also animation. (PP03)
>
> Just like Virtual School is not a good thing for all students, online classes are not good for all teachers. If we've learned anything through brain research, we know that kids—and this applies to adults just as well—learn differently. (PH05)

c) Instructor

> Rated on a scale of one to five, with five being the highest, I would rate the ability like a 4.5. (PD02)
>
> And their knowledge of the topic has been excellent. Knowledge of the topic and ability to convey that to their audience, much like a teacher teaching any topic, regardless of if it's Shakespeare or Glogster, varies by the individual. (PH05)

> That sort of gets left off because I've never really thought to categorize. They're all pretty self-explanatory. But I've never heard anybody say, this is a Web 2.0 tool for social networking. This is a presentation Web 2.0 tool. I've never really heard that categorization. It's always just this is this, this is that. They don't even really say things are Web 2.0 tools. I don't really know why. It might be fear of intimidation. (PS01)

Problems and benefits. The sub-themes the participants addressed examined the benefits that districts accrue as a result of teacher familiarity with Web 2.0 tools. They also talked about obstacles impeding the use of these tools in schools in the district. The sub-themes, the number of references and the percentage of coverage of each sub-theme by participants are detailed in Table 8 and discussed below. Some of the benefits involve the leverage they bring to student achievement in the classroom. According to one of the participants, benefit to students is how benefit to the district is measured. Web 2.0 tools engage students in the classroom and thereby are a benefit to students, teachers, and the district. The Web's 24/7 accessibility and the associated behind-the-scenes database infrastructure, which the teacher does not have to worry about, makes it possible for the teacher to manage student data in ways that ensure a record of students' activities. Participants made a case for less restrictive network security policies to increase accessibility to other instructionally useful Web 2.0 tools, asserting that the best security watchdog is the teacher in the classroom, who can redirect students when they go astray.

Table 8

Problems and Benefits Sub-Themes

	Participants				
Sub-themes	PT04	PS01	PP03	PH05	PD02
Student achievement	2(2.27%)	-	1(0.74%)	3(4.00%)	1(1.52%)
District policies	4(3.57%)	-	3(3.27%)	3(2.69%)	2(3.27%)
Culture of collaboration	3(2.28%)	-	-	2(2.28%)	-

Note. The numbers represent coded references and the numbers in bracket the percentage coverage of the references by participants for each sub-theme.

Sample narratives from participants follow:

a) Student achievement

> We have to look at all technology that we use to engage students as a benefit to students. Benefits to students are how we measure benefits to the district, in my experience. You can have any kind of programs you want, be they software or hardware, for teachers, administrators, counselors—all of those things are helpful in moving students through the educational process, but until it's software and hardware that affects the individual learning of the student, it's not important to the student. (PH05)

It's getting our kids to the network. And when I say "network," I'm not talking about the Internet and Google search, I'm talking about cloud stuff where they're keeping their data there. The network is the key. And whatever device, whatever we choose to put in kids' hands, it doesn't matter if it's an iPad, if it's an Android, if it's a Smartphone—Kids have to get to the network, and that's where the Web 2.0 tools, we've talked about it kind of, it started five years ago with the iPhone. Technology is moving faster now than it has ever moved before in history. (PT04)

You have to create the content. And that's the part that I know for me sometimes discourages me, trying to come up with things every week or so. (PP03)

b) District policies

Of course the district has to approve, because a lot of times a district doesn't let certain things in because of all the security hassles. So I had to talk to my principal and let her know we needed more access. (PP03)

There are all the blocking issues, regardless of where you are. We are, of course, required by law to filter for students. That makes those types of things difficult by their very nature. There are some district-approved social networking types of things. (PH05)

We need to be teaching teachers how to be proactive in their classrooms, how to deal with those situations. Because it's not if we start opening the Internet and if the Internet, if those bad things enter our classroom. It's not if, it's when; because those bad things are entering our classroom now because kids are not using our district Wi-Fi but using their own unrestricted ways of access. (PT04)

So I like using it because it is monitored, and it is monitored by the district, and it lets me know when students are sending inappropriate things. (PD02)

c) Culture of collaboration

That's how professionals engage right now. They engage virtually, so that regardless of the distance, you can collaboratively work on research and projects. (PH05)

