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TECHNOLOGY A WIDENING FRONTIER IN PROFESSIONAL DEVELOPMENT

How well prepared are teachers,
and what more needs to be done
to ensure success?

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After languishing as largely an afterthought for a quarter-century, teacher professional development around information technology has been growing in frequency and urgency during the past half-decade.

Educators nationwide increasingly are undertaking efforts to ensure that teachers are up to speed on the latest in technology, so they're both using it in the most pedagogically sound manner and ensuring that students know the tools of the present.

“Districts have overlooked the value or relevance of information technology,” says Rich Kiker, director of online learning at the Palisades School District in Kintnersville, Pa., north of Philadelphia. “Now all of education is saying, ‘You know what? We get it.’ . . . For me, the end goal is always, how does technology make my job easier, more efficient, and more effective?”

The heightened awareness and discussion around professional development for technology intersects with the current push toward the Common Core State Standards, which rely heavily on technology-based instruction and, as of the 2014–15 school year, will include an online testing component.

In addition to structured professional development, teachers are also turning to informal technologically based means for collaborating, such as Twitter feeds on particular topics and ongoing Personalized Learning Networks (PLNs) in which they share best practices on a range of issues.

The continuing rollout of emerging technologies provides another reason why teachers need professional development around information technology. Last but certainly not least, teachers are beginning to get up to speed on Massive Open Online Courses (MOOCs) like those used for college students.

HOW WELL SUPPORTED ARE TEACHERS?

The need to support new technology in the classroom with professional development to match has been recognized since at least the advent of the No Child Left Behind Act of 2001, which provided funding through the Enhancing Education Through Technology program toward technology integration and teacher professional development. Half of that funding was allocated based on federal formula and half on a competitive grant basis.¹

“High quality professional development is central to any education improvement effort, especially those that pertain to the integration of technology to support classroom instruction,” writes Stephanie Renee Tweed of East Tennessee State University. “More specifically, professional development has been identified as one of the most important factors influencing teachers’ integration of technology into the classroom.”²

Such observations have been made by researchers on an international level, as well. “Teachers’ professional development is a key factor to successful integration of computers into classroom teaching,” writes Charles Buabeng-Andoh of Pentecost University College, Ghana. “Several studies have revealed that whether beginner or experienced, [IT]-related training programs develop teachers’ competencies in computer use, influence teachers’ attitudes towards computers as well as assisting teachers [to] reorganize the task of technology and how new technology tools are significant in student learning.”³

But despite more than a decade of efforts to this end, Tweed writes, “Conflicting research indicated that while professional development programs are increasing computer skills among teachers, the integration of technology into curriculum is still at a limited level.”⁴

The New Media Consortium’s Horizon Project places professional development for teachers around technology as the first of six top technology challenges facing education in “The NMC Horizon Report: 2013 K–12 Edition,” as reported in *THE Journal*.

“Key among all challenges is the lack of adequate, ongoing professional development for teachers who are required to integrate new technologies into their classrooms yet who are unprepared or unable to understand new technologies,” *THE Journal* says, adding directly from the NMC report: “The results are that the new investments are underutilized, not used

at all, or used in a way that mimics an old process rather than innovating new processes that may be more engaging for students.”⁵

While some districts are effective in delivering professional development around technology use, many face a number of deficits, according to Tom Whitby, a social media consultant who spent the bulk of his career as an English teacher in the Sayville School District, on New York’s Long Island.

For one thing, Whitby says, they give teachers the option of whether to pursue professional development (PD) around technology or in other areas, and those least comfortable with technology, who need it the most, often tend to sign up for other topics. Those who do sign up for the tech offerings find that, “too often, the PD that is presented is simply the bells and whistles of applications, as opposed to getting a teacher and saying, ‘What is it you do in your class?’, and then figuring out how technology can make that teacher more efficient.”

Formalized, classroom-setting PD doesn’t provide enough opportunity for teachers to collaborate and bounce ideas off one another, which would be especially helpful when it comes to technology, Whitby says.

“Schools do not provide collaborative time to do this,” he says. “If you look at where we’ve been going with professional development over the generations, obviously something is not working. We’re not assessing how we deliver PD. Too often, people are just buying in to consulting companies that just send their experts in to do stuff. And there are some fine companies out there, but you’ve got to change the culture first before you change anything else.”

