



Deeper Learning and e-learning

A Review of Promising Programs and Emerging Technologies in
the Field of Online Teacher Professional Development

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INTRODUCTION

The Hewlett Foundation’s “Deeper Learning” focus is aimed at ensuring that all students, particularly those from disadvantaged backgrounds or underserved communities, have access to the kind of integrated, collaborative learning experiences that will allow them to gain the knowledge and skills they need to succeed—and continue to learn—in postsecondary education and in their careers. As a supplement to WestEd’s previous report, an analysis of curricula and face-to-face professional development programs that support Deeper Learning, this report will look specifically at online teacher professional development (oTPD).

OUR PROCESS

In creating this report, we engaged in the following activities:

COLLECTED AND REVIEWED DATA

We began by surveying the field, reviewing several dozen online professional development programs and many more technologies and platforms. From these, we interviewed several providers with the goal of identifying some of the important ways that online providers are addressing aspects of Deeper Learning in oTPD.

CREATED THE DEEPER LEARNING OTPD FRAMEWORK

Based on the work by Linda Darling-Hammond and others on best practices in teacher professional development (Darling-Hammond et al., 2009) and WestEd’s previous report, we developed a preliminary set of core quality indicators for oTPD. These core qualities are presented as a framework and we looked for evidence for these indicators in each program and technology we reviewed.

IDENTIFIED IMPORTANT TRENDS IN THE CONTEXT OF ONLINE LEARNING

During our survey and review, it became apparent that some of the essential and powerful trends in online learning are emerging outside of the sphere of formal environments. We believe that there are a number of trends, some of which are “disruptive,” that represent significant opportunities to advance the goals of Deeper Learning.

PROFILED PROMISING PROGRAMS AND TECHNOLOGIES

Based on this broad review and the Deeper Learning oTPD Framework, we attempted to capture the essence of what made various oTPD practices noteworthy in program profiles, toward the goal of documenting promising online efforts are supporting Deeper Learning goals.

DEVELOPED A SET OF RECOMMENDATIONS REGARDING FUTURE SUPPORT FOR OTPD

Gathering all this information and analysis, we offer a set of recommendations that will support oTPD related to Hewlett's Deeper Learning Initiative.

HOW THIS DOCUMENT IS ORGANIZED

RECOMMENDATIONS

We present five recommendations, which we believe can support Hewlett's efforts to extend the reach and impact of the Deeper Learning Initiative.

DEEPER LEARNING OTPD FRAMEWORK

We include a working set of quality indicators for oTPD, based on findings from our reviews of various programs. This initial listing, like all frameworks, is under development and will be informed by new work and revised as the field develops new and better tools.

CONTEXT: EMERGING TRENDS IN ONLINE LEARNING

In this section, we discuss emerging trends and opportunities that are shaping the context of professional learning for teachers. These trends apply to formal online learning programs as well as the kinds of innovative informal and highly social ways that some teachers are pursuing knowledge online. Broadly, these online trends include: *Personal Learning Networks, Openness, Future of Learning Management Systems, Video Analysis, and Simulations*.

STRATEGIC LITERACY INITIATIVE'S CASE STUDY

The story of the Strategic Literacy Initiative (SLI), a prominent provider of face-to-face professional development, and its recent foray into online learning, provides a representative case study of the challenges that organizations encounter when transitioning from face-to-face to online professional development environments. We summarize some important lessons learned and implications from this case study that can be generalized to the larger field and offer recommendations for Hewlett's efforts in this area.

PROGRAM PROFILES INTRODUCTION

This section introduces the list of oTPD programs that we profiled. The profiles highlight features that can support Deeper Learning goals.

TECHNOLOGY PROFILES INTRODUCTION

This section introduces the array of emerging technologies that we identified that can help providers address the Deeper Learning Framework for oTPD and emerging trends in online learning.

APPENDICES A & B

The appendices contain profiles of the programs and technologies reviewed for this paper.

RECOMMENDATIONS

Based on our preliminary review of programs and technologies, we are confident that online learning environments represent a strategic opportunity to scale Deeper Learning through effective teacher professional development. We offer the following recommendations to extend the reach and impact of the Deeper Learning Initiative.

1. **Build Capacity**
2. **Support Rapid Prototyping of Tools and Platforms**
3. **Create Additional Proof Points Networks**
4. **Monitor, Evaluate, and Disseminate Effective Online Teacher Professional Development Programs**
5. **Foster Strategic Alliances with the Education Technology Community**

Below, we describe these in more detail.

1. BUILD CAPACITY

Fund a select group of proven face-to-face professional development programs that are aligned with Deeper Learning principles to develop and scale online models.

In our review process, we interviewed several program staff involved in the development of online professional development efforts. In each case, the funding for such efforts is scarce and the cost of high quality development approaches is prohibitive. Specifically, these programs need support to:

- Access technical expertise and support;
- Complete a comprehensive needs assessment and business plan for developing and scaling online learning;
- Select, fund, use, and maintain appropriate open source and commercial technologies.

2. SUPPORT RAPID PROTOTYPING OF TOOLS AND PLATFORMS

Fund an effort, supported by an advisory board, to create and field-test new online learning structures and environments.

In the rapidly evolving field of emerging technologies, programs transitioning to online teacher professional development will by necessity innovate, creating and customizing online environments that meet their needs. A number of the programs profiled here, could benefit from additional knowledge and resources to expand their online efforts. For example, the New Teacher

Center and Powerful Learning Practice programs could add video analysis and simulations their coaching models. The SAM Inquiry Process Simulations could be added to the either program as well. The mobile aspects of MAT@USC are relevant to other programs. Many programs are interested, but from our vantage point, they are hard-pressed to envision online environments that combine some of the following promising and innovative structures:

- Lesson study methodology
- User-generated video of classroom practice
- Video analysis tools
- e-Mentoring
- Social software
- Simulation platforms
- Access to Personal learning network tools (e.g. blogs, Twitter, wikis, etc.) already in wide use on the Web.

A specific example of linking the above promising structures would combine simulations that allow teachers to practice skills in a virtual environment with an online “lesson study” approach where teachers systematically identify a challenge for which they all plan, teach, analyze video, modify the lesson, re-teach, and reflect.

From our examination of various programs, an additional area where Hewlett might focus research or support is the inclusion of frameworks for effective instructional practice in video analysis or simulation platforms. Some examples of instructional practice frameworks that might apply are:

- Common Core State Standards
- Charlotte Danielson's Framework for Teaching
- Doug Lemov's *Teach Like a Champion: 49 Techniques that Put Students on the Path to College*
- SLI's Video Case Profile Protocols
- Summative and formative Deeper Learning assessments

3. CREATE ADDITIONAL PROOF POINT NETWORKS

Create a Proof Points network (similar to one already in existence) for Deeper Learning programs using online models in order to support knowledge development, documentation and dissemination of successful efforts or lessons learned.

An important insight gained from our review is that many programs have developed expertise and successful models that capture some important qualities of professional

development, but none that we found have mastered all areas. For example: The Strategic Literacy Network and New Teacher Center collaborated over several meetings as SLI first considered how to venture into online professional development. However, neither program had the funding for the initial meetings or for any ongoing collaborative learning. Each program has solved different problems in different ways and has a lot to offer one another. As we reviewed Expeditionary Learning's oTPD, we realized that the three programs, and likely others, would benefit from learning about each other's approaches. An initiative to bring strong early implementers together to share approaches and then document and disseminate new knowledge would impact the discourse and direction of other programs in a position to support Deeper Learning.

We suggest working with programs that showed strong alignment with Deeper Learning principles (based on the previous WestEd study) to see which ones are inclined to support online learning. It would also be worthwhile to consider including school districts (like Vail School District in Tucson, Arizona) that are offering oTPD with Deeper Learning core qualities in a Proof Points network. Alternatively, a separate network could be created for districts that have demonstrated a commitment to delivering this kind of oTPD.

4. MONITOR, EVALUATE, AND DISSEMINATE EFFECTIVE ONLINE TEACHER PROFESSIONAL DEVELOPMENT PROGRAMS

Fund the study of innovative online teacher professional development programs in greater depth and evaluate the impact of oTPD on teacher practice and student achievement as they relate to Deeper Learning goals.

The collection of profiles in this report is an important step in surveying the ever-evolving field of online professional development. In completing our review, we were impressed with the efforts underway and aware that the scope of this project did not allow for a truly comprehensive profiling, analysis and synthesis of data. We have captured some promising core qualities, indicators, and described programs that have promising online practices exemplifying these. Few programs collect significant data about user behavior online that might indicate engagement. While most programs generate some kind of self-reports about the learning experience and/or learner satisfaction, there is scant data about their efficacy and impact. Given the emphasis on research-based practices in the field of education, and the growing prioritization of data use, online learning programs will need to be able to measure impact and efficacy as they scale up. Research would be useful in the following two areas:

Methods for transferring the following kinds of proven structures and supports into an online environment in ways that maintain their efficacy and simultaneously take advantage of the emerging technologies.

- Personalized coaching
- Online “lesson study”
- Video Analysis using Deeper Learning-aligned protocols and frameworks
- Assessment and e-Portfolios

Methods for tapping emerging technologies that offer meaningful opportunities to support oTPD

- Personal learning networks in formal and informal settings
- Collaboration and social learning
- Massive Open Online Courses (MOOC)
- Platform openness - to the rest of the Web and other people’s content
- Ubiquitous learning with mobile devices
- Use of simulations for practicing instructional and assessment strategies

5. CREATE STRATEGIC ALLIANCES WITH THE EDUCATION TECHNOLOGY COMMUNITY

Schools are not going away, but learning is shifting to the Web. Face-to-face learning will remain valuable, but so will learning on the Web. The melding of the two will profoundly re-shape our schools as well as the way teachers are trained. The education technology community, particularly teachers in higher education who have been working to re-invent their teaching, has strongly embraced a number of Deeper Learning principles, e.g. self-directed learning, teacher-as-coach, inquiry methods, collaboration and performance assessments. Many leaders in the education technology community are calling for fundamental school transformation (not just reform). These leaders have a growing following as well. In July, over 13,000 people attended the International Society for Technology in Education Conference in Philadelphia. In his new book entitled *Personal Learning Networks, Using the Power of Connections to Transform Education*, EdTech blogger Will Richardson reflects:

Most schools were built on the idea that knowledge and teachers are scarce. When you have limited access to information and you want to deliver what you do have to every citizen in a era with little communication technology, you build what schools are today: age-grouped, discipline-separated classrooms run by an expert adult who can manage the successful completion of the curriculum by a hundred or so students at a time.... But what happens when knowledge and teachers are not scarce? What happens when it's easy to connect our passion to learn to the resources to learn it? What happens when, in the next decade or so,

almost everyone gains access to these profoundly different learning spaces filled with teachers and content through the devices they carry in their pocket? ...Things change.

People who understand the potential of technology-enabled learning are a tremendous resource to educators. Hewlett can deepen connections by:

- Introducing Deeper Learning professional development providers to the ideas of key education technology thought leaders, such as, David Wiley, Alec Couros, Dave Cormier, Georges Siemens, Stephen Downes, Will Richardson, Michael Wesch, Wesley Fryer, and David Warlick, to name a few.
- Encouraging new and existing grantees to network with education technology leaders
- Sponsoring a MOOC (Massive Open Online Course) or virtual conference to convene education technology and education reform leaders to discuss the role of online technologies in teacher professional development, specifically the following shifts identified by David Wiley (2009):

analog -> digital

tethered -> mobile

isolated -> connected

generic -> personal

consumption -> creation

closed systems -> open systems.

THE DEEPER LEARNING OTPD FRAMEWORK

“Deeper Learning” is an umbrella term for the experiences that lead students to understand and retain the knowledge they need to succeed in both school and careers. At its heart is a set of skills students must master in order to develop a keen understanding of academic content, apply their knowledge to problems in the classroom and on the job, and become life long learners. Deeper Learning skills fall within three categories. Although each is associated with a different aspect of education, all are essential to prepare students to achieve at high levels.

Category	Skills
A. Content Knowledge	1. Master core academic content
	2. Acquire, apply and expand knowledge
B. Cognitive Strategies	3. Think critically and solve complex problems
	4. Communicate effectively
C. Learning Behaviors	5. Work collaboratively
	6. Learn how to learn

Taking into account this definition of Deeper Learning, and what are widely considered to be best practices in teacher professional development (i.e. job-embedded, collaborative, and ongoing), we created the framework below to review online learning programs. In order for professional development to be aligned with Deeper Learning goals, teachers must build capacity as teachers, as well as learners. In order to provide students with experiences to gain Deeper Learning skills, teachers benefit by experiencing professional learning that embodies those very skills, as a way to learn, and as a way to organize learning.