I don't think the district has a true culture of collaboration. We have pockets of collaboration, like me and you are collaborating right now. Me and a teacher on my campus, we'll collaborate. I and a teacher from Morrill are collaborating. That's great because those are small pockets. I think we need to change the culture of the entire district to collaborate together as a whole, and we don't have anything like that. (PT04)

Discussion

Phenomenological research generally has been found effective in bringing to light individual experiences and perceptions of events from the participants' own standpoints; this may be quite different from what is commonly assumed and can lead to positive changes in the way that training is done (Lester, 1999). Interpretations of findings are based on the participants' responses to interview questions relating to previously established themes. In cases where findings seem to be applicable to more than one question, they are interpreted within the context of each particular research question (Table 9).

Table 9

Research Questions and Main Themes

Research Questions	Main Themes
1. What were teachers perceptions of being able to translate skills acquired in Web 2.0 professional development to the classroom?	Workshop experience Integration in classroom
2. What factors did participants perceive that impede or enhance their ability to integrate Web 2.0 applications in the classroom following professional development?	Integration in classroom Problems and benefits Knowledge of Web 2.0 tools
3. How beneficial was the professional development to the participants?	Workshop experience Problems and benefits Knowledge of Web 2.0 tools

Research Question 1

Professional development can be evaluated by a desirable outcome, in this case, the extent to which participants in Web 2.0 tools workshops were able to implement what they learned in the classroom. Since technology has assumed a pivotal role in education, the salient issue has not been about implementing hardware and software in schools but rather whether there is human capital to properly harness technology in a scholastic context (Swain & Pearson, 2002). All of the participants stressed the need for the workshop to be oriented to providing strategies for implementing Web 2.0 tools in the classroom. That is the reason the theme *integration of technology* recorded the highest coverage and number of references in participants' responses. Web 2.0 tools are new in the classroom, and the technologies involved touch all aspects of 21st-century learning skills, which are dominated by creativity, critical thinking, and collaboration. Participants in this study stated they wanted to learn the relevant skills, but unfortunately, not much in the way of meaningful technology integration was modeled for them.

What might account for the absence of meaningful technology integration in the classroom in these workshops might be limited understanding on the part of the organizers of the various types of technology integration workshops. Lawless and Pellegrino (2007) clearly delineate three types of technology and instruction workshops with very desirable pedagogical implications: professional development focused on integration of technology into classrooms, learning about technology to create awareness of a new tool, and how to use particular software (Lawless & Pellegrino 2007). From the participants' accounts in the study, the type of workshop they experienced falls under the second category, where the primary objective was to introduce new software or technology to create awareness of the potential of Web 2.0 tools. Participants did not feel their experiences in the workshops empowered them to be successful in integrating the tools into classroom instruction.

Research Question 2

Learning to integrate technology into the classroom is a process of change for teachers. Web 2.0 tools are a segment of emerging technologies that affect classroom instruction and implementation will take time as individuals change over from traditional methods; consequently they need a lot of sustained support (Bowe & Pierson, 2008; Newman, 2008). Various factors affect whether teachers successfully make these changes. From the study participants' accounts of their experiences during Web 2.0 tools workshops they attended, *hands-on* and *workshop experience* themes ranked high (see Figure 1). Although the workshops purported to have some hands-on activities, these were not considered adequate for sustained implementation in the classroom..

Web 2.0 tools workshops are implemented in a one-size-fits-all style, including teachers of all levels in the school system and with no distinction made between curricula. This is why two of the five participants, who were high school teachers, considered Web 2.0 tools workshops irrelevant and too elementary for them. Research shows that enduring motivation to learn happens when participants can see direct relevance to their jobs and to prior experiences of such training (Noe & Schmitt, 1986; Noe & Colquitt, 2002).

To sustain technology integration strategies learned during the workshop, the post-training climate has to be very supportive (Salas, Kraiger, & Smith-Jentsch, 2012). Some of the participants complained of not being able to use Web 2.0 tools that were blocked or filtered from the school's network.. The reasons behind such restrictive technology practices are all too familiar, but as one of the participants pointed out, the best filter in the classroom is the teacher; moreover, with smartphones, students are able to access sites considered inappropriate anyway.