Kiker says districts are belatedly realizing the need to get teachers up to speed on technical skills. “It’s not about the tools; it’s about the teaching,” he says. “But you can’t get there until you have foundational technical skills. You have to know how to use Google Docs. You have to know how to use StrataLogica.”

Part of the trick to getting teachers on board is giving them independence in how they choose to become familiar with technology and design assignments using it, Kiker says. “You need to give teachers autonomy and choice to build an English assignment or an art assignment and make sure it’s relevant to them,” he

“Without adequate support and motivation educators will retreat to their old ways of teaching.”

says. “The end goal is helping teachers find solutions for their professional practice and the engagement and achievement of their students. Why is technology important to me? How does it help in my classroom? How does it help my culture?”

Too few districts have gotten to that point, to date, Kiker says. “Online learning was looked at as a buzz idea and a buzzword for a long time: There’s nothing powerful or useful there. You get to put assignments online,” he says. But with greater bandwidth, lower device costs and other barriers to entry removed, “E-learning has converged into a space right now where it’s easy to see why this is happening, and why online professional development has become so powerful.”

But, he adds, districts “are not anywhere close to where they need to be with online learning. . . . Good teaching is good teaching. The core principles of being responsive and pro-active—the art of knowing when a student needs assistance—those don’t change. What changes is how and when you give content to students.”

BEST PRACTICES AND DISTRICT STRATEGIES

Just filling classrooms with technology doesn’t guarantee it will be used—or, certainly, used to maximum effect. Bridget McCrea writes in *THE Journal*, “In fact, if there’s one thing that districts have learned during this information age it’s this: Without adequate support and motivation educators will retreat to their old ways of teaching.”

McCrea recommended strategies like multifaceted training models that include lectures, videos and homework assignments; training as an incentive to receive new technology in the first place; taking teachers out of their comfort zones to get them excited about IT tools; understanding that teachers will start

from different places and move at different speeds when it comes to IT; and perhaps letting teachers decide if they want new technologies, anyway.⁶

As one example of multifaceted training, Western Heights School District in Oklahoma City beefed up a one-day technology training session into a district wide model that consisted of four sessions, two to three hours long, that included lectures, videos, homework assignments and tests for teachers before they moved on to the next segment. “We hit from all angles,” says Kimberly Race, director of instruction.

To take teachers out of their comfort zones, Westville Community District II in Westville, Ill., gave teachers flip video cameras and asked them to demonstrate how their new equipment could improve student achievement—an open-ended assignment that flustered some of them. “But there was no right answer,” says Jim Owens, superintendent. “We simply wanted them to use their creativity.”⁷

Web-based resources and tools help to continue and deepen the learning that occurs during “in-class” professional development days, writes Kathy Schrock in *District Administration* magazine. This can include travel budget-saving technology like Skype or Adobe ConnectNow to bring experts into the classroom virtually, commercial software packages that teachers can use at their own pace—but which “may not map well with local initiatives”—and custom-designed tools by districts themselves.⁸

Among the districts using such homegrown approaches are the William Floyd School District in Mastic Beach, N.Y., where teachers create professional development courses for other teachers; Bernards Township Public Schools in Basking Ridge, N.J., which has a formalized



“Staff College” that incorporates face-to-face, online and blended courses; and the large, urban Hillsborough County (Fla.) Public Schools, which has a technology trainer in each of its seven regions that provides in-house technology PD.

“The best thing about it is our teachers write the professional development content, and its rigor is based on our rigor,” says Kathleen Pantaleo, instructional technology specialist in the William Floyd School District. “We can diagnose and prescribe courses based on our needs.”⁹

Some districts turn to a blended model that combines some face-to-face contact with a local educator or consultant with online resources. The Devils Lake (N.D.) Public Schools uses such a model, and technology director Mike DeFoe says, “An advantage of local trainers is that we know the situation our staff is in and can tailor the PD to their skills and needs. The disadvantage is trying to find times when all staff members are available.”¹⁰

Effective teachers must facilitate and inspire student learning and creativity, design and develop digital age learning experiences and assessments, model digital age work and learning, promote and model digital citizenship and responsibility, and engage in

professional growth and leadership, according to the International Society for Technology in Education (ISTE).