The same is true for online professional development. Teachers need to experience authentic learning online (i.e. choice, collaboration, content expertise, problem-solving, communication, and application of instructional skills) AND have a meaningful experience with technology as a critical tool in the process. Teachers need to participate in the very kinds of learning that they plan to facilitate for kids. The Online Indicators in the framework on the following pages are the experiences that one would expect to see present in oTPD that is in alignment with Deeper Learning goals. Each program profile in Appendix A describes ways in which the following core professional development qualities manifest in that program. Each technology profile (Appendix B) does the same.

OUR FRAMEWORK

Core Qualities for Deeper Learning

Online Indicators

- **LEARNER CENTERED**—The needs of the learner drive the curriculum, that is, topics, inquiries and/or activities are designed or evolve in response to learner questions, needs and input, sometimes having a “just in time” quality. *For example: posing a collaborative problem solving activity on an issue raised by participants; planning instruction on a topic teachers select.*
- **JOB EMBEDDED**—Participants actively engage with learning experiences that are directly applicable to classroom practice and will positively impact Deeper Learning goals. *For example: relevant instructional strategies are described, practiced and tried in the classroom.*
- **SCAFFOLDED AND DIFFERENTIATED**—Learning experiences are developmentally appropriate and differentiated, responding to the unique capacities and needs of individual learners. *For example, access to a more experienced other provides the right support at the right time for individual learners; technical supports such as pull down menus and hyperlinks offer learners opportunities for individuals to access support, resources or information on demand.*
- **MODELS BEST PRACTICES**—The learning experiences develop experiential understandings of practices that support Deeper Learning goals. *For example, teachers reflect on how: learning experiences support mastery of knowledge; activities engage learners in thinking critically and communicating effectively; support and/or teach collaboration, learning behaviors; develop metacognition.*
- **CYCLES OF INQUIRY INTO PRACTICE**—Professional learning experiences support inquiry into teaching and learning before, during and after implementation of instructional practices that will likely support Deeper Learning goals. *For example: teachers design lessons, implement them, analyze student learning and redesign lessons; teachers engage in case studies or investigations that engage them in problem-solving, design and implementation of new practices.*
- **LONG TERM LEARNING**—Teachers are engaged in ongoing, long-term learning experiences. *For example: learning experiences extend over weeks, months or even a year or more, allowing for cycles of planning, implementation, analysis and feedback and re-design based on learning.*
- **TOOLS FOR REFLECTIVE PRACTICE**—Reflective learning experiences are generative, that is, by participating in them, teachers develop tools to support ongoing, lifelong inquiry into their own practice that could continue once the online learning experience culminates. *For example teachers learn to and/or develop tools to support: planning; analysis of student work; rubrics for professional practice and growth.*

RELEVANCE

REFLECTION

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- INTERACTIVE TECHNOLOGIES—Technologies support interaction around content, at least some of which is user generated. For example, teachers may: share lesson plans and/or student work; participate in discussion and/or work groups; share resources.
 - SOCIALLY MEDIATED LEARNING—collaboration skills (such as effective communication around problem solving) are supported, leading to interactions between users that lead to acquisition mastery of knowledge and instructional practices that support Deeper Learning goals. For example, teachers practice and may learn to apply: protocols to guide discussion; routines and to support collaboration and problem solving.
- COLLABORATION
- CRITICAL CONVERSATIONS—a safe, professional learning environment demands and supports transparent sharing and discussion of crucial problems of practice. For example: teachers post lessons, student work, video or questions and receive meaningful feedback that lead to changes in practice; learning activities help teachers develop dispositions and skill to offer and receive feedback; teachers reflect on feedback and set goals for professional learning and practice.
 - EXPERT OTHER—users have opportunities to contribute their expertise as well as benefit from the knowledge and experience of others with more expertise. For example: teachers generate new lessons, resources, content; mentors and/or facilitators provide guidance, content or resources.
 - CONTENT AREA KNOWLEDGE—Learning experiences support the acquisition, application and mastery of knowledge of the content and practices of the teachers' academic discipline. *For example: learning experiences deepen knowledge of specific topics; teachers access resources and/or experts that support learning of content.*
 - PEDAGOGICAL CONTENT KNOWLEDGE—learning experiences support masterful teaching that supports Deeper Learning goals in an academic discipline. *For example, teachers develop or use tools to: address common student misconceptions; support thinking and talking about learning in the content area; support discipline-based problem solving, communication and/or practices.*
- CONTENT KNOWLEDGE
- TECHNICAL, PEDAGOGICAL AND CONTENT KNOWLEDGE— Teachers gain awareness of how the medium and tools of their online learning experiences can help them realize Deeper Learning goals with students their classroom. *For example, teachers gain personal experience with a variety of Web 2.0 tools to collaborate, reflect, etc and are asked to consider how these technologies are relevant to student learning.*

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EFFECTIVENESS
DATA

- **TEACHER CHANGE**—the program collects and uses data on changes in teacher practice that inform instruction and the learner. *For example: teachers submit self-assessment and/or reflection on the impact of the learning experience; teachers have access to PD goals and/or benchmarks for self-assessment; teachers submit evidence of change from samples of lessons and/or student work.*
- **TEACHER ENGAGEMENT**—the program collects data on the level of teacher engagement. For example: frequency/length of user interaction with the site; assignment tracking; participation in activities, discussion groups.
- **TEACHER SATISFACTION**—the program collects data on the level of teacher satisfaction with the online learning experiences. *For example: the program administers surveys; teachers submit evaluations.*

CONTEXT: EMERGING TRENDS IN ONLINE LEARNING

PERSONAL LEARNING NETWORKS: SOCIAL AND INFORMAL LEARNING

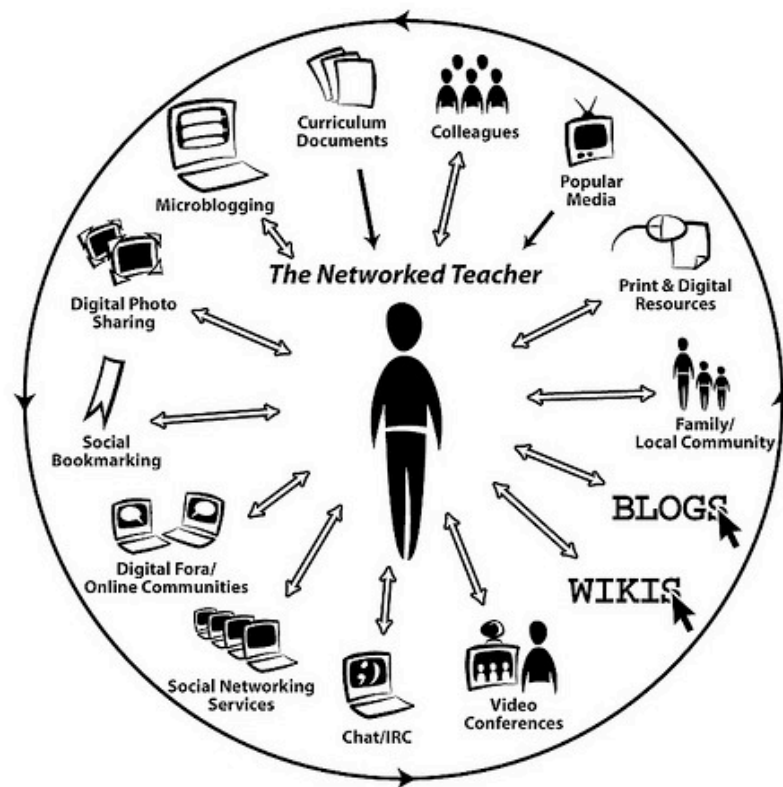
When conceiving this report, we began with the assumption that oTPD would primarily consist of formal learning experiences, of the kind we at WestEd are very familiar. Formal learning is designed and managed by a program with fixed structures, centralized content, and predetermined learning tasks ranging from innovative to traditional. SLI, Teachscape, PBS TeacherLine are examples of programs that offer formal learning with networks of dedicated users.

To increase their impact and reach, perhaps even to remain effective, we believe that these providers will need to offer opportunities for informal learning as well. The primary benefits of informal learning are immediacy and relevancy. Informal methods of learning offer learners the ability to access information and take advantage of it right away in apply it to their job.

Below, we review a sphere of learning that is a powerful, emerging paradigm of education—personal learning networks. Web 2.0 tools provide users with opportunities to organize vast networks of people with similar interests, access volumes of information nearly instantaneously and create learning environments and structures in which people separated by geography and time can nonetheless collaborate, create, learn and produce new information and tools. Learners are creating organized networks of informal and self-directed learning. How this sphere will evolve and its eventual role and impact certainly bears close attention; we believe it will “disrupt” existing providers. We expect, at the very least, that these early implementers will influence when, where, and how educators learn in the 21st century.

GROWING POPULARITY AND REACH

The news is replete with statistics about online use and the growing reach of the Internet. As a recent Nielson report explains, social networking is more popular than ever. “...Two thirds of us now use what it calls ‘Member Communities,’ which includes both social networks and blogs. Member Communities now make up the fourth most popular category online – ahead of personal email,” says Nielsen Wire (2009). The other categories are search, portals, and PC software. The following is a view provided by Alec Couros, professor at the University of Regina, on the networked world of a 21st century teacher:



(diagram source: Alec Couros, <http://www.flickr.com/photos/courosa/2922421696/> Created October 7, 2008. Licensed under a Creative Commons Attribution 2.0 License)

POTENTIAL FOR IMPACT

The highly democratic, almost anarchistic forum that is the Internet holds the same promise and weakness that has been an ongoing political concern since the time of Caesar: popularity is no guarantee of quality. People will vote for bread and circuses. The potential power in Web 2.0 tools and the social connectivity offered by the Internet certainly offer opportunities for very high quality interaction, nearly instantaneous and unfettered access to information and learning.

While Web 2.0 tools, connectivity and access inevitably lead to the production of content that may overwhelm in its quantity and underwhelm in its quality, centralizing authorial power does not guarantee value. Libraries, universities, colleges and school boards control access to learning experiences and information, sometimes creating high quality experiences; other times the content is questionable and even objectionable. In the online world and the lived world, the maxim is "garbage in, garbage out." As Scott Mcleod (2011) writes:

Although there is a lot of noise out there on the Web, it's hard to argue that there is little learning value in social media. There are numerous ways in which teachers and

administrators could be using blogs, Twitter, Facebook, online videos, podcasts, online slideshows, and other social media tools to advance their own practice. Whether it's subscribing to other innovative educators' feeds, interacting and sharing resources with global colleagues, or consuming and using high-quality peer-created resources, there are myriad teaching ideas, lesson plans, Web resources, conversation spaces, technology tools, reflections on practice, and other pedagogical fruits that are ripe for the picking by online-savvy educators. Peer-to-peer online learning networks can help educators sort the wheat from the chaff and curate what's relevant and powerful.

OPEN ECONOMICS OF PLNs

Why would people construct knowledge for free? Wikipedia is now more popular than the NY Times (Wiley, 2010a). As part of the Wikipedia platform, people are having discussions about the quality of information, putting into play the 21st century and Deeper Learning skills that form the foundation of learning in this environment. Social bookmarking operates on the same principles, where user activity builds the application. Every time users bookmark a link, they contribute to the information and structure in and of the environment. Social and peer-produced content is beginning to yield noteworthy and important knowledge and knowledge-building structures (Wiley, 2010a). This, we believe, is the direction that serving students is taking and will continue to take in the 21st century.

Despite the potential for distributing the task of content creation, commons-based peer production can create tensions within institutions. Many, if not most, formal education systems have not begun to catch up with new processes. As Kansas State professor, Michael Wesch describes it, we are approaching in a world characterized by “ubiquitous computing, ubiquitous information, ubiquitous networks, at unlimited speed, about everything, everywhere, from anywhere, on all kinds of devices that make it ridiculously easy to connect organize, share, collect, collaborate and publish” (TEDxTalks, 2010b).

Critical openness to information and knowledge exchange need to be addressed. Who should control the educational environment and access to information online (and in schools) is not an educational question, but a political one. As Jefferson expressed, "I know of no safe repository for the ultimate powers of society but the people themselves; and if we think them not enlightened enough to exercise their control with a wholesome discretion, the remedy is not to take it from them, but to increase their discretion by education." Social media and personal learning networks offer an opportunity for learners to enlighten themselves and each other, using 21st century and Deeper Learning skills to build, create and become agents of their learning.