Tannernbaum and Yuki (1992) have noted that participants are more likely to view workshops as important if they are mandatory or demonstrably relevant to their careers. All the participants in the study attended the Web 2.0 tools workshop out of sheer interest to discover what Web 2.0 is all about. They had no compulsion to attend; furthermore, Web 2.0 tools workshops are structured mostly around elementary and middle school curricula.

Sustained effort on the part of workshop instructors and organizers to follow up with participants is pivotal in sustained success. This includes whether the workshop is mediated by online, face-to-face, or blended learning (Garet, Porter, Desimone, Birman, & Yoon, 2001; Richardson, 2003; Little & Housand, 2011). Participants reported no follow-up to find out if they were putting what they learned into practice. The collaboration and communication features of Web 2.0 tools could assist in the follow-up effort, however. Instructors can customize Web 2.0 tools such as wikis, blogs, and social networking sites as avenues for keeping in touch with participants instead of emails, which are the more common follow-up channel. Emails do not offer the collaboration afforded by Web 2.0 tools. A participant could circulate a post-workshop problem he or she is facing using a collaborative tool; in this way, the solution suggested by instructors or other teachers would be visible to others and serve as a repository of knowledge for the workshop. This is what one of the participants in the study referred to as a "culture of collaboration," currently lacking in the district with respect to Web 2.0 tools.

Research Question 3

Participants in the study were upbeat and proud of their district's professional development workshops despite the shortcomings of Web 2.0 workshops. Elementary and middle school teachers experienced a higher level of satisfaction than high school teachers. This supports what has already been noted about the relevance of the content of the workshops to the high school curriculum. Elementary and middle school teachers found collaborative and communication Web 2.0 tools such as Edmodo and Gaggle very beneficial in their classrooms. These Web 2.0 tools enable teachers and students to connect, collaborate and share content; as well as access homework, grade, and school notices. There are other useful Web 2.0 tools, however, that go beyond communication and collaboration and that engage students in critical thinking, problem-solving and productivity. Riding on the generally favorable perception of the district's other professional development workshops, what is required now is to fine tune workshop content concerning Web 2.0 tools to include more tools that utilize these higher order skills.

Limitations of the Study

The generalizability limitations of qualitative research apply to this study. This study investigated the lived experiences of a targeted population of five teachers. Whether the findings may be extrapolated to have wider implications for the general population of teachers in the district or to draw general and far-reaching conclusions from the study is a judgment for each reader to make.

Another limitation has to do with the reliability of the study, that is, the reproducibility of the results. The coding system used for the themes and sub-themes was based on the applicable literature and the experience of the researcher. Another researcher might code differently and arrive at themes not exactly the same as the ones used in this study. In general, most qualitative studies are exploratory in nature and point researchers in directions for more detailed studies on the phenomenon under investigation.

Directions for Further Research

An aspect of this research that could be investigated further would be to increase the sample to include more female and science teachers both at high and low secondary school levels to see how Web 2.0 tools are being integrated into their classrooms. It is also important to find out any relevant facts regarding student achievement in classrooms where there is extensive integration of Web 2.0 tools.

Another aspect of Web 2.0 tools that might benefit from further research would be to assess the level of engagement among students in classes where their teachers have attended Web 2.0 tool workshops. Of these future research possibilities, much has been done quantitatively, but investigation from a qualitative perspective is uncommon. As pointed out in the literature review, numbers and statistical inferences may not tell us all the subtle but important facts about experiences in a Web 2.0-mediated classroom environment.

Conclusions

Web 2.0 tools professional development workshops constitute a very small percentage of the workshops offered in the district. When offered, though not on a consistent or sustained basis, their content focuses more on software or tool demonstrations than on Web 2.0 tool integration into classroom instruction. The content provided is also more relevant to elementary and middle school teachers than to high school teachers. Additionally, Web 2.0 tools that might be used to transform media such as audio, video, and text into collaborative spaces are seldom accessible from school district networks due to security and bandwidth concerns. These are the types of Web 2.0 tools needed in high schools, but they are not offered in professional development sessions. As a result, most high school teachers find the workshops too elementary to meet their instructional objectives. Overall, much still needs to be done to raise the level of engagement so participants are inspired to integrate the technologies into their classrooms.