Digital age learning experiences and assessments should include digital tools and resources, technology enriched learning environments that prompt students to pursue their own interests and assess their own progress, ISTE says. To model digital age work and learning, teachers need fluency in technology, the ability to collaborate with students and peers, the know-how to communicate information using “a variety of digital age media and formats” and to show how to “use information resources to support research and learning,” the society believes.¹¹

ISTE’s notion of engaging in professional growth and leadership means going beyond the four walls of the traditional professional development classroom. Teachers should participate in local and global learning communities, engage in shared decision making and community building, develop others’ leadership and technology skills, and regularly evaluate current research and best practices around use of emerging digital tools and resources, ISTE says.

PERSONALIZED LEARNING NETWORKS

The notion of forming personalized learning networks (PLNs) is a key component of professional development around technology. Writing in *Edutopia*, Whitby recently

defined a PLN as “a tool that uses social media and technology to collect, communicate, collaborate, and create with connected colleagues anywhere at any time.” That means “each individual educator becomes a potential source of information,” and that “there are no two PLNs that are the same,” Whitby writes.

PLNs often develop thought leaders in education, promoting reflection and collaboration that sometimes further prompts blogging, speaking, and writing, Whitby notes. They enable students to “share cultural information with other children around the world” and for teachers to “exchange methods and strategies” as well as online materials and links.¹²

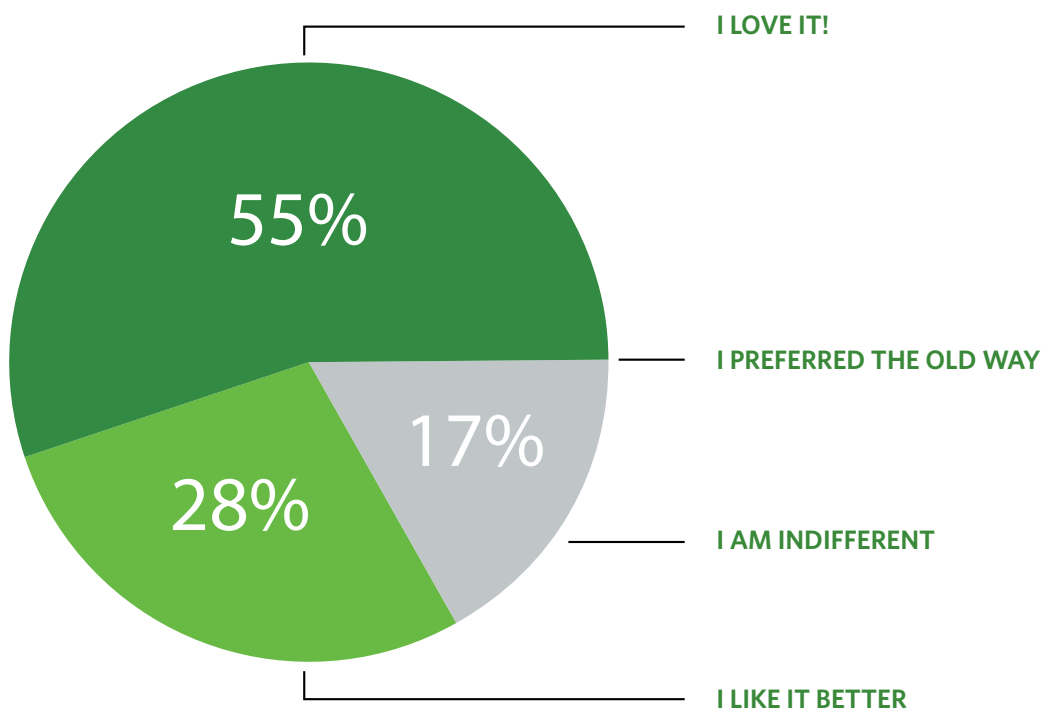
Among the activities Whitby suggests for building a PLN: starting a Twitter account focused on educators, building a circle of connected educators on Google Plus, following education blogs or chats, joining and participating in education groups on Facebook or LinkedIn, and accepting others’ invitations to collaborate.