WHAT A NETWORKED WORLD MEANS FOR SCHOOLS AND TEACHERS

A growing movement of teachers has begun to say, "I know what I need and want to know and I'm organizing my learning to meet these self-defined goals." These same teachers, as they participate in formal learning, are asking for choices and options on how best to learn new skills and gain new knowledge (Nussbaum-Beach, 2011). The participatory culture of social networking and the overall abundance of information available have certainly created a Do-It-Yourself ethos that is a positive trend to leverage. As we shift from teaching to learning, we must imagine that the same goals of highly adaptive, innovative, collaborative, and creative students should apply to teachers. As Hewlett considers how to support teachers becoming life-long learners and embracing Deeper Learning goals, we advocate that it is essential to take into account how to integrate, support and build broader access to networking technologies within school contexts. Will Richardson and Rob Mancabelli (2011) write:

Schools will need to plug into this vibrant worldwide network of learning to stay relevant and to prepare our children for a vastly different learning landscape. That means that schools will need to embrace a form of learning that is fundamentally different from the one they have known. This is not a case for education 'reform' in the sense that we need to make the current system better as measured by traditional methods, such as standardized tests. No, to prepare students to flourish in the new learning world, schools will need to transform themselves in important ways to become places where deep learning, inquiry, collaboration and performance are the emphasis, not just test scores. We believe personal learning networks are at the heart of this shift.

Education or training is no longer something we should view as provided to us. We need to create it for ourselves. Teachers now have the tools to take charge of their own learning; within pockets of networked teachers there is renewed enthusiasm over the idea of being active learners.

OPENNESS

Openness is a growing ideal in today's technology-driven culture. Previous academic and intellectual paradigms were shaped by the separation of time and space and the challenge of creating and distributing new knowledge. With tools of knowledge production being scarce (in an economic sense—libraries, laboratories and presses involving substantial financial investments) intellectual work required benefactors and was the realm of the wealthy. Ideas and knowledge were carefully guarded intellectual property with significant exchange rates that helped to pay for its generation and distribution. Today, tools and communities to research, construct and distribute knowledge are accessible to the masses through the Internet. Knowledge is generated at an astonishing pace, co-constructed within broad participatory communities of practice and exchanged with a freedom and openness that disrupts previous notions of intellectual property.

Examples of communities that have these characteristics of openness are Wikipedia, MIT's OpenCourseWare and the Public Library of Science.

At the core of openness is the act of sharing. A primary role of new media and networked technology is to increase our capacity to be open, to be generous. According to David Wiley, Associate Professor of Instructional Psychology & Technology at BYU and Chief Openness Officer of Flat World Knowledge, the ideal for technology in education is to "increase our capacity to be generous." When sharing knowledge, even providing feedback, participants are not just creating content for the learning of others, they are "giving of their time" (Wiley, R. 2009).

Since MIT's OpenCourseWare launched the Open Educational Resources movement ten years ago, educators have been discussing and exploring ways to create a global commons of rich content, where sharing, lifelong learning, customization, and democratized access are valued highly. While many universities have posted their syllabi, handouts, and quizzes online, this content remains very much "Web 1.0." The content is there, but often lacking is a good way to structure, contextualize, aggregate and incorporate the content into a social learning environment. Openness, however, is not limited to sharing materials or content. New forms of openness, enabled by technology, have arrived and they have the potential to fundamentally shape teaching and learning practices across the education sphere.

DIMENSIONS OF OPENNESS FOR LEARNING AND TEACHER PRACTICE

Dave Cormier and George Siemens maintain that openness applies directly to teachers, curricula and students. Cormier and Siemens define three dimensions of openness, which are particularly relevant to oTPD:

Open Educators. The opening up of the teaching process is an important dimension of openness in education more broadly. Increasingly, educators are able to share and participate in the trials and successes of their fellow educators as they tweet and blog about their work. This process can be as simple as posting ideas for the classroom or as profound as posting daily reflections on the successes and failures of different approaches.

Open Curricula. The idea of openness can be applied to the curriculum of a given course as well. As content becomes readily available and as searching for it becomes easier, allowing learners to participate in the creation of their own curriculum becomes increasingly realistic. The move away from standard class structures and toward a lifelong learning model also encourages this, since it allows learners with different interests and needs to

create their own flavor of a course within the course. The community-as-curriculum model inverts the position of curriculum: rather than being a prerequisite for a course, curriculum becomes an output of a course. This is particularly useful in adult professional learning environments, where learners come to a course with diverse skills and needs. The community-as-curriculum model allows the curriculum to diverge on a learner-by-learner basis.

Open Learners. Learners themselves have become open to a variety of nontraditional learning models. They are now able, sometimes through the open access noted above and sometimes through access to other materials and guidance, to engage in their own learning outside of a classroom structure. Although this has always been possible, of course, learners now have considerably more access to content and more opportunities to engage online (through synchronous tools such as Elluminate and Skype). (Cormier & Siemens 2010)

OPEN CURRICULA: MASSIVE OPEN ONLINE COURSES (MOOCs)

MOOC stands for Massive Open Online Course. A report by McAuley et al. (2010) offers the following description:

A MOOC integrates the connectivity of social networking, the facilitation of an acknowledged expert in a field of study, and a collection of freely accessible online resources. Perhaps most importantly, however, a MOOC builds on the active engagement of several hundred to several thousand 'students' who self-organize their participation according to learning goals, prior knowledge and skills, and common interests.

MOOCs are part course, part community and part event. A MOOC expands learning to anyone interested in the topic using participatory learning and Web 2.0 tools. The term was created in response to George Siemens and Stephen Downes's 2008 "Connectivism and Connective Knowledge" course. An initial group of twenty-five participants registered and paid to take the course for credit. The course was then opened up for additional learners to participate: course lectures, discussion forums, and weekly online sessions were made available to non-registered participants. This second group of learners — those who wanted to participate but were not interested in course credit — numbered over 2,300. The addition of these learners significantly enhanced the course experience, since additional conversations and readings extended the contributions of the instructors (Cormier & Siemens, 2010).

One of the key reasons for creating an open course is to bring a wide variety of perspectives to bear on a given topic. In the case of Siemens and Downes's course, the instructors were interested in obtaining broader insight into their ideas. Enough structure is provided by the course

that if a learner is interested in the topic, he or she can build sufficient language and expertise to participate peripherally or directly. The conversations occur in various forums: blogs, Twitter, course discussion boards, commenting tools, virtual worlds, and in some cases, face-to-face. Participants can create study groups to discuss and collaborate around areas of interest. In sum, a MOOC is an online learning ecosystem in which knowledge emerges from participant interaction. Some examples of MOOCs can be found at:

- PLENK 2010: *Personal Learning Environments, Networks and Knowledge*
<http://connect.downes.ca/>
- eduMOOC 2011: *Online Learning Today... and Tomorrow*
<https://sites.google.com/site/edumoooc/home>

We did not encounter any MOOCs focused K-12 education, but we think that they represent a new environment for highly-participatory professional development and a valuable opportunity for teachers to build technology skills, professional networks, and their digital identity.

OPEN EDUCATORS: THE ROLE OF FACILITATORS IN ONLINE ENVIRONMENTS

Online learning requires that teachers assume new roles with respect to access to content and interactive technologies, which are increasingly under the control of the learner. Educators continue to play an important role in facilitating interaction, sharing information and resources, challenging assertions, and contributing to learners' growth of knowledge. Cormier and Siemens (2010) offer the following map of important online facilitator roles and methods and technologies that support them.

Roles of Facilitators in Online Environments

Facilitator Role	Activity of Facilitator	Tactics and Tools
Amplifying	Drawing attention to important ideas/concepts	Twitter, blogs
Curating	Arranging readings and resources to scaffold concepts	Learning design, tutorials, adjustment of weekly activities to reflect course flow
Wayfinding	Assisting learners to rely on social sense-making through networks	Comments on learners' blog posts, help with social network formation, "live slides" method
Aggregating	Displaying patterns in discussions and content	Google Alerts, RSS reader, visual tools (e.g., Many Eyes)
Filtering	Assisting learners in thinking critically about information/conversations available in networks	RSS reader, discussion of information trust, conceptual errors
Modeling	Displaying successful information and interaction patterns	All use of tools and activities to reflect educators' modeling of appropriate practices

Staying Present Maintaining continual instructor presence during the course, particularly during natural activity lulls

Daily (or regular newsletter), activity in forums, video posts, podcasts, weekly live sessions in synchronous tools (e.g., Elluminate)

(Cormier & Siemens 2010)

OPEN PRESENTATIONS

Openness principles can shape online presentations (Webinars), a popular way for many programs to deliver oTPD. In a recent presentation to a group of librarians on the future of libraries, Dave Cormier used the Elluminate Webcasting platform to deliver what he terms "live slides." Instead of presenting facts or ideas, each slide offered a relevant question (e.g. "What is a library?" "What is a librarian?"). Participants were asked to enter their responses and thoughts directly into the slide. As the answers were entered, and as the group could see them appearing, Cormier narrated the knowledge that emerged from the learners with his commentary and analysis. Cormier's approach ensures high audience engagement and, with good facilitation, that the learning is valuable. The entire presentation can be archived and shared for others to view.

According to Cormier (2009), the "live slides" method "presents a far more realistic vision for knowledge. When asked a question like "What is a library?" a single person has to come down to a single definition that can't possibly encompass the full cultural impact of a word. If you look at the first question slide of the presentation you'll see a very broad ranging definition created by a collaborative of people... the definition is rhizomatic, created in time, and the record presented here is a snapshot of it... an archive of a live moment of knowledge."

AN OPEN EDUCATOR MANIFESTO

The notion of openness as a transparent way of practice for educators is a related byproduct of the numerous open technologies available for learning. A recent blog entry at <http://www.connectedprincipals.com> demonstrates how powerfully openness is manifesting in the practice of a principal at Dalian Maple Leaf Foreign Nationals School, located in Dalian, China.

My Open Educator Manifesto

'We' educate future citizens of the world

Teaching is my professional practice

I Share by default

I am Open, Transparent, Collaborative, and Social

My students own their own: (Learning)

- *learning process*
- *learning environment*
- *learning products*
- *learning assessment*

My students belong to learning networks

Every student deserves customized learning

- *Student voice*
- *Student choice*

Every educator deserves customized learning

I have high expectations

I Care, Share, and Dare

I am a role model

I am the change I want to see in Education!

(Truss, 2011)

THE FUTURE OF LEARNING MANAGEMENT SYSTEMS

WHAT IS A LEARNING MANAGEMENT SYSTEM?

A Learning Management Systems (LMS) is a software application for the administration, documentation, tracking, and reporting of online events or e-learning programs. According to Ryan Ellis (2009), editor of *Learning Circuits*, a robust LMS should be able to do the following:

- centralize and automate administration
- use self-service and self-guided services
- assemble and deliver learning content rapidly
- consolidate training initiatives on a scalable Web-based platform
- support portability and standards
- personalize content and enable knowledge reuse.

In higher education circles, it is widely believed that we are at an inflection point in what it can mean to teach and learn online. The primary challenge of learning platforms in higher education is how to address the issues of informal learning, social networking, assessment and a mobile learning environment. As is currently the case, the technologies developed or used in response to the challenges in the higher education space will likely influence the technologies that

are used in other adult learning programs. There are many different technologies that can deliver effective oTPD. Some of the programs we profile in this report (e.g. Powerful Learning Practice and PBL Camp) do not use a Learning Management System. Rather, they use a collection of Web 2.0 tools to deliver and facilitate Relevance, Collaboration, Reflection and Content Knowledge. Yet, a number of other oTPD programs (e.g. eMSS, PBS TeacherLine, and SLI) have adapted LMS's that were developed originally for university use. Moodle, Sakai, Blackboard are all established systems that have been used widely by universities for years, but they are relatively inflexible, closed systems in today's increasingly "open" world. Systems to manage content and track learning are necessary for many formal programs, so giving thought to the future of Learning Management Systems is important to our goal of understanding which technologies are going to be effective tools for oTPD.

Below are some thoughts shared by leading technologists, educators, and vendors in a recent panel discussion on how to make the LMS integral to 21st century learning. These ideas are worth considering for the purposes of imagining how our nation's teachers will LEARN and TEACH in the near future. (Campus Technology, 2011)

Josh Baron, Senior academic technology officer, Marist College (NY)

"Today's learning, whether on the ground or online, tends to take place in fairly closed learning environments that are isolated from the real world. If the LMS begins to embrace the movement towards openness in education, it will begin to break down this artificial barrier, allowing knowledge and learning experiences to flow more easily across it. A secure but permeable LMS of this nature would facilitate regular interactions between students and experts from industry as well as peers from other cultures and societies. At the same time, it will promote the use of Open Educational Resources (OER) as well as the dissemination of student-generated content for use by those outside the institution. And the integration of the LMS with electronic portfolios, particularly those that support structured assessment, will provide instructors with powerful tools to assess student learning in more authentic ways than traditional multiple-choice tests. We may be entering a new assessment era in which students will graduate not with a single-page transcript but a media-rich portfolio that provides direct evidence of their achievements."