As Web 2.0 becomes the de facto school platform of choice and popular software companies like Microsoft, Adobe, and others transition to cloud computing, it is a matter of economic expediency that school districts adopt cloud computing to save costs. School districts that make Web 2.0 tools an integral part of their overall technology policy now will be better prepared for this inevitable transition.

Web 2.0 workshops should be structured to take into account the varying needs of teachers: recognizing different school levels, competencies, professional development needs, and any generational gaps among the teachers regarding Web 2.0 tools (Schools and Staffing Survey, 2009; Metlife, 2010). Web 2.0 is an emerging technology, and not all teachers have the same level of understanding and capabilities. Workshops, therefore, should be offered in two modules: beginning and advanced. The beginning module should be offered as an online workshop that covers the basics of Web 2. 0 tools and provides resources describing where Web 2.0 materials can be accessed. Ubiquitous

mobile computing platforms like notebooks, tablets, phablets, and smartphones offer flexibility for those interested in familiarizing themselves with tools of their own choosing before enrolling in the advanced module.

The advanced Web 2.0 tools workshop will be dedicated to Web 2.0 technology integration in the classroom. Enrollment in the advanced module requires the teacher to have completed the beginning module and received a competency certificate issued by the district. Recognition of digital badges from other organizations showing adequate learning has taken place towards the oncoming advanced professional development workshop should also be considered (EDCAUSE, 2013). This background is important in order to make the advanced level course meaningful, relevant and engaging to the participant. The advanced module should be dedicated to classroom integration of Web 2.0 tools and a place for collaborative work among teachers, where they will take turns explaining what is working for them in the classroom. The advanced module should engage teachers in rigorous and reflective hands-on activities, providing a simulation environment where teachers will be free to experiment and unafraid to make mistakes (Salas, Wildman, & Picocolo, 2009). It will provide an environment for teachers to network, collaborate, model and share individual experiences of their integration strategies for the benefit of all (Schlager et al., 2003; Dede et al., 2009).

The pre-workshop structures relate to what needs to be done to prepare the intended participants for future Web 2.0 workshops. Currently, most participants attend these workshops oblivious of what to expect, apart from the fact that a friend told them about it or they happened to see it on a district workshop registration website. The workshops need to be better explained to teachers regarding what they will accomplish and how they will impact their career in the form of advanced guidelines (Wolfson, 2010). Use of social networking tools like Facebook, Tweeter and other collaborative tools could be used effectively in dissemination of information during the pre –workshop stages of professional development (Escobar-Rodrguez, Carvajal-Trujillo, & Monge-Lozano, 2014). Communication about workshops for Web 2.0 tools in the form of advanced guidelines needs to be comprehensive and frequent so that both newcomers and older teachers new to Web 2.0 technologies can figure out which session is most appropriate as well as what to expect during such professional development sessions. Wolfson and Cavanagh (2011) also found that provision of advanced guidelines is especially helpful in closing the generational gap between younger and older teachers.

The advanced workshop will be strictly face-to-face and dedicated to integration of Web 2.0 tools into the classroom. Participants need to be informed beforehand that they will each make a presentation on how Web 2.0 is being implemented in his or her classroom. When a workshop participant has yet to implement Web 2.0 in the classroom, the advanced Web 2.0 face-to-face workshop will be the place to acquire valuable skills and practical know-how as well as to ask questions regarding what to do with Web 2.0 tools in the classroom. After the presentations, the rest of the time allotted will be for collaborative discussions, running parallel with teachers showing each other what content was created by the teacher or the students. This will also be a time for teachers

to examine what other teachers have posted on the proposed district-wide Web 2.0 collaborative tool website in order to learn what other Web 2.0 resources teachers are using.

Post-workshop activities would involve extensive feedback and follow-up between participants and teacher instructors. Teacher instructors are teachers who are savvy with technology, acting as technology liaisons in schools. The volume of information an individual is subjected to in this digital age is so enormous, it is unlikely anyone would acquire all of the necessary knowledge in a formal learning environment such as a traditional professional development workshop. In a recent study by Gray, Thomas, and Lewis (2010), "Use of Educational Technology in US Public Schools," over 78% of teachers indicated they met their educational technology training needs by independent learning; 61% of teachers did this through formal professional development. Independent learning mediated by online training is becoming increasingly popular. As a result, it is highly recommended that an online learning platform dedicated to the basics of Web 2.0 tools and Web 2.0 collaborative tools be part of the overall implementation of formal professional development workshops.