“Remember that the purpose of a PLN is *personalized learning*,” he writes. “You determine your needs and goals, and then acquire the sources that you need in order to attain them.”¹³

Districts can proactively set up in-house PLNs among their own teachers, Whitby says, which can be considerably more cost effective than inviting consultants to come analyze your district’s needs and create something for you. “That’s an expensive way to go,” he says. “If school districts could use that model and do that on their own—build up their own support systems and their own personal learning networks and personal learning communities, those are the ones that are most successful.” But collaboration in larger networks is also necessary for districts and their teachers to stay current with the latest in tools and resources, Whitby says.

“Educators who are connected through social media and involved in these education communities online are having discussions about the changes in

HOW DO YOU FEEL ABOUT THE DIRECTIVE TO CHOOSE AND TRACK YOUR OWN PROFESSIONAL DEVELOPMENT WITH A PERSONALIZED LEARNING PLAN?



Source: EdTechCoaching.org

Information gathered from a survey of approximately 270 teachers called “Personalized Learning Plan Feedback Survey.” The survey was conducted between June–August 2013 by the Kettle Moraine School District in Wales, Wisconsin.

education because they're connected with the thought leaders," he says. "They're having discussions about what's going on in the classrooms of the future. They were having conversations about the flipped classroom six months to a year before anybody knew what it was. The discussions that are happening online are far ahead of the discussions happening in faculty meetings."

The U.S. Department of Education has recommended that teachers create personal learning networks for career-long learning through the use of social media, notes researcher Cindy Salo at Boise State University.

"These groups augment online PD by providing a forum for developing and sharing best practices, participating in real-time problem solving, and collaboratively developing student learning resources. Personal learning networks overcome the isolation inherent in teaching and allow teachers to draw on the knowledge of experts and fellow practitioners around the world," Salo says, drawing from the U.S. DOE 2010 National Education Technology Plan.

Salo also notes that online collaboration with far-flung colleagues leads to freer discussions on more challenging topics, which teachers might be shier to share with colleagues, as well as broader perspectives that come from a more geographically diverse group of learners.¹⁴

The New York Times has taken note that teachers are using Twitter for professional development, with weekly chats focused on math, science, sixth grade, and new teachers among many others. The #Edchat space co-founded by Whitby and two other educators has provided a number of such forums.

"We realized that many valuable mini-discussions were taking place on Twitter with limited exposure, so we started Edchat to gather as many tweeters as we could, at the same place and at the same time, to discuss topics important to educators in general," Whitby told the *Times*. "We later branched out to do live sessions with education leaders."¹⁵

PD, IT & CCSS

Among the reasons why PD around IT has gained urgency in recent years has been the ongoing implementation of the Common Core State Standards. ISTE sees technology in the classroom as crucial to the success of the Common Core, starting with its integral role in personalizing instruction and

creating richer learning environments, and ramping up with the advent of the 2014–15 Common Core Online Assessments.

"It is imperative that students' learning takes place in a robust digital learning environment in order for them to be successful on these new higher-order thinking assessments," reads ISTE's position statement on Common Core. "Schools will have to make significant investments in infrastructure and hardware, which will provide an extraordinary opportunity for extending and leveraging the use of technology to transform teaching and learning."¹⁶

Whitby believes the framers of the Common Core virtually ignored professional development, which he sees as a missed opportunity. "The whole idea of Common Core is that it was supposed to change everything. If it was so important, why did they not build a PD component into it with support and money?," he says. "Technology is a component of Common Core; it's not driving Common Core. But theoretically, every teacher is supposed to be teaching within Common Core digital literacy."

The Common Core standards have helped school districts wake up to the reality that teachers need tech-oriented professional development, even if they haven't moved quickly enough yet, Kiker believes.

"I believe the term 'Web publishing' is mentioned about 80 times in the Common Core standards," he says. "Of course there's the common assessment—the online assessment now has driven, from a managerial standpoint, the need for devices. And partnered with that, Web-based learning. We've been talking about Web-based learning for a long time, and now we need to do that."

Plus, Kiker says, the Common Core is pushing teachers to get up to speed on blended classrooms, flipped classrooms and other hybrid models of instruction. "It's teaching kids how to learn and be independent about learning," he says. "That leads to creating an ecosystem where students can spend less time on the simple standards and dive deeper into higher-order thinking skills, and having a classroom that's about learning and not discipline."