Brian Whitmer, Co-founder, Instructure - developer of Canvas

The traditional LMS is a walled garden. It's data in, nothing out. There are powerful tools all over the Internet, and education companies need to learn how to work with these tools instead of trying to rewrite and replace them. This means that LMS's are going to have to

become more open and flexible, because the walled-garden approach won't work anymore...Mobile technology is going to give birth to new forms of communications and collaboration that will impact online learning. Since typing on a mobile device is hard for long messages (writing a term paper on an iPhone sounds like an exercise in futility to me), I think we'll start to see video messaging become more common.

Mark Frydenberg, Senior lecturer and instructional software specialist, Bentley University (MA)

In the future, LMS's will adapt to a student's learning style, actually managing learning more than learning materials. They will know in what areas a student needs help, provide additional relevant evaluation exercises, and suggest they see their instructors in person for help. Perhaps students will be able to speak their responses, and the LMS will be able to evaluate what they say.

Matt Leavy, CEO, Pearson eCollege

Analytics have the power to drive the evolution of pedagogy and the student experience. There are two principal axes along which analytics will propel learning. The first axis is toward personalization. The real-time evaluation of learning and activity data allows our systems to adapt to provide a learning experience that is individually appropriate to a given student. The current state of personalization tends to be based on tracking the development of online work and identifying interventions that have worked in the past for students with common data patterns. As we advance into whole-program and learner-lifecycle systems, sophisticated learner profiles are being developed from which more precise and efficient learning paths will emerge.

The second axis is toward content and pedagogy improvement. Not all learning experiences are created equal and we can evaluate the difference through analytics. By tracking carefully developed learning objects in repositories and using analytics to measure the impact of exposing learners to those experiences, we will be able to demonstrate quality at a very granular level.

A NEW ENTRANT: THE CANVAS LMS DEVELOPED BY INSTRUCTURE

Canvas (<http://www.instructure.com>) is a new online application that instructors can use to manage lesson plans, schedule courses, and improve student-teacher communication. Canvas's interface design is being widely praised for its very clean features. Canvas is also highly adaptable (not a common LMS trait), so teachers or trainers can use the system in whichever ways they see fit. Canvas can take a snapshot of anything on the Web and pull it into the feedback (grading) interface. A blog post from a teacher's own WordPress installation or a video posted to YouTube can be easily submitted and reviewed. With a Webcam and built-in mic, facilitators or coaches can record video commentary right from the feedback interface, cultivating an increased sense of presence that is so important in successful coaching. In fact, Canvas makes videoconferencing and video recording a core part of its platform, giving it a privileged place on the main menu (Feldstein, 2011).

In the words of LMS expert Michael Feldstein, “If I had to summarize Instructure’s strategy in one sentence, it would be ‘They use the lessons learned by consumer Web companies to clear the clutter out of LMS software design and business model.’ ... They are looking at core use cases and trying to make them as simple as possible, throwing out some outdated LMS design assumptions in the process (Feldstein, 2010).”

One of the challenges with the LMS (as implied in the quotes above) is that there has been no revisiting of basic design and architectural assumptions in the past ten years — and perhaps since the product category came into existence. Canvas, on the other hand, was designed from the ground up with today's learning concepts. Facilitators and teachers are able to use multiple modes for communication—email, Facebook, Twitter, text messaging, Skype, etc. Canvas has a rich set of personalized communication preferences, which make possible the kind of quality contact and collaboration that is so critical to online teacher professional development. In addition, Canvas calendars integrate with Google Calendar, iCal and Outlook.

VIDEO ANALYSIS

THE ANTHROPOLOGY OF YOUTUBE

The popularity of video sharing on the Internet demonstrates our culture’s strong desire to view and share images, as well as to connect with others around those images. Up until 2005, it was difficult to upload video to the Web. YouTube changed everything. Now, people all ages readily capture images using cell phones, tablets or digital cameras and share these photos and videos of themselves throughout the “mediascape;” i.e., YouTube, Facebook and other media sharing sites. As people become more accustomed to seeing images of themselves, inhibitions about being viewed by strangers are falling away— youth, in particular, often operate in a “post first, think later” mode. This trend has the possibility of disrupting an implicit norm in the culture of education against sharing and critiquing practice.

In his talk, *An Anthropological Introduction to YouTube*, to the Library of Congress, Michael Wesch (2008) reviews the history of YouTube, its new forms of empowerment, community, and possibility, and offers the observation that “[a]t the center of this mediascape is us. I don't think of media as content and I don't even think of media as just tools of communication. I think of media as mediating human relationships. When media changes, human relationships change and that's where the anthropology comes in.” Digital media is forcing us to rethink what the Web is all about. It's not really about linking information anymore; it's about linking people in ways that we've never been linked before (Wesch, 2008).

VIDEO AND TEACHER REFLECTION

For the most part, teaching happens behind the closed doors of the classroom, in isolation from one's peers. Inside of schools, sharing practice has increasingly been connected to high stakes evaluations rather than to on-going professional learning. For obvious reasons, teachers can be reluctant to share images of their work. As younger teachers, with new digital habits and cell phones doubling as video cameras, enter the teaching corps, new cultural norms will develop around sharing instructional practice, bringing a new expectation of openness and throwing open the doors of classroom practice. MAT@USC & Teachscape Reflect are examples of programs that are exploring the use reflection around online video to improve instruction.

Video has long been used to capture microteaching events, illustrate classroom cases and practices, and to review teaching practices (Rich & Hannifin, 2009). For the past decade, logistical and financial obstacles have dictated that online video analysis was performed primarily on clips of other people's teaching practice. Video cases continue to be an important strategy to support teacher professional development. In fact, Teachscape Reflect technology was developed out of the Measures of Effective Teaching (MET) project, in partnership with the Bill & Melinda Gates Foundation. The MET project has captured and evaluated more than 20,000 lessons in over 3,000 classrooms nationwide for use in creating teaching exemplars. Teaching Channel, profiled in this paper, also represents a video showcase of effective teaching techniques and lesson ideas.

Michael Preston of the Columbia Center for New Media Teaching and Learning (CCNMTC) writes that “the in-depth study of videos—particularly if the videos capture situations that reveal something about children’s thinking—creates a context in which teachers can act as researchers by gathering evidence, developing hypotheses, and coordinating this information as a guide for further inquiry and teaching. Over time, close and repeated viewing and analysis of video helps shift focus away from the teacher and to the child, and allows for a richer conception of the relationship between children’s performance and understanding [or misconceptions], to help better inform teaching” (Preston, 2010).

MEDIA THREAD AS AN EXAMPLE VIDEO ANNOTATION TOOL

Recent developments in online video annotation tools can help to extend and augment teacher self-reflection. In 2006, CCNMTC started a project titled Video Interactions for Teaching and Learning (VITAL). The goal of the project was to develop and distribute a resource to enhance teacher preparation in early childhood mathematics education. The VITAL tool has since evolved into a tool called MediaThread that offers the ability for teachers to bring their own videos into the online environment. The MediaThread platform allows teachers to create mini-clips out of a video

(whether of themselves or another teacher) and embed these clips into a text analysis. The clips act like media citations allowing a teacher to produce a reflection on a topic using precise examples or occurrences from a videos inserted into the narrative.

MediaThread links the video analysis to group interaction, bringing media into a communal space and encouraging people to work together and connect with each other around examples of practice. Teachers can work in groups and link up in ways that would be difficult to do in a general library. Social features also allow students who are working with a common piece of media to be alerted of the connection. Class discussions are available in MediaThread and, when one posts to a discussion, one has access to all saved clips and other people's clips to insert into the post.

VIDEO ANALYSIS FOR DEEPER LEARNING

Video annotation tools now offer the potential to support both the reflection and analysis of one's own teaching, as well as the ability to associate captured video with related student and teaching evidence and changes in development over time (Rich & Hannifin, 2009). Watching and reflecting on one's own practice, almost universally, enables teachers to see and believe things that they otherwise cannot or do not see and believe about their practice. The same can apply for teachers' perceptions of their students (Rich, 2011). The kind of online video analysis that would be supportive of Deeper Learning goals would be used in a regular, collaborative, and facilitated fashion.

For example, every three weeks, teachers might convene online, in groups of three to four in a video chat space, to discuss their submissions. In advance, each teacher would have created short clips and prepared an analysis of each clip based on a predetermined area of focus. The annotation tool would allow the analysis to be affixed to each instructional "scene." During a group video chat, teachers would take turns, spending 30 minutes to present their clips, provide their analysis and to get group feedback.

There are many benefits to doing video reflection in groups. For example, colleagues tend to see one's positives more readily. When presenting in groups, there is also more accountability and follow-through due to the expectation that progress will be shown at the next convening. Progress tends to occur when awareness is high. Furthermore, the expectation of presenting a video can raise the awareness level to a point where teachers are often trying to perform for their peers in positive ways that benefit kids.

In addition, reflection over time can be very powerful, especially if guided by an online facilitator who can probe teacher reflections. A facilitator can focus the reflection on one strategy at

a time, use an inquiry approach, and sense when it is time to move on. Facilitators can also help with teacher readiness to receive feedback or learning.

In sum, with the right platform, a collegial community, good facilitation, and a well-focused inquiry or “lesson study” approach, video analysis is a powerful way to address all five of the core qualities for oTPD aligned with Deeper Learning: Relevance, Reflection, Collaboration, Content Knowledge and Data Effectiveness. Digital media allows teachers to participate in their learning and connect with peers in transformative ways. As video communication becomes more accessible and sophisticated, capturing and analyzing images of one's own teaching practice will become a “new normal” for oTPD.

SIMULATIONS

The substantial financial resources available for research and development in military and corporate sectors are giving rise to innovative training models. Devices like the iPad and smartphone, coupled with other technology advances, have transformed how we consume media. These changes will likely see our primary form of mobile communication shift from a textual mode towards more seamless interactive experiences, including video, animations, and immersive environments. This shift in communication is naturally affecting learning programs. The US Department of Defense, IBM, Cisco, Lockheed Martin, leading financial and pharmaceutical corporations are experimenting with immersive learning environments. In these environments, learning is situated in online virtual worlds. Game-like simulations have been used extensively to train, assess and enhance critical functional and soft skills such as leadership, decision-making and problem solving.

In our review, we encountered two interesting, low-budget online simulations for teacher learning developed by The School of Public Affairs at Baruch College, one of the colleges of the City University of New York. Working with the New York City Department of Education and support from the Carnegie Foundation, they have developed the Scaffolded Apprenticeship Model (SAM). SAM is an approach to school reform that integrates improvement in student achievement with instructional and leadership capacity building and succession planning. As an apprenticeship model, SAM embeds learning in the daily routines of a school. The program's success does not depend upon the size of the school, the way it is organized, student demographics, teacher credentials or any particular method of teaching or learning. As teachers work within the SAM model, they encounter and practice using a set of ideas, which are embedded in the work. These are explicit at first and then fade as teachers apply them in a variety of circumstances and for varying purposes, eventually developing the habits of mind that SAM is intended to instill. The following

two simulations are used within SAM in conjunction with face-to-face coaching and can be accessed for free at <http://acceleratelearning.net/>.

INQUIRY TEAM TRAINING SIMULATION

The Inquiry Team Training simulation was developed to support the New York City Department of Education in coming to scale with the Children First inquiry team initiative. The simulation is designed to be used by facilitators to familiarize teams of teachers and administrators with the core elements of the inquiry team process and surface some of the issues that are likely to arise as teachers implement the initiative in their schools. The goal of the simulation is to accelerate the learning of two students so that they progress as far as possible from their baseline performance levels. To accomplish this task, participants assemble an inquiry team, the composition of which will affect their ability to implement change strategies during the course of the simulation, and select two students struggling to learn reading skills.

During the simulated school year, the team has seven opportunities to implement instructional changes to help the selected students achieve (or exceed) the identified goals. Participants select one change strategy for each of the seven opportunities. Once the strategy has been implemented participants receive feedback on how much progress each has made toward the identified goals. The two different student needs and one change strategy design is intended to raise participant awareness of the need for differentiated instructional responses. Although the simulation has a “game like” quality, its primary purpose is to stimulate rich conversations about the link between information and effective instructional decision-making to accelerate progress for struggling learners. Currently, these conversations happen face-to-face, but could be hosted online as well. In addition to its use as a training tool, schools have used this simulation as part of the interview process when hiring new staff members.