In conclusion, findings from this study indicate that teacher professional development is not in sync with the realities of 21st-century learning, which to a large extent are embodied in Web 2.0 applications (Vrasidas, 2015). As we move forward through the second decade of the 21st century, the case for elevating professional development beyond the traditional stand-and-deliver approach could not be made at a better time.. Finally, there is a need for utilization of Web 2.0 applications such as Facebook, Tweeter and other forms of social media and emerging innovative practices like MOOCs to offer a direct path to the realization of a culture of collaboration essential in professional development for educator empowerment.

References

Anderson, P. (2007). What is Web 2.0? Ideas, technologies and implications for education. *JISC Technology and Standards Watch*. Retrieved from http://www.jisc.ac.uk/media/documents/techwatch/tsw0701b.pdf

Ashton, J. and Newman, L. (2006). An unfinished symphony: 21st century teacher education using knowledge-creating heutagogies. *British Journal of Educational Technology, 37*, 825-840.

Bernard, H. R. (2006). *Research methods in anthropology: Qualitative and quantitative approaches.* Walnut Creek, CA: AltaMira Press.

Borko, H. (2004). Professional development and teacher learning: Mapping the terrain. *Educational Researcher*, *33*, 3-15.

Bowe, R. & Pierson, M. (2008). Professional development in educational technology: What have we learned so far? In Borthwick, A & M. Pierson (Eds.), *Transforming classroom practice*, (pp. 9-22).Washington, DC: ISTE.

Chen, Y. L. (2008). Modeling the determinants of Internet use. *Computer & Education,51*, 545-558.

Cheek, J., Onslow, M., & Cream, A. (2004). Beyond the divide: Comparing and contrasting aspects of qualitative and quantitative research approaches. *Advances in Speech-Language Pathology*, *6*, 147-152. doi: 10.1080/14417040412331282995

Clarke, D., & Hollingsworth, H. (2002). Elaborating a model of teacher professional growth. *Teaching and Teacher Education*, *18*, 947–967.

Consortium of School Networking. (2011). *Leadership for Web 2.0 in education: Promise and reality*. Retrieved from http://www.cosn.org/Portals/7/docs/Web%202.0/ExecSummaryCoSN%20Report042809Final.pdf

Cooper, T. & Johnson, C. (2013). Web 2.0 Tools for Constructivist Online Professional Development. In J. Herrington et al. (Eds.),*Proceedings of World Conference on Educational Media and Technology 2013* (pp. 1923-1926). Association for the Advancement of Computing in Education (AACE).

Creswell, J. W. (2007). *Qualitative inquiry and research design: Choosing among five traditions*. Thousand Oaks, CA: Sage.

Creswell, J. W. (2005). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (2nd ed.). Upper Saddle River, NJ: Pearson.

Dalgarno, B. & Lee, M. J. (2010). What are the learning affordances of 3-D virtual environments? *British Journal of Educational Technology*, *41*, 10-32.

Dede, C. (2006). The evolution of online teacher professional development. In C. Dede (Ed.),

Online professional development for teachers. Cambridge: Harvard Education University Press.

Dede, C., & Ketelhut, J. (2009). A Research Agenda for Online Teacher Professional Development. *Journal of Teacher Education*, *60*(1), 8.

Dewey, J. (1933). *How we think: A restatement of the relation of reflective thinking to the educative process*. Chicago: Henry Regnery Co.

Dukes, S. (1984). Phenomenological methodology in the human sciences. *Journal of Religion and Health, 23*, 197-203.

Eagleton, T. (1983). *Literary theory: An introduction*. Oxford: Basil Blackwell.

EDUCAUSE(2013). Digital badges for professional development. *EDUCAUSE Review.* Retrieved from http://www.educause.edu/ero/article/digital-badges-professional-development.

Escobar-Rodrguez, T., Carvajal-Trujillo, E. & Monge-Lozano, P. (2014). Factors that influence the perceived advantages and relevance of Facebook as a learning tool: An extension of the UTAUT. *Australasian Journal of Educational Technology, 30*(2),. Australasian Society for Computers in Learning in Tertiary Education.