The National School Boards Association agrees that the support for training teachers in the new methods of instruction will be essential for effective implementation of Common Core, as reported in

THE Journal. But professional development is both crucial and doable even under tough budgetary times, NSBA says in its new report, “Teaching the Teachers: Effective Professional Development in an Era of High Stakes Accountability.”

NSBA’s report said that professional development should be ongoing, delivered within subject areas and employ peer coaches and mentors when possible. The report did not discuss the role of technology, and NSBA senior policy analyst Jim Hull told *THE Journal* that the research is inconclusive, “but he added that technologies that make tools available to teachers on an ongoing basis do present an opportunity.”¹⁷

At least some jurisdictions have begun to move on those opportunities. The Fresno County (Calif.) Office of Education Instruction Technology Services staff “can provide coaching and support for transforming teaching and learning with available technology,” the office’s website states. “This on-site support can provide an environment where all educators can feel empowered and ready to infuse various technologies to embrace our 21st century learners.”

As one example, the county education office is offering a multi-day series to “assess technology proficiency of staff, provide demonstration lessons, [and] delve into curriculum design with the emphasis of integrating 21st Century Skills into the process,” the website states. This will enable teachers to design lessons and units, using district resources, which provide “rigorous and relevant content that aligns with the Common Core.”¹⁸

EMERGING TECHNOLOGY

Another reason for the ramped up urgency for PD around IT is simply the ever-quickening pace of technological change. “It is difficult for educators to keep up with it, and they have to, in order to stay relevant,” Whitby says. “Unfortunately, some educators still think they have a choice as to whether to use technology in the classroom. Technology tools for learning are here, forever.”

That’s partly because businesses use the same tools—as do average people in their every day lives. “Kids will be required to live in a computer-driven society,” he says. “That’s one of the advantages of being connected and using social media for collaboration. The whole collaborative learning process is helping people become relevant and stay relevant. It’s a mindset; it’s not a workshop. It’s all part of the education culture.”

Districts tend to be hesitant to introduce emerging tools for reasons like the lost money and lost time if a new technology doesn’t strike a chord with students, as well as the uncertainties of which emerging technologies are truly going to gain a foothold in the marketplace overall, Kiker says. “There’s the diagnostic process: 3-D printing, is this going to be an engineering product, is this going to be a medical product?” he says. “Is it going to be across industries? Once you see it has inter-industry value, it’s easier to answer the question of, why does this have value to me?”

The New Media Consortium Horizon Project 2013 report lists several emerging technologies that will most noticeably impact education during the next five years, according to *THE Journal*. Cloud computing was the top trend listed, with examples cited like cloud-based 1-to-1 programs and computing platforms with shared desktops. Mobile learning is another breaking trend, with implications for 1-to-1 computing on a budget.

Two to three years out, NMC sees learning analytics—customizing education at the individual level using data—as well as open educational resources as being particularly impactful on education. And four or five years from now, 3-D printing, and virtual and remote laboratories will be the emerging technologies that teachers will need to know and understand through professional development, *THE Journal* notes in its summary of the NMC report.¹⁹

PD FOR MOOCS

The advent of Massive Open Online Courses (MOOCs) in higher education has begun to spread into the K–12 world as well, which provides another reason why professional development around information technology continues to grow in importance.

“Blended learning mixed with classroom teaching requires a different methodology that we’re not teaching our educators,” Whitby says. “You can’t take the same worksheets you use in the classroom and send them out electronically. . . . That’s the kind of thing we’re going to have to start to address, understanding that teaching online is different from teaching in the classroom.”

MOOCs can aid the process of learners picking and choosing the concepts that seem most relevant to them, Kiker says, but teachers need the time and space to learn how to build an online classroom with 24-7 access. “This is part of the professional development, knowing how to saturate the technology,” he says.

“Knowing how to do these things . . . gives students independent learning opportunities. It might mean one group of students are working on a MOOC, another group building an online presentation.”

Although MOOCs are sometimes seen as potential cost-savers, Kiker would imagine that the staffing for a K–12 MOOC would be similar to that of regular classroom. “I don’t think any educator worth their weight would support 100 kids sitting in a self-directed classroom,” he says. “That’s a guaranteed failure. In our district, I put in cyber-centers where [an] information technology specialist staff provides general support.”