TAMING ASSESSMENT SIMULATION

The Taming Assessment simulation was developed to support the New York City Department of Education’s effort to help teachers get the most out of the assessment tools available to them. It is based upon current research on the use of assessments to identify what students are struggling with when they are struggling to learn and the New York State and City assessment systems. Student performance patterns on middle school mathematics assessments across New York City public schools are used to inform the system. Taming Assessment is a strategy game in which the user attempts to identify a hidden misconception or gap in student knowledge interfering with mastery by using assessment information and narrowing the possibilities of what needs to be

taught in order to accelerate learning. The simulation connects the user with a middle school math teacher and a group of students he/she is worried about. While the user is uncovering and addressing the student's hidden misconception, the teacher is continuing to teach the prescribed curriculum. The longer it takes the user to identify and address the student's misconception, the further the student falls behind.

The object of the game is to identify and address the student's hidden misconception as quickly as possible. To accomplish this goal, the user works with three types of assessments, summative, formative, diagnostic, and various levels of analysis (e.g. aggregate, disaggregate, item error). The learner acts based upon two choices, to ASSESS or to TEACH, using the information already uncovered. After each decision is made, the user receives two types of feedback – time and progress. The simulation is designed to address the perceived resistance to expending time on administering assessments and analyzing the results, so that to successfully complete the simulation before the clock runs out, teachers must use assessment results to strategically target their instruction. Individuals or groups of teachers with or without the support of a facilitator may use the simulation.

THE BIG PICTURE

According to Liz Gewirtzman, SAM Project Director, "Within any HOW are a WHAT and a WHEN. Teaching is at its core a decision making enterprise" (2011). While virtual simulations of real life situations are not common in teacher professional development programs, the SAM examples reveal their potential. With greater resources, a simulation environment could be developed to address Deeper Learning issues teacher face on a day-to-day basis, taking teachers through various decision making scenarios while exposing them to promising practices and optimal decision making trees. Guided through their paths by virtual mentors who discreetly but intuitively take them through different options, teachers could role-play critical and often-encountered classroom situations in Project Based Learning or other Deeper Learning instructional strategies. Decision making simulations could also allow teachers and their coaches to capture decision-paths for purposes of analysis, reflection and further inquiry.

Imagine the following new simulation/game scenario: provided with a curriculum and a learning objective and faced with a classroom full of students with varying needs, the teacher is prompted to identify the teachable moments and decide which teaching strategies (a collection of possible strategies would be available to try) to employ — some techniques work better for some things and with some students than others. The goal would be to maximize the learning of the

greatest number of students within the constraints of the “game,” one of which is, once a teachable moment is gone, it’s gone.

A PROGRAMMATIC CASE STUDY: LEARNINGS FROM SLI'S TRANSITION TO ONLINE TEACHER PROFESSIONAL DEVELOPMENT

Since 2000, the Strategic Literacy Initiative at WestEd has provided face-to-face professional development for secondary teachers in Reading Apprenticeship, an instructional framework to accelerate student literacy in the content areas, including grades 6-12 and community college. SLI's face-to-face professional development is highly designed and addresses the same critical qualities of oTPD listed earlier.

Ten years of research, including large-scale randomized control treatment studies, have shown that the Reading Apprenticeship instructional model and professional development have a positive, statistically significant impact on students' academic literacy. The Reading Apprenticeship framework focuses on students' abilities to master academic content, acquire, apply and expand knowledge, think critically and solve complex problems, communicate effectively, collaborate, and discuss their learning, reading and thinking processes.

As a tightly structured face-to-face model, SLI faced challenges (shared by New Teacher Center and Expeditionary Learning Schools) when transitioning to an online professional development approach: how to replicate the inquiry-based, highly collaborative, learner-driven activities that they had been successful with in face-to-face settings in an online environment? What would be the roles of the facilitator, coach, mentor and organization in this new paradigm?

In this mini-case study, we offer examples of one organization's attempts to enter into the online market. Of particular note are the ways in which SLI has integrated members of its community of teacher-practitioners and professional development consultants in their collaborative effort, often in response to pressure from users of the online products. SLI considered online learning for many of the same reasons other programs have: they want to scale up, budget constraints and logistics of a small, lean program make extensive travel untenable. In addition, more and more grantors expect an online presence. Indeed, the new i3 grant from the US Department of Education stipulated the creation of new online learning forums. Prior to that grant, SLI considered improving and extending its online presence, largely for marketing purposes. Initially, this consisted of establishing new Web pages. Then, the program ventured into creating a blog and later it created two separate online courses, one for PD consultants working for SLI and another in collaboration with Renton College for its faculty and staff.

NOTEWORTHY

SLI has an ongoing professional inquiry question about oTPD: how can online structures and programs support the robust, inquiry based, collaborative learning environments that we know work in face-to-face settings and still offer important input and access to the knowledge base that has been generated through the collaborative efforts of this community? This question—closely related to questions of authority and the roles of teachers and learners in constructivist learning environments—guides the evolution of SLI’s online offerings. As we describe below, SLI has three major online interactive learning environments, all of which are shaped and influenced by users. Although SLI still maintains much authorial control over the processes and products, the community of users has direct and immediate influence in these spaces.

BLOG

The blog was SLI’s first step into an interactive and collaborative online space. Initially, blog posts were written and edited by SLI staff, and then, per WestEd policy, vetted by staff in the communications department. Very soon, SLI discovered that the financial and time investment in this process was unsustainable. As well, a large proportion of SLI’s community of practicing teachers and PD consultants wanted and expected deeper online learning, social networks and collaboration. Eventually, this community of SLI digital pioneers began to shape and influence SLI’s online presence. When SLI staff began to ignore the blog, members of the SLI community insisted on keeping it alive and volunteered to generate posts each week for their own purposes and learning. SLI staff now play a minimal role, managing the production schedule and editorial process. The community itself drives the content.

This was an important discovery: the blog, initially conceived of as a way to increase SLI’s online presence and potentially reach new audiences and clients, turned out instead to be an important collaborative learning environment for educators to share, comment and reflect on one another’s practice. This was, even in the conceptual stages, a secondary goal for the blog, but turned out to be the driving purpose and function. Largely because the organization has from its inception been a teacher-researcher collaborative in which teachers and researchers learn together, construct new knowledge and tools, field test these and analyze and reflect on outcomes, SLI was well-positioned to welcome and leverage this user-directed collaboration.

FACILITATORS INTENSIVE TRAINING

As required by its i3 grant, SLI recently began designing and piloting an online learning experience for a core of PD consultants involved in scaling up Reading Apprenticeship in Biology,

History and English Language Arts. This was the only online effort that had any funding. As such, SLI was able to contract the services of WestEd Interactive to support the needs assessment, design process, and educate SLI staff in the management of the learning environment. This professional support was one critical element in the success of this first formal effort.

Of particular note is that minimal funding for this effort from the i3 grant was enough to get SLI started. SLI also has some internal capacity and resources. One staff member is pursuing a Masters in Education through an online program, and she used the SLI work to complete several class projects. This provided access to a knowledge base and outside sources of information and mentoring—an important supplement to the support from WestEd Interactive. In addition, strong professional connections between SLI and the director of the New Teacher Center allowed these two groups to engage in collaboration through several meetings, in spite of the fact that there was no funding on either side for this work.

Core Qualities of oTPD Consistent with Deeper Learning

Relevance

The online PD experiences were designed to mirror activities that consultants would be leading in face-to-face professional development as they simultaneously built content knowledge.

Reflection

Consultants engaged in reflection on their own experiences and collaborative inquiry into problems of practice. Following the facilitation of institutes, consultant teams were invited to post reflections on their experiences, new insights and suggestions for future institutes and teams.

Collaboration

Prior to the face-to-face Facilitator Intensive Training, consultants were divided into small groups and provided with opportunities to reflect together on professional reading and the problems of practice these raised. Following the face-to-face training, new learning spaces were designed to support collaboration within teams of facilitators and interaction between teams— at the request of the consultants. The primary tool for the learning environment is a wiki (PBworks), a limited platform that SLI has stretched beyond its intended use. In order to expand this program, SLI will need to work with more robust collaborative technologies.

Content Knowledge

The activities were specifically designed to engage prior knowledge, surface misconceptions and build knowledge of the Reading Apprenticeship model— the content of the professional

development. Consultants were able to access and download materials for training as well as post questions, comments and reflections and get help from each other and SLI staff.

Effectiveness Data

SLI staff track user data regarding interaction with content on the site and between users. There has been uneven participation, but observations of consultants in their own training and in the field are strongly suggestive of learning. For example, teams are downloading and using addenda to agendas and suggestions from other teams.

RENTON COMMUNITY COLLEGE

The Reading Apprenticeship online course is offered for Renton Community College (RCC) faculty as a collaborative effort of SLI and Renton Community College SLI consultants. While SLI was exploring online learning structures and opportunities as part of a new DOE i3 grant expectation, RCC staff members were enthusiastically requesting permission to create an online course for their community. SLI staff initially responded with reluctance. This was an unfunded effort that potentially could take a great deal of time and expense for unknown outcomes and no financial benefit. Given the early and nearly concurrent experience with FIT, SLI administration made a strategic decision to bootstrap funds and donate a significant amount of staff time (primarily directors) to this new effort. Without the experience of the blog and FIT, it is highly unlikely this would have happened.

Core Qualities of oTPD Consistent with Deeper Learning

Relevance

All of the learning activities were designed to engage teachers in learning, planning, implementation and reflection on practice. In each week of the RCC course, teachers were asked to try a specified strategy in their classrooms.

Reflection

Teachers engaged in cycles of learning, planning, implementation and reflection on practice.

Content Knowledge

It is clear from work submitted that teachers engaged in the course learned a great deal about the Reading Apprenticeship model and integrated new approaches into their teaching. As with SLI's face-to-face professional development, it is expected that these changes in practice will lead to positive impact on Deeper Learning goals for students at Renton Community College.

Effectiveness Data

Moodle, the LMS used by the RCC Course, tracks data on user interaction, primarily by number and length of posts. Posts, comments, and course papers are submitted for assessment and grading. These include teachers' reflections on implementation. In addition, a member of SLI's research staff and others analyzed student work and compared these to the rubric used to grade papers as well as look for evidence of learning using SLI's professional development goals for participants. There was substantial, qualitative evidence of student learning through these measures.

LESSONS LEARNED

During the SLI and RCC faculty debriefing sessions, several people discussed the importance of collaboration in the SLI PD model. Of particular interest to research staff was the limited nature of collaborative, student-to-student discussion in the online environment, compared to what SLI has come to expect in the face-to-face environment. Drawing on research from the field of online learning, some suggestions were made regarding the roles of prompts and the instructor. For example "Post your thought in response to the assignment" did not lead to collaboration where as "Post your own response to the assignment *and* begin a discussion about at least one post from your peers with an extension question" might have led to greater interaction and collaborative discussion. Interactivity and collaboration are certainly impacted by design at the instructional level, however in an online learning environment, attention must also be paid to the limits and affordances of technological tools.

Moodle and PBworks are the platforms that SLI began with to prototype these ventures because they were accessible and they did not require significant capital investment either in staff learning or engineering to start. However, both platforms have substantial limitations. They are separate and relatively closed systems that are not easily tied to the day-to-day communication methods of SLI learners. Without significant engineering, they use fairly simple discussion boards and commenting features. While technological tools exist which could support the field-tested, complex collaborative protocols (such as Think Aloud and video case analysis) that are core to SLI's professional development experience (see for example, the profile of VoiceThread in Appendix B and the section on Video Analysis), it is unlikely that SLI or Renton Community College will be able to develop this bootstrap this effort further without new funding.

THE ROAD AHEAD

As SLI looks into the future, online learning must necessarily play a central role in the major scale up effort underway. Not only is the scale up leading to a rapidly growing community of teacher

practitioners who are demanding more convenient access to SLI's documents, products and learning networks online, it also is creating pressure to build a stable community of facilitators, coaches and mentors who can support this population. Over time, SLI's six full-time PD staff will not be able to adequately support 3,000 teachers and teacher leaders in five states serving 400,000 students. SLI will need to develop ways to leverage its nascent online work to provide more high quality leadership, and quickly. Much could be gained from creating PLNs, building on the structures that support mentoring and coaching designed at NTC, and even introducing video analysis tools into mix. In addition, openness and two-way access to other learning communities and their products (such as the public facing site of Expeditionary Learning) would serve to enrich SLI and distribute knowledge built within its communities.

EMERGING PRINCIPLES INFORMING OUR RECOMMENDATIONS

Understanding the challenges of transitioning facilitated, collaborative learning experiences into an online environment is critical for the scaling of Deeper Learning goals. If, as Darling-Hammond and others have suggested, collaboration is critical for deep, lasting and systemic professional learning, then online professional development will need to go beyond simply providing a forum for teachers to talk. Teachers need to practice active teaching, assessment, observation, and reflection in social settings where feedback is readily available.