Frankel, J. & Wallen, N. (2009). *How to design and evaluate research in education*. New York: McGraw-Hill.

Gray, L., Thomas, N., and Lewis, L. (2010). *Teachers' Use of Educational Technology in U.S. Public Schools: 2009* (NCES 2010-040). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC. Retrieved from http://nces.ed.gov/pubs2010/2010040.pdf

Garet, M. S., Porter, A. C., Desimone, L., Birman, B. F., & Yoon, K. S. (2001). What makes professional development effective? Results from a national sample of teachers. *American Educational Research Journal, 38,(4)* 915-945.

Groenewald, T. (2004). A phenomenological research design illustrated. *International Journal of Qualitative Methods, 3* (1). Retrieved from http://www.ualberta.ca/~iiqm/backissues/3_1/pdf/groenewald.pdf

Grundy, S. & Robinson, J. (2004). Teacher professional development: Themes and trends in the recent Australian experience. In C. Day and J. Sachs (Eds.), *International Handbook on Continuing Professional Development of Teachers* (pp. 146-66). Maidenhead: Open University Press.

Hanushek, E. A. (2005). *Economic outcomes and school quality: Education policy series*. Paris, France: International Institute for Educational Planning and International Academy of Education.

International Society for Technology in Education (ISTE). (2008). *The ISTE NETS and Performance Indicators for Teachers (NETS•T)*. Retrieved from http://www.iste.org/Libraries/PDFs/NETS_for_Teachers_2008_EN.sflb.ashx

Interactive Educational Systems Design (IESD). (2011). *National survey report digital districts: Web 2.0 and collaborative technologies in U.S. schools*. Retrieved from http://www.prweb.com/releases/2011/03/prweb5205194.htm

Johnson, L., Adams Becker, S., Estrada, V. & Freeman, A. (2014). *NMC Horizon Report: 2014 K-12 Edition*. Austin, TX: New Media Consortium.

Knowles, M. S., Holton, E. F., & Swanson, R. A. (2005). *The adult learner: The definitive classic in adult education and human resource development* (6th ed.). Boston, MA: Elsevier.

Knowles, M. (1984). *The adult learner: A neglected species*. Houston: Gulf Publishing.

Lemke, C., Coughlin, E., Garcia, L., Reifsneider, D., & Baas, J. (2009). *Leadership for Web 2.0 in education: Promise and reality*. Culver City, CA: Metiri Group.

Lester, S. (1999). *An introduction to phenomenological research*. Retrieved from http://www.sld.demon.co.uk/resmethy.pdf

Lawless, K. A. & Pellegrinio, J. W. (2007) Professional development in integrating technology into teaching and learning: Knowns, unknows, and ways to pursue better questions and answers. *Review of Educational Research*. Retrieved from http://www. Jstor.org/stable/4624911.

Lincoln, Y. S., & Guba, E. G. (2000). Paradigmatic controversies, contradictions, and emerging confluences. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (2nd ed., pp. 163-188). Thousand Oaks, CA: Sage.

Little, C. A., & Housand, B. C. (2011). Avenues to professional learning online: Technology tips and tools for professional development in gifted education. *Gifted Child Today*,. Retrieved from http://gct.sagepub.com/content/34/4/18.full.pdf+html

Loucks-Horsley, S., Hewson, P. W., Love, N., & Stiles, K. E. (1998). Designing professional development for teachers of science and mathematics. Thousand Oaks, CA: Corwin Press.

Merriam, S. (2009). *Qualitative research: A guide to design and implementation*. San Francisco: Jossey-Bass.

McDuffie, K. A., & Scruggs, T. E. (2008). The contributions of qualitative research to discussions of evidence-based practice in special education. *Intervention in School and Clinic*, *44*, 91-97. Retrieved from http://isc.sagepub.com/

Met Life (2010). *Met Life survey of the American teacher: Collaborating for student success.* Retrieved from: https://www.metlife.com/assets/cao/contributions/foundation/american-teacher/MetLife-Teacher-Survey-2011.pdf

Miles, M. B. (1995). Foreword. In T. R. Guskey & M. Huberman (Eds.), *Professional development in education: New paradigms and practices* (pp. vii-ix). New York, NY: Teachers College Press.