The NMC 2013 report included, for the first time, a section on new models for teaching that are providing “unprecedented competition to traditional models of schooling,” *THE Journal* notes, adding that “in particular, the MOOC . . . was identified as being ‘at the forefront’ of discussions about new modes of delivering K–12

education.” Competition from specialized charter schools and for-profit providers is part of what’s prompting K–12 districts to examine the possibilities, the report says.²⁰

Ed Tech Coaching notes that many of one’s best learning experiences, whether reading a book, engaging in an #edchat or sharing your ideas at a conference, tend to be self-directed—and yet none of these activities technically counts as professional development.

“In most districts, they probably didn’t,” writes Krista Moroder. “Here’s the problem: we’re encouraging personalized learning for students, but then we’re turning around and telling teachers that *their learning* only counts if they are sitting in the traditional four walls of classroom. That is so ridiculous that it is almost laughable.”²¹

MINNESOTA DISTRICT USES ‘FLIPPED’ PD

The 8,500-student Stillwater Area Public Schools in Minnesota has turned to “flipped professional development,” which combines personalized online resources and face-to-face support, to boost teachers’ knowledge and confidence in use of technology in the classroom, as reported in *Education Week*.

Teachers watch how-to videos on better approaches to using interactive-whiteboard software or the multi-tasking bar on the iPad, for example, and then collaborate with technology-integration specialists on how to develop those approaches themselves.²²

Since Stillwater began flipped PD in 2011–12, it’s spread to all nine elementary schools and gained 93 percent participation from classroom teachers by June 2013. Two IT specialists meet with teachers monthly in small groups for two-hour sessions that focus on individual projects, then provide other support as needed.

Flipped PD takes into account content area, grade level, technological expertise and teacher interests. “We don’t come in dictating what they’re here to work on,” technology-integration specialist Kristin Daniels told *Education Week*. “When they realize they’re being given time to think about what they want to be doing, and to grow at their own pace, they’re absolutely relieved. And there’s been a remarkable shift in attitude toward personal growth because of that.”²³

Stillwater cites several lessons learned from its first two years of flipped PD: include not only teachers but also principals, bolster your online resources, give teachers time to self-reflect, and realize that it provides the potential for continuous growth. But of course districts must also recognize the risks teachers see, notes Michael Dronen, Stillwater’s coordinator of educational innovation and technology.

“It’s not unlike asking someone without any training to walk out on a tightrope,” he told *Education Week*. “But once you’re on the rope and have those basic skills, it’s a really thrilling place to be. And it allows for deep reformational changes.”²⁴

Professional development around information technology has moved forward in fits and starts, but it must become a more rigorous and intentional part of teachers' continuing education going forward across all districts if American education is to stay at the forefront globally in the 21st century.

In part, this can happen through expanding districts' definition of professional development beyond the traditional "four walls" classroom into cyberspace, which allows for ongoing learning in-between formal PD sessions. To some extent, districts can encourage this, although teachers also can take it upon themselves to connect through personalized learning networks.

The implementation of the Common Core State Standards with their significant reliance on technology, the continuing and ever-increasing pace of emerging technologies, and the expansion of new ways of delivering instruction such as online learning and MOOCs mean that the need for teachers to become familiar with technology will only continue to grow.