Three important concepts emerged from this case study that inform our previous recommendations: First, financial support is essential if non-profits with proven face-to-face models are to build online learning environments equal in quality to their existing face-to-face models. Secondly, additional funding for collaboration between high-quality early implementers like SLI, Renton College, NTC, EL, and MAT@USC would launch the field forward. Finally, rapid and collaborative prototyping of platforms integrating new and emerging technologies could accelerate the process of successful face-to-face programs delivering their services at scale.

PROGRAMS PROFILES INTRODUCTION

This paper profiles a range of online teacher professional development (oTPD) programs that have promising individual qualities. Taken as a group, these programs present opportunities for teachers to lead their own learning process, to engage meaningfully with content, share and apply knowledge, reflect individually and collectively on their practice, and demonstrate their learning in ways that support the goals of Hewlett's Deeper Learning Initiative. Particular strengths of each profiled program are highlighted and organized using the framework of core professional development qualities presented previously. The core quality indicators that we looked for were: Relevance, Reflection, Collaboration, Content Knowledge and Effectiveness Data.

The programs we have chosen are not selected as exemplars of complete and sufficient practice. Rather, each has something to offer Hewlett and the field in the form of creative strategies to deliver effective teacher professional development in an online environment. Surely there are other programs, nationally and abroad, that might be equally or more accomplished. These profiled programs have not solved all of the thorny challenges that accompany online work, i.e. providing great content, effective coaching, robust inquiry processes, social learning, informal learning, and assessment. Moreover, the data on effectiveness is mostly qualitative at best, often merely anecdotal and rarely collected over time. Nevertheless, these programs have helped to inform our recommendations and represent a valuable starting point for Hewlett to begin to understand how oTPD might play an important role in scaling Deeper Learning.

While we looked at dozens of online programs, we include 10 profiles in our paper. A few of these programs have been referenced throughout the body of the paper and they are of particular interest because, not only do they display noteworthy presence of the core quality indicators, but they also address, in some form, one or more of the identified emerging trends. We offer the following list of programs and some key highlights as a guide to the exploration of the 10 full profiles in Appendix A.

PROFILED PROGRAMS LIST

		Program Highlights
	New Teacher Center's eMSS	Intensive Coaching Subject Matter Experts Self-selected Teacher Inquiry
	Edutopia PBL Boot Camp	Project Based Learning Learner Driven

		Web 2.0 Technologies Highly Collaborative
	Powerful Learning Practice	Learner Driven Web 2.0 Technologies Action Research Highly Collaborative
	MAT@USC	Synchronous Video Chat Regular Video Analysis Mobile Apps Highly Collaborative
	Teachscape Reflect	Video Capture, Storage & Analysis Effective Teaching Framework
	Teachscape Professional Learning Suite	Expert Interview Videos Videos of Practice Classroom Resources Discussions
	Expeditionary Learning Commons	Collaborative Project Design Tool Mentor Feedback
	PBS TeacherLine	Masters Level Courses Classroom-Embedded Coursework Tools & Support for Coaches
	Intel Teach	21 st Century Skills Reflective Course Design Student-Centered Approaches
	Teaching Channel	High-Quality Video Video Annotation Tool Common Core Standards Aligned
	Strategic Literacy Initiative (profiled in the body of this paper)	Reading Apprenticeship Application of Practice Followed by Reflection

TECHNOLOGY PROFILES INTRODUCTION

If teachers are to foster Deeper Learning skills in today's students, they will need to be able to leverage technology, integrating it in the learning experience. The National Education Technology Plan 2010, in a vein related to Deeper Learning skills, refers to “a connected teaching model,” consonant with teaching and learning envisioned in the Deeper Learning Initiative, where “classroom educators are fully connected to learning data and tools for using the data; to content, resources, and systems that empower them to create, manage, and assess engaging and relevant learning experiences; and directly to their students in support of learning both in and out of school” (U.S. Department of Education, 2010).

Our research and compilation in this paper corroborates what the national plan argues: “the technology that enables connected teaching is available now, but not all the conditions necessary to leverage it are” (2010). One of these conditions is clearly content pedagogical knowledge related to the use of technology to support learning.

Is our current teaching force ready to fully embrace this model and develop the Deeper Learning that students so desperately need? The national plan recognizes that, “many of our existing educators do not have the same understanding of and ease with using technology that is part of the daily lives of professionals in other sectors. The same can be said of many of the education leaders and policymakers in schools, districts, and states and of the higher education institutions that prepare new educators for the field” (2010).

This identified need for teacher development around technology is echoed in *The NMC Horizon Report: 2011 K-12 Edition*, where the authors explain,

“digital media literacy continues its rise in importance as a key skill in every discipline and profession. The challenge [in education] is due to the fact that despite the widespread agreement on its importance, training in digital literacy skills and techniques is rare in teacher education and school district professional development programs” (Johnson, 2011).

A new vision of education must not only involve teachers in authentic Deeper Learning experiences—those that include collaboration, reflection, problem-solving, building content knowledge, and using data—but also must call for meaningful experiences with technological tools as integral supports in their learning processes. As “digital natives,” today's youth—and increasingly the newest generations of teachers—live their lives online. As “digital immigrants,” many educators will be the second language learners in this new culture that is increasingly shaped

by the use of technology. Schools must support this shift, building communities that use and value new technological tools for life-long learning (OECD, 2008).

One noteworthy district in Tucson, Arizona, Vail School District, is leveraging technology to aid in both collaboration and professional development of its teaching force. Challenged by reduced budgets and substandard test scores, the district set out to reinvent its approach with curriculum and instruction. The district realized that something about their current system was hindering their students from excelling on the state assessments. Either the textbooks were not aligned to the assessments closely enough, or teachers were not able to cover all of the curriculum in time to take the test.

Instead of letting textbooks drive what was happening in classrooms, the district decided to start with the standards and enlist teachers at every level and every subject area to locate resources for teachers and students to use for mastery of the standards. Finding resources on the Internet was easy, but organizing them into a logical and approachable method proved to be more difficult. Vail decided to use wiki technology to list standards at each grade level and subject, and then catalogued resources that could be used to teach those standards. The wiki features “pacing calendars” that guides a logical sequence for teaching the standards. Because it is Web-based, “Teachers use the wiki to review the curriculum and calendars, locate and share resource materials, and communicate and collaborate with peers across the district who use the same curriculum but who would not otherwise be available to share resources and provide other support” (Carney, 2011).

The individual technologies referenced in Appendix B can support Deeper Learning goals when integrated effectively into professional development programs. In our review, we observed many of these tools being used independently and informally to support learning, providing creative visions of how existing providers might use them more productively. We have profiled these technologies as a resource to Hewlett and its grantees to better understand how these tools can support both adult and student learning. The majority of these tools can be used at little or no cost. Many programs profiled in this paper rely on tools from this list to support the Deeper Learning quality indicators for oTPD.

While all of the following technologies have promise when used in formal and/or informal learning environments, one technology has particularly high potential to support an effective online coaching and feedback processes. VoiceThread is a very exciting tool, and this fall it will be launching a mobile version. We heard one report from a university professor at BYU about teaching assistants who were using VoiceThread to correspond with students and do office hours, etc.

Students reported feeling more connected and supported by their TA's who were using VoiceThread than those they were meeting in small face-to-face groups. For any program attempting to offer coaching or direct peer-to-peer feedback, VoiceThread is worth a serious look.

TECHNOLOGIES PROFILED LIST

VoiceThread
Google+
Twitter
Video Sharing: YouTube, Vimeo, TeacherTube
Podcasts
Blogs
RSS and Google Reader
Ning
Facebook
Skype
Delicious
Diigo
Tynchat
Wikis
Google Apps for Education
Edmodo
Blackboard Collaborate
Slideshare

APPENDIX A – PROGRAM PROFILES

NEW TEACHER CENTER’S E-MENTORING FOR STUDENT SUCCESS (EMSS)

BACKGROUND

The New Teacher Center in Santa Cruz, California, has been providing face-to-face training for teacher coaches and site-based mentoring and coaching for new teachers since 1998. NTC launched eMSS, e-Mentoring for Student Success, to broaden their reach and impact: “beginning math, science, and special education teachers are matched with a mentor based on similar teaching assignments and grade level rather than on proximity or convenience. With Internet access, all eMSS activities and discussions can be done “anytime and anywhere.”

From the 2011 Final Report: e-Mentoring for Student Success (eMSS) completed its ninth year as a highly interactive online science and math education community and saw the addition of the first full year of eMSS- Special Education. The eMSS program originated from a partnership of the National Science Teachers Association (NSTA), the New Teacher Center (NTC), and the Science Math Resource Center at Montana State University (MSU) with funding from the National Science Foundation to develop a national network for online mentoring for beginning science and math teachers. In 2007, funding was received from Goldman Sachs to develop eMSS - Math. With the financial support of the state Departments of Education of Nevada, Louisiana, and funds from the US Department Of Education, OSEP to develop the infrastructure, eMSS embarked on supporting special education teachers in the spring of 2010.

NOTEWORTHY

NTCs face-to-face professional development is a tightly structured, highly designed model. They faced challenges shared by Strategic Literacy Initiative and Expeditionary Learning Schools when transitioning to an online professional development model: how to support an inquiry-based, highly collaborative, learner-driven learning model that they had been successful with in face-to-face settings in an online environment? What would be the roles of the facilitator, coach, mentor and organization in this new paradigm?

In this profile, we offer examples of ways that NTC has begun to develop structures and supports for collaborative inquiry into practice based on their coaching and mentoring model.

CORE QUALITIES OF oTPD CONSISTENT WITH DEEPER LEARNING

Relevance

The eMSS program, drawing on NTCs proven model of structured coaching, engages teachers in a variety of learning experiences that extend over the course of a year, described below. These core activities are highly relevant, job-embedded inquiries into practice.

- **Inquiries**, which form the core of the eMSS program, are eight week, online conversations based on classroom practices. Mentees self-select inquiries based on interest or need and each Inquiry is flexible and adaptable for a mentee's own unique teaching situation. A group of mentees and mentors, guided by a facilitator, work together on an Inquiry over a period of eight weeks.

- **Dilemmas** are short, open-ended scenarios that pose a question about a specific teaching issue. Facilitators design the scenario in response to Mentee questions raised in discussion forums. Mentees and mentors participate in online facilitated discussions offering possible solutions to a Dilemma. The nature and structure of a Dilemma invites a wide range of ideas, offers opportunities to exchange contrasting viewpoints and motivates teachers to respond.
- **Content Focus.** eMSS differentiates itself from other online programs by providing access to content specialists—practicing scientists from universities in the areas of physics, life science, chemistry, earth science as well as mathematics educators. The beginning teachers have a unique opportunity to engage with university scientists and mathematicians on a daily basis.

Reflection

The eMSS program engages teachers in deep reflection and critical analysis of practice. NTC's tools for reflection on practice are well-tested in the face-to-face setting, and the extent to which these are integrated in their online model is of value to others.

- **Inquiries follow a Plan, Practice, and Reflect cycle.** There are three sessions of Inquiries offered during the year: fall, winter, and spring. Each session offers a choice of topics so mentees can select an area relevant to their teaching. Inquiries follow a Plan, Practice, and Reflect cycle. This cycle allows mentees to dig deep into a topic in a manner that can be applied to other aspects of their teaching. During Inquiries, mentees post plans for instruction and reflections on implementation and receive feedback from mentors and potentially other mentees in the inquiry group.
- **Skype and video analysis of classroom practice.** Mentors meet online with mentees and offer personal coaching, using NTCs proven protocols for critically examining classroom practice.
- Based on these coaching conversations, mentees engage in **Dilemmas and Content Focused forums** to explore and build knowledge about areas of practice they (and their mentors) identify as areas for professional growth.

Collaboration

Several aspects of the eMSS support collaboration. Much of this collaboration is between mentors and mentees, and so necessarily limited, however, the depth of critical conversation, access to expertise and the ways in which mentors and facilitators support meaningful social interaction is noteworthy and worth examining further as a model of the transformed role of the teacher in a online environment.