Moore, M. G. (2007). Theory of transactional distance. In M. G. Graham (Ed.), *Handbook of distance education (2nd ed.*, pp. 89-101). Mahwah, NJ: Lawrence Erlbaum.

Moustakas, C. (1994). *Phenomenological Research Methods.* Thousand Oaks, CA: Sage.

Morrow, S. (2005). Quality and trustworthiness in qualitative research in counseling psychology. *Journal of Counseling Psychology*, *52,* 250-260.

Newman, D. L., (2008). Ensuring integration of teacher changes: What practices will make sure that professional development takes hold? In R. Bowe & M. Pierson (Eds.), *Transforming classroom practice* (pp. 187-203). Washington, DC: ISTE.

Noe, R. A., & Schmitt, N. (1986). The influence of trainee attitudes on training effectiveness: Test of a model. *Personnel Psychology*, 39, 497–523.

Noe, R. A., & Colquitt, J. A. (2002). Planning for training impact: Principles of training effectiveness. In K. Kraiger (Ed.), *Creating, implementing, and maintaining effective training and development: State-of-the-art lessons for practice* (pp. 53–79). San Francisco, CA: Jossey-Bass.

Nyirenda, R. (2015). Factors that support and inhibit the use of Web 2.0 technology tools among faculty and students in higher education. In *Proceedings of Global Learn 2015* (pp. 134-135). Association for the Advancement of Computing in Education (AACE).

Opfer, V., & Pedder, D. (2011). Conceptualizing teacher professional learning. *Review of Educational Research*, *81(3)*, 376-407. Retrieved from http://rer.sagepub.com/content/81/3/376

Onwuegbuzie, A. J. & Leech, N. L. (2007). A call for qualitative power analyses. *Quality & Quantity: International Journal of Methodology, 41*, 105–121.

O'Reilly, T. (2005). *What is Web 2.0? Design patterns and business models for the next generation of software*. Retrieved from http://oreilly.com/pub/a/web2/archive/what-is-web-20.html?page=2

Orr, B. (2007). Parsing the meaning of Web 2.0. *American Bankers Association*, *99*(4), 53.

Patton, Q. (2002). *Qualitative research and evaluation methods*. Thousand Oaks, CA: Sage.

Richardson, W. (2007). *The read/write lab in the classroom*. Retrieved from http://weblogged.com.

Richardson, V. (2003). The dilemmas of professional development. *Phi Delta Kappan, 84,* 401-406*.*

Salas, E., Wildman, J. L., & Piccolo, R. (2009). Using simulation based training to enhance management education. *Academy of Management Learning & Education, 8*, 559–573.

Salas, E., Tannenbaum, S. I., Kraiger, K., & Smith-Jentsch, K. A., (2012). The science of training and development in organizations: What matters in practice? *Psychological Science in the Public Interest, 2,* 74-101. doi: 10.1177/1529100612436661

Schlager, M. S., & Fusco, J. (2003). Teacher professional development, technology, and communities of practice: are we putting the cart before the horse? *The Information Society*, *19*(3), 203-220.

Shank, G. D. (2002). *Qualitative research: A personal skills approach*. Columbus, OH: Merrill Prentice Hall.

Solomon, G. & Schrum, L. (2007). *Web 2.0: New tools, new schools.* Washington D.C.: ISTE.

Sykes, G. (1996). Reform of and as professional development. *Phi Delta Kappa*, *77*, 465–489.

Stake, E. R. (1995). *The art of case study research*. Thousand Oaks, CA: Sage.

Tannenbaum, S. I., & Yuki, G. (1992). Training and development in work organizations. *Annual Review of Psychology,* 43, 474–483.

Timperly, H., & Alton-Lee, A. (2008). Reframing teacher professional learning: An alternative policy approach to strengthening valued outcomes for diverse learners. *Review of Research in Education,* 32(1) 328-369. Retrieved from http://rre.sagepub.com/content/32/1/328.full

Swain, C. & Pearson, T. (200). Educators and technology standards: Influencing the digital divide. *Journal of Research on Technology and Education, 34,* 326-335.