CITATIONS

1. "The Impact of a NCLB-EETT Funded Professional Development Program on Teacher Self-Efficacy and Resultant Implementation," Richard Overbaugh and Ruiling Lu, Old Dominion University, published by International Society for Technology in Education, 2008.
2. "Technology Implementation: Teacher Age, Experience, Self-Efficacy, and Professional Development as Related to Classroom Technology Integration," Stephanie Renee Tweed, East Tennessee State University, 2013. Electronic Theses and Dissertations, Paper 1109, <http://dc.etsu.edu/etd/1109>
3. "Factors Influencing Teachers' Adoption and Integration of Information and Communication Technology Into Teaching: A Review of the Literature," Charles Buabeng-Andoh, Pentecost University College, Ghana, *International Journal of Education and Development Using Information and Communication Technology*, Vol. 8, Issue 1, pp. 136-155, 2012.
4. "Technology Implementation: Teacher Age, Experience, Self-Efficacy, and Professional Development as Related to Classroom Technology Integration," Stephanie Renee Tweed, East Tennessee State University, 2013. Electronic Theses and Dissertations, Paper 1109, <http://dc.etsu.edu/etd/1109>
5. "6 Technology Challenges Facing Education," David Nagel, *THE Journal*, June 4, 2013, <http://thejournal.com/Articles/2013/06/04/6-Technology-Challenges-Facing-Education>
6. "How to Bring Teachers Up to Speed With Technology," Bridget McCrea, *THE Journal*, March 14, 2012, <http://thejournal.com/Articles/2012/03/14/Getting-Teachers-Up-to-Speed-with-Technology/>
7. "How to Bring Teachers Up to Speed With Technology," Bridget McCrea, *THE Journal*, March 14, 2012, <http://thejournal.com/Articles/2012/03/14/Getting-Teachers-Up-to-Speed-with-Technology/>
8. "Equipping Teachers to Infuse Technology," Kathy Schrock, *District Administration*, January 2012, <http://www.districtadministration.com/article/equipping-teachers-infuse-technology>
9. "Equipping Teachers to Infuse Technology," Kathy Schrock, *District Administration*, January 2012, <http://www.districtadministration.com/article/equipping-teachers-infuse-technology>
10. "Equipping Teachers to Infuse Technology," Kathy Schrock, *District Administration*, January 2012, <http://www.districtadministration.com/article/equipping-teachers-infuse-technology>
11. ISTE Standards for Teachers, <http://www.iste.org/standards/standards-for-teachers>
12. "How Do I Get a PLN?", Tom Whitby, *Edutopia*, Nov.18, 2013, <http://www.edutopia.org/blog/how-do-i-get-a-pln-tom-whitby/>
13. "How Do I Get a PLN?", Tom Whitby, *Edutopia*, Nov.18, 2013, <http://www.edutopia.org/blog/how-do-i-get-a-pln-tom-whitby/>
14. "Beyond Workshops: New Technologies for Online Teacher Professional Development," Cindy Salo, Boise State University, 2011.
15. "Teachers Teaching Teachers," on Twitter: Q and A. on 'Edchats'," Katherine Schulten, *The New York Times*, Sept. 30, 2011. <http://learning.blogs.nytimes.com/2011/09/30/teachers-teaching-teachers-on-twitter-q-and-a>
16. ISTE Position Statement on the Common Core State Standards, International Society for Technology in Education, <http://www.iste.org/standards/common-core>
17. "Report: Effective Teacher Professional Development Crucial to Common Core," David Nagel, *THE Journal*, Sept. 10, 2013, <http://www.thejournal.com/Articles/2013/09/10/Report-Effective-Teacher-Professional-Development-crucial-to-common-core.aspx>
18. Instructional Technology Services office, Fresno County Office of Education, <http://commoncore.fcoe.org/technology-services>
19. "NMC Horizon Report: 2013 K-12 Edition," New Media Consortium, <http://nmc.org/publications/2013-horizon-report-k12>
20. "6 Technology Challenges Facing Education," David Nagel, *THE Journal*, June 4, 2013, <http://thejournal.com/Articles/2013/06/04/6-Technology-Challenges-Facing-Education.html>
21. "Personalized Learning for Teachers Too: Professional Development Should Reflect Learning, Not Seat Time!", Krista Moroder, Ed Tech Coaching, Sept. 4, 2013. <http://www.edtechcoaching.org/2013/09/personalized-learning-for-teachers-too.html>
22. "'Flipped' PD Initiative Boosts Teachers' Tech Skills," Robin L. Flanigan, *Education Week*, June 11, 2013, <http://www.edweek.org/dd/articles/2013/06/12/03whatworks.h06.html>
23. "'Flipped' PD Initiative Boosts Teachers' Tech Skills," Robin L. Flanigan, *Education Week*, June 11, 2013, <http://www.edweek.org/dd/articles/2013/06/12/03whatworks.h06.html>
24. "'Flipped' PD Initiative Boosts Teachers' Tech Skills," Robin L. Flanigan, *Education Week*, June 11, 2013, <http://www.edweek.org/dd/articles/2013/06/12/03whatworks.h06.html>