- **High-Quality eMSS-Trained Mentors Support Mentees.** While a small staff manages the program, it is the mentors and facilitators whose day-to-day interactions with the beginning teachers comprise the heart of the eMSS program. The mentors selected for eMSS have an impressive array of credentials and must successfully complete a three-week, online summer intensive professional development with the goals of building trusting relationships, strengthening online skills, and understanding the role of a mentor and the online learning environment. Mentors support critical conversation, surface and offer expertise and guide socially constructed collaborative conversation that is uncommon if not unique.
- **Critical conversations and socially mediated learning.** Facilitators and mentors provide significant scaffolding, posing questions and other supportive models of effective communication focused on inquiry and critical conversation about practice. This is noteworthy in a profession that has traditionally not supported this kind of professional conversation. As professional development providers develop online models, finding new

roles for the "teacher" in this setting is crucial. NTC has found roles where the voice of the teacher is present as a source but not arbiter of expertise.

- **Video analysis and personalized coaching.** eMSS is using occasional video analysis to facilitate mentoring feedback. This is worth further study.

Content Knowledge

Of particular note in the NTC model is the support for development of content knowledge through the community, content focused forums, combined with content pedagogical knowledge development in the Inquiries, Dilemmas and personalized coaching. Few, if any, programs, have such a tightly integrated and closely supported model.

- **Content specialists.** eMSS differentiates itself from other online programs by providing access to content specialists—practicing scientists from universities in the areas of physics, life science, chemistry, earth science as well as mathematics educators. The beginning teachers have a unique opportunity to engage with university scientists and mathematicians on a daily basis.

Effectiveness Data

NTC, with funding from NSTA and NSF, has contracted with Horizon, an outside evaluator, to collect and analyze data about teacher engagement and use of the online environment and impact. These are included in the Final Reports in appendix B. NTC uses this data to inform next steps for improving the online learning model.

Resources and References

eMSS White Paper: An Online, Content-Focused Mentoring Program for Secondary Math and Science Teachers. Prepared by: Lynn Kepp, Alyson Mike, New Teacher Center at University of California Santa Cruz, January 2009

2010-2011 eMSS - SCIENCE FINAL REPORT. 725 Front Street, Suite 400, Santa Cruz, CA 95060

EDUTOPIA'S PBL CAMP

BACKGROUND

In the summer of 2010, Edutopia hosted a Project-Based Learning (PBL) Camp as an online professional development experience for educators around the country. The driving question for the camp was: "How can we turn the Gulf disaster into meaningful learning opportunities for our students?" This experience was only offered once.

An online community--including teachers, pre-service educators, administrators, and technology integration specialists--came together to plan student projects in response to the Gulf of Mexico oil spill. PBL Camp was facilitated by Suzie Boss, an Edutopia contributor and co-author of *Reinventing Project-Based Learning*.

CORE QUALITIES OF oTPD CONSISTENT WITH DEEPER LEARNING

Relevance

- The learning process was self-directed, job embedded.
- Teachers put themselves into groups based on the projects they were interested in working on.
- A wiki page was created as a matching service to allow teachers to propose project ideas and to find projects that might interest them.
- The goal of the camp was to learn more about project based learning by designing a project with other teachers that could be taught in the upcoming year.

Collaboration

- The PBL Camp used the PBworks wiki tool to build a community with user profiles and organize all the resources for three-week experience.
- The participants used a common planning template and the commenting features to design the project.
- Each project plan could be edited by anyone working on the project.
- A comment feature was enabled on the same page of the plan to allow for team members and others in the community to provide feedback.

Reflection

Reflection and feedback was built into the design and planning process. Because it was a brief summer experience, there wasn't time to allow for feedback from student or teachers having tried the actual project.

Content Knowledge

Suzie Boss used PBL strategies throughout the camp so that participants would have the experience of participating in a collaborative project (while also planning a project for their students). For example, the camp incorporated these PBL features:

- Driving question: How can we turn the Gulf disaster into meaningful learning opportunities for our students?
- Entry event: A kick-off webinar was designed to spark inquiry, just as entry events are used to launch projects in the classroom.

- Experts: Various experts (i.e., wildlife scientists and residents of Gulf region affected by the spill) shared insights during PBL Camp in response to questions participants were asking.
- Teams: PBL Campers self-organized into small teams, typically around grade levels, content areas, or shared interests and collaborated on project planning.
- Technology: A variety of technology tools were introduced and used for authentic purposes. Examples: Elluminate for webinars, Twitter for synchronous chats, Edutopia groups for asynchronous discussions, wiki for collaborative project planning and resource sharing, Delicious for resource sharing, blogs for reflection, and PBworks for project planning and organization
- Culminating event: PBL Camp concluded with several teams of participants sharing their project plans with an authentic audience (via Elluminate) and reflecting on the experience.

The following technology tools were introduced and used for authentic purposes:

- Elluminate for webinars
- Twitter for synchronous chats
- Edutopia groups for asynchronous discussions
- PBworks for collaborative project planning and resource sharing
- Delicious for bookmark sharing
- Blogs for reflection

Effectiveness Data

As a free professional development program, the initial interest in participating was extremely high. Edutopia did not formally track the number of participants; however, registration was capped at 1,000 and this number was reached within a week of announcing the camp. Some folks dropped out, some folks dipped in and out, but the ones that stuck with it and formed productive teams got very far and planned compelling units that were used in classrooms this past year. One teacher became so passionate about the work that he decided to devote his entire teaching practice to the PBL approach. Another teacher created a blogging space called “Voices of the Gulf.”

Many of the project plans are available for viewing on the PBL Boot Camp wiki (www.pblcamp.pbworks.com)

What is Edutopia?

Edutopia.org is an interactive website designed to disseminate innovative educational practices for grades K-12 in the form of in-depth articles, video clips, interviews and links to other sites. Edutopia hopes to connect and inspire positive change in all areas of education by offering “practical, hands-on advice, real-world examples, lively contributions from practitioners, and invaluable tips and tools.” The site’s many videos can help educators and parents, as well as business and community leaders visualize the kinds of innovations that might be possible in their communities.

Edutopia’s core concepts include Integrated Studies, Project Learning, Social & Emotional Learning, Technology Integration, and Teacher Development.

Cost

PBL Camp was offered at no charge to participants.

Resources and References

<http://www.edutopia.org/project-based-learning-summer-camp>

POWERFUL LEARNING PRACTICE

BACKGROUND

Powerful Learning Practice (PLP) is small, private company run by Will Richardson and Sheryl Nussbaum-Beach. PLP's primary offering is a year-long program of experiences that asks teachers to conduct collaborative action research that molds teachers into connected learners. According to Nussbaum-Beach, "becoming a learner first and teacher second, is what it means to be a 21st century educator?"

PLP's core program is a year-long blend of face-to-face and job-embedded online learning. It is offered in three one-year segments. Learning communities of approximately 100 are built by combining 5-member teams from 20 different schools within a geographic area to provide a rich and diverse learning experience. Each year of learning includes two days of face-to-face sessions. The first face-to-face event is a full day of relationship-building and introduction to norms and goals. The year ends with a culminating event where teams share their inquiry work with the rest of the community. During the year, five two-hour online sessions are provided, as well as ongoing instruction, peer-to-peer collaboration and support in an online learning community supported by the PLP leaders. Communities can continue for up to three years.

CORE QUALITIES OF oTPD CONSISTENT WITH DEEPER LEARNING

Relevance

At the core of the community work is collaborative action research. Each five-member team develops an action research plan and, with the support of a coach, pursues a question of interest and possible solutions. For example, "How do you tie into student passion and still meet state mandates?"

Reflection Testimonial

'..the experience shook me out of a comfortable position of being "The Teacher" and encouraged and cajoled me back into being "The Student." PLP gave me a forum within which to stretch myself. It gave me people to talk to along the way, to share confusions and frustrations as well as successes and joys. It allowed me to move slowly, step by step, out of one comfort zone into another, one where the colleagues I share and learn from circle the globe. As I live that, I can share it with my students and empower them for the world that will be their future.'

- Hadley Ferguson, Springside School

Collaboration

- Teams work as personal learning networks, connecting, having fun, harvesting links, designing their own learning and excited to be learners again.

- Teachers use Ning, wikis, Twitter, Delicious to share ideas and conduct their action research with their coaches and one another.
- Every six weeks, a webinar convenes the entire community to focus on learning a new tool for strengthening the collaboration.
- At the end of the year, a culminating event occurs in which the is the Action Research results are presented in person.
- Coaches bring in experienced voices, teachers or experts in the area of research, to work with the teams.
- In between the webinars there is online interaction, sometimes on a daily basis.

Content Knowledge

- Teachers are able to experience authentic learning (i.e. collaboration, content expertise, problem-solving, communication, instructional skills, and have a meaningful experience with technology as a critical tool in the process.
- Teachers participate in the very kinds of networked learning that they must facilitate for kids. While more national organizations are calling for the teaching of these 21st century skills, few models exist for preparing classroom teachers to deliver these literacies.
- Experienced voices (practitioner or academic) are brought in by coaches to work with the teams.

Potential limitations

In year one, the action research is less focused on classroom practice and more on group systems in a school or district. In year two the action research tends to focus more on classroom practice. Video analysis tools would be a welcome addition here.

Cost

The cost for a one year program which includes two full-day workshops, five webinars and a variety of online tools for continual collaboration, is \$1,500 a year per person.

Resources and References

<http://plpnetwork.com/>

USC ONLINE MASTERS IN TEACHING (MAT@USC)

BACKGROUND

The MAT@USC is a year-long masters in teaching program delivered entirely online to students across the US and around the world. The MAT@USC is specifically designed to prepare current and aspiring teachers with the knowledge, skills and experience needed for today's classrooms. It is combines interactive online learning with intensive, school-based fieldwork experiences.

Since USC first launched MAT@USC four years ago, over 1,500 students have enrolled in the program. Students come from 45 states and 25 countries, including Turkey, Japan and South Korea. The MAT@USC now is the country's fastest growing teacher preparation programs and has placed students at more than 700 school districts and 1,400 individual schools around the country for practicum. It is the only online MAT program from an elite research university. The MAT@USC program enrolled 144 students during its first year, 2009. In 2010, it enrolled 1,000 students, and it expects an enrollment of around 2,000 students in 2011. MAT@USC is on pace to become the country's largest not-for-profit teacher prep program by 2013.

MAT@USC is unique from other online programs because it strives to offer a true classroom experience where meaningful relationships (personal and professional) are fostered. As one student reports, "... all students are facing each other and the professor throughout the whole class. They might be in different cities, states, or countries, but they interact in an on-the-spot manner, sometimes interacting with the whole class, sometimes in break-out groups, and other times in study groups. That said I am delighted when I am able to interact with my classmates outside of class."

When students enter the online "classroom," they see a Brady Bunch style matrix of live-stream video headshots of 10-12 students and the professor. During class, which is scheduled several times throughout the week, students can take notes, view slides, discuss questions on a Twitter-like chat pod, break into groups, or virtually "raise their hand" to answer a question.

Students complete the student teaching component of the program at one of their local schools. Student performance is evaluated by a supervising teacher at that school and the USC instructor, who watches videos that the students take of themselves teaching. About 80% of the first class, according to USC, is currently employed as teachers.

The program has a significant Facebook presence as well. Over 11,330 people "like" the Master of Arts in Teaching at USC page, where students and their friends can send badges, take polls, view videos, and share teaching stories.

Mobile:

USC has recently teamed up with New York based TouchAppMedia and 2tor, Inc. to introduce one of the first mobile apps for higher education/teacher training. "You can do everything on the iPad app that you could do on your laptop," says Sundt, associate dean of academic programs at USC's Rossier School of Education.

2tor provides a platform for online graduate degree programs that uses real-time technology to mimic a physical classroom as closely as possible. The premise of 2tor is that excellent learning can occur online if the university controls the faculty, the curriculum, and the selective admissions, while 2tor provides an exceptional learning environment.

Starting last spring, Georgetown's School of Nursing and Health Studies offered a master's program for family nurse practitioners. Julie DeLoia, the school's interim dean, claims that "Five years ago we never would have done this because the technology was too static, it was too linear, so it was a one-way conversation. In the last few years the technology is such that we can have dynamic engagement."

The 2tor platform is as much a personal teaching environment and social network as it is a course management system.

Potential Limitations:

MAT@USC is still a closed platform. The next step would be to open it up. Melora Sundt, associate dean of academic programs, wants to build an alumni wiki network that could co-write lesson plans and share best practices from around the world.

2tor is a commercial software that may not be affordable to many non-profits. Some downsides to MAT@USC's mobile app are content creation (it's hard to type papers on an iPhone) and file sharing (documents created on the iPad can't be transferred easily to different apps). But as new technologies come along to streamline the online learning environment, this should improve.

CORE QUALITIES OF oTPD CONSISTENT WITH DEEPER LEARNING

Relevance

- Students attend live online class sessions on a weekly basis where they can actively engage with their professor and classmates in real-time, face-to-face discussions.
- There is live online chat assistance.

Reflection

- Students receive feedback classroom teaching experiences by uploading videos of work and discussing them with their professors and Guiding Teacher.
- Students upload daily videos of their classroom experience.

Collaboration

- Students can chat with classmates, post and comment on their walls, join communities, and form study groups.

Content Knowledge

- Coursework is made up of original documentary-style videos, reading materials, and class assignments.
- The school is experimenting with recorded or simulated lessons for topics they can't film as effectively on camera.

Resources and References:

<http://mat.usc.edu/>

Facebook Page

<http://www.facebook.com/MATatUSC>

2tor, the company that creates the technical side of the MAT@USC platform

<http://2tor.com/>

Mashable, "The Case for the Virtual Classroom," by Sarah Kessler

<http://mashable.com/2011/01/03/virtual-classroom/>

Daily Trojan, "USCNow Rebrands Online Ed " by Rachel Bracker

<http://dailytrojan.com/2011/06/07/uscnow-rebrands-online-ed/>

The Atlantic, College? There's an App for That: How USC Built a 21st Century Classroom, by Derek Thompson, May 27, 2011

<http://www.theatlantic.com/business/archive/2011/05/college-theres-an-app-for-that-how-usc-built-a-21st-century-classroom/239554/>

TEACHSCAPE REFLECT

BACKGROUND

Teachscape Reflect (TR) is a professional development tool that combines a 360-degree, panoramic video capture, online tools for collaboration and frameworks to measure effective teaching. While a teacher can use TR for self-review and self-reflection, instructional leaders can use TR to support both individual coaching and professional learning communities. TR enables educators to capture a complete view of the classroom, and then use web-based software to review, comment, and share the video with colleagues.

Set up and recording is easy. Panoramic videos are automatically uploaded and saved to Teachscape's secure website where they can be viewed on-demand, commented upon, and shared from any internet-connected computer. All teachers and administrators in a school have access to TR hardware, video capture, and online tools to view, share, catalog, comment upon, or publish videos.

In partnership with the Bill & Melinda Gates Foundation, the TR technology was developed out of the Measures of Effective Teaching (MET) project, in partnership with the Bill & Melinda Gates Foundation. It has been used to capture and score more than 20,000 lessons in over 3,000 classrooms nationwide. TR enables the measurement of teaching practice against Charlotte Danielson's instructional framework or district-created frameworks, making the tool equally valuable for learning and evaluation.

CORE QUALITIES OF OTPD CONSISTENT WITH DEEPER LEARNING

Relevance

Through video-based self-reflection, teachers can take control of their own professional learning. Teachers can work on specific areas of practice in which they want to improve. TR enables the capture of entire lessons as well as the upload of lesson artifacts such as lesson plans and student work. Teachers can choose to which lessons or artifacts to share, in order to provide peers with examples of successful teaching or to seek comments for growth and collaboration.

Panning around the classroom or zooming in and out on students, the teacher, or the board, allows the analysis to focus on particular activities or behaviors. Teachers can also assess student engagement and evaluate how students' learning needs were addressed.

TR provides the tools to develop a common language of effective teaching and to share concrete visual examples. The panoramic video capture provides teachers and administrators with a "visual dictionary" for identifying, discussing, and promoting effective practices.

Reflection

Teachers can view, reflect on, and analyze their own classroom instruction and its impact on student learning from home, from school, from anywhere. Teachers can gain perform an analysis of their teaching strategies, get feedback from their coaches (not provided by Teachscape) and make adjustments that improve their practice.

Collaboration

A shared video library that allows teachers to learn from one another. Teachers can review each other's lessons online, or jointly view 360-degree classroom footage to discuss specific strengths or improvement areas. Search tools allow easy retrieval if recorded lessons within your video library.

Instructional leaders and coaches can review video footage of lessons alongside teachers and identify specific growth opportunities. Instructional leaders can also use Teachscape Reflect to cultivate and deepen a school-

wide culture of continuous improvement.

Content Knowledge

Content experts from across the district can join the viewing sessions.

Effectiveness Data

An entire school district can benefit from shared video libraries that provide locally developed examples of excellent teaching in specific content areas, and comments provided by the entire professional learning community.

Teachscape Reflect comes pre-loaded with the widely used and highly respected Framework for Teaching created by Charlotte Danielson, providing a research-based foundation for a systematic and scalable teacher evaluation system. Evaluators can use the panoramic videos to evaluate and score classroom videos.

Resources and References

<http://www.teachscape.com/reflect>

TEACHSCAPE PROFESSIONAL LEARNING SUITE

BACKGROUND

Teachscape Professional Learning Suite (PLS) delivers online learning modules and professional learning communities. PLS provides a over 10,000 resources, including: videos, activities, discussions, case studies, as well as course development and coaching tools.

CORE QUALITIES OF oTPD CONSISTENT WITH DEEPER LEARNING

Relevance

- Provides easy-to-use functions for customizing and archiving personally created collections of professional development materials. Users can drag and drop items from the multimedia database into folders they have created in their own libraries. These items can then be annotated, ordered, edited and saved.
- A fine-grained, multi-criteria search and retrieval function allows users to quickly locate the system resources most relevant to their particular needs or interests. Thumbnail descriptions and content maps are provided for each item returned by a search, making it easy for users to quickly browse through and select materials for use.
- Interviews with researchers who are expert with the strategies.
- Teachers can view examples of teachers teaching the strategies to be learned and read commentary from the filmed teachers.
- Teachers can submit their own professional learning resources, upload videos of teaching, and share lesson plans and student work.

Reflection

- Reflection is encouraged in the discussion area.
- Resources can be annotated for future reference.

Collaboration

- Discussions allow teachers within schools and across a district share content from the online modules. Throughout each module, teachers are encouraged to engage in discussion about the content and peer-to-peer brainstorming.
- Teachers are able to set up their own school-based, on-line learning groups through which members can share resources, participate in discussions, and engage in collaborative work on an on-going basis.
- Teachers can push their own video cases, resources, or student work to a team of colleagues as well as assess student work products and share action research.
- Teachers have access to a public discussion area where they can monitor and participate in threaded-discussion groups that are open to the larger professional community. Participation in this community allows users to tap into expertise that might be beyond what is available in their local context.

Content Knowledge

Video resources include:

- Best-practice videos that show research-based practices in action in the classroom
- Commentaries by noted researchers that are designed to provide a research-based perspective on the practices illustrated
- Teacher reflections to promote better understanding of the featured teacher's instructional decisions
- Student commentary on the featured classroom processes and students' experience of the instruction

Text resources are designed to deepen content understanding and may include:

- Background material focused on building academic background knowledge and the featured pedagogy
- Research summaries that support the featured practice and help teachers understand why and how the practice works
- Classroom resources, including lesson plans, sample student work products from the featured lesson, assessments (including rubrics) for assessing the student work, and suggestions for addressing the diverse learning needs of students

Graphical models enable teachers to manipulate and engage with the content in order to:

- Deepen content knowledge for teaching
- Promote greater understanding of complex topics
- Illustrate key ideas

Resources and References

<http://www.teachscape.com/txl/>

EXPEDITIONARY LEARNING COMMONS

BACKGROUND

The Expeditionary Learning Website has a public facing side and a members' only area. The public facing side, designed to extend the program's visibility and impact, offers information for the public about the efficacy, theoretical base and history of Outward Bound's Expeditionary Learning Schools. While it obviously reaches potential new markets, is also educative, offering resources including: samples of student projects; a blog sharing vignettes of best practice, research, and news about Expeditionary Learning; and a professional reading library. The Expeditionary Learning Commons, the password protected area accessed from the EL homepage, is an area for teachers within the Expeditionary Learning Schools Network to access resources and collaborate with others in the Expeditionary Learning network of schools.

Expeditionary Learning (EL) is a chartered entity of Outward Bound. Through professional development, on site coaching and support and whole school design, Outward Bound, in cooperation with the Harvard School of Education, seeks to bring essential elements of Kurt Hahn's experiential education model-- active pedagogy, leadership, service, craftsmanship, self-reliance, reflection, among others-- into public schools.

The EL Commons, the name of their web-based online professional learning site, is a new effort, designed to support the Expeditionary Schools professional learning community and increase interaction between schools and teachers across the network. Expeditionary Learning has been involved in Hewlett's Deeper Learning Initiative, which supports some of the development of this web-based learning community. Many of the resources accessible through the public facing part of the website have been developed and vetted within the members' only EL Commons.

The Commons has three areas visible to teachers and school leaders: Planner, Document Library and Student Project Archive. These provide strong supports for face-to-face coaching at individual schools. A fourth area, Staff Library, is visible only to EL administrative staff and contains materials and resources to support professional development and the administration of the EL Schools Network. Each EL school has a school designer, a site based leader who provides in depth, long term coaching, face-to-face PD and leadership development. The school designers have been trained to help teachers and school site administrators access and use the Commons.

PLANNER

Teachers collaborate on projects ranging in complexity from Expeditions (full length units of instruction) to Projects (several thematic lessons) and Lessons (shorter, self-contained units of instruction). The Planner has a template with prompts and resources to help teachers integrate EL principles and core practices. For example, as a teacher or team begins planning a new lesson, project or expedition, they begin at the STA tab (standards, targets and assessments). This tab contains a template with prompts to select standards (academic, 21st C and CCSS) by state and grade level, and links to readings about EL planning structures and criteria for quality.

Comment and sharing functions to allow groups of teachers to collaborate and school designers can provide mentoring and support during the design process. Projects can be posted for sharing, and posted projects can be viewed, cloned (downloaded and edited). EL administration currently reviews all posted projects "unshares" those that do not yet meet the criteria for quality and contacts the author and team with suggestions for revision. As previously mentioned, projects developed in this area that have been evaluated and meet the quality criteria are often published the public facing side of the site.

EL administration is currently developing additional collaborative functions for this area, which they intend to have in place by September. There is substantial evidence of teacher work and interaction in this area. It is a very interesting and promising model of support for a collaborative learning community. Members can comment on lessons that have been shared.

DOCUMENT LIBRARY

Here, teachers and school leaders can access foundational readings on core practices and the EL model. Currently, this functions strictly as an online library, with the intention that the readings will be accessed and used for face-to-face professional learning at school sites. It is a rich, voluminous library providing access to extensive resources.

STUDENT PROJECT ARCHIVE

Network members can access projects completed by EL students and vetted for quality by EL administrative staff. The site can be browsed or searched by grade level, academic discipline, project format or date posted. Each project contains samples of student work, an overview, suggestions for how the project might be useful and connections to academic and 21st Century standards. EL administration is in the process of mapping Common Core State Standards onto existing projects, a process that will be integrated into the design of new projects. Members can mark projects as favorites, saving them to their own favorites page, and rate projects.

CORE QUALITIES OF oTPD CONSISTENT WITH DEEPER LEARNING

Relevance

- The Planner and Project Archive are designed to support teachers in designing and implementing EL's model.
- Teachers refine their searches in the Document Library, project archive to match their needs (by grade level, discipline, standard, topic, etc.)
- The planner supports problem solving and integration of new pedagogies.

Reflection

- The planner provides opportunities for in-process feedback on design process.
- The project archive has a rating function, providing some public feedback on completed projects. The process of creating a project for the archive presents opportunities to retrospectively analyze student work and reflect on instruction.

Collaboration

- The templates in the Planner support interaction with content and the comment functions provide support for online collaboration. EL administration is developing additional tools to increase this collaboration and support.
- Members upload and share volumes of content, much of it very high quality.

Content Knowledge

- A structure of the EL model is STAs (Standards, Targets and Assessments). The Student Project Archive, Planner and Documents Library all support teacher attention to standards and standards based assessment.
- Rich samples of finished student work are captured in the archive.

Effectiveness Data

- Currently, EL administration is tracking the total number of members and individual member's work within the Planner.

PBS TEACHERLINE

BACKGROUND

PBS TeacherLine is a provider of online professional development for educators. It offers in excess of 130 graduate level facilitated, online courses for teachers that address: Reading/Language Arts, Mathematics, Instructional Technology, Instructional Strategies, and Science. PBS TeacherLine is funded by a grant from the U.S. Department of Education to help educators acquire the skills they need to become—and stay—the highly qualified teachers. PBS TeacherLine courses are hosted in Moodle, an open-source learning management system.

PBS TeacherLine also offers PBS TeacherLine Peer Connection, a professional development tool for instructional coaches that facilitates online communication, collaboration, and content. It provides a flexible set of tools to help coaches search for appropriate professional development resources, save these resources using a unique custom labeling system, and share them with the educators they are coaching.

NOTEWORTHY

PBS TeacherLine has been recognized for excellence by organizations such as the United States Distance Learning Association, National Educational Association, and the Software and Information