U. S. Department of Education. (2004). *New no child left behind flexibility: Highly qualified teachers.* Retrieved from http://www2.ed.gov/nclb/methods/teachers/hqtflexibility.html

U. S. Department of Education (2008). National Center for Educational Statistics. *The condition of education*. Retrieved from http://nces.ed.gov/pubs2008/2008031.pdf

U. S. Department of Education (2009). National Center for Educational Statistics. *Statistics, Schools and Staffing Survey (SASS)*. Retrieved from http://nces.ed.gov/pubs2009/2009324.pdf

Vandenberg, D. (1997). Phenomenological research in the study of education. In D. Vandenberg (Ed.), *Phenomenology & education discourse* (pp. 3-37). Johannesburg, South Africa: Heinemann.

Vrasidas, C. (2015). The rhetoric of reform and teachers' use of ICT. *British Journal of Educational Technology, 46*(2), 370-380. Wiley

Wells, J., & Lewis, L. (2006). *Internet access in U. S. public schools and classrooms:*

1994–2005. (NCES 2007-020). Washington, DC: National Center for Education Statistics.

Wei, R. C., Darling-Hammond, L., Andree, A., Richardson, N., & Orphanos S. (2009) *Professional learning in the learning profession: A status report on teacher development in the United States and abroad* (Technical Report). Retrieved from National Staff Development Council website: http://www.srnleads.org/resources/publications/pdf/nsdc_profdev_tech_report.pdf

Wei, R. C., Darling-Hammond, L., & Adamson, F. (2010). *Professional development in the United States: Trends and challenges* (Technical Report). Retrieved from National Staff Development Council website: http://www.nsdc.org/news/NSDCstudytechnicalreport2010.pdf

Wolfson, N. (2010). *Cognitive aging and computer-based instruction: The role of coherence level and advanced organizers* (Unpublished master's thesis). Fort Collins: Colorado State University.

Wolfson, N. E., & Cavanagh, T. M. (2011, August). *Older adults and technology-based instruction: Optimizing learning outcomes and transfer*. Paper presented at the annual meeting of the Academy of Management, San Antonio, TX.

Yoon, K. S., Duncan, T., Lee, S. W.-Y., Scarloss, B., & Shapley, K. (2007). *Reviewing the evidence on how teacher professional development affects student achievement* (Issues & Answers Report, REL 2007–No. 033). Washington, DC: U.S. Department of Education. Retrieved from http://ies.ed.gov/ncee/edlabs

Appendix A: Interview Questionnaire

SUBJECT (Code #)

Interview Questions

Before commencement of the interview, Web 2.0 applications and categories will be discussed with the subject.

1. How did you begin using Web 2.0 applications?
    a. What Web 2.0 applications or tools do you use in your instruction?
    b. Why did you begin using Web 2.0 applications or tools for instruction?
    c. Did you have experience using Web 2.0 applications or tools before you attended the workshop?
    d. Describe the training you received regarding how to integrate Web 2.0 applications or tools in classroom instruction.
2. Describe the benefits you have experienced from using Web 2.0 applications or tools?
    a. What do you believe are the most important benefits that Web 2.0 applications or tools provide to you as a teacher?
    b. Is using Web 2.0 applications or tools by teachers beneficial to the district? If so, please explain.
3. How would you describe your experience, problems or issues using Web 2.0 applications or tools in your role as a teacher?
    a. Describe problems or issues you experienced using Web 2.0 applications or tools for instruction.
    b. How do your team members feel about Web 2.0 applications or tools for teaching?
    c. Are there Web 2.0 applications or tools that you would like to use that you cannot use?
    d. What is preventing you from using them?
    e. Are there Web 2.0 applications or tools that you must use that you would prefer not to use?
    f. Why are you not using them?

4. Did the workshop prepare you adequately to use Web 2.0 applications or tools?

    a. What categories of Web 2.0 applications or tools did you learn in the workshop?

    b. What areas during the workshop on Web 2.0 applications or tools did not work well?

    c. Would you consider the hands-on experiences during the workshop adequate?

    d. Considering the integrative nature of Web 2.0 applications, would you have preferred to work alone?

5. Discuss other matters of concern about Web 2.0 applications or tools and integration in the classroom.

Text of the online interview will be provided to participants for their review before data analysis is commenced. Participants will be advised to continue thinking about the topic because they will be able to add written comments after they review the transcript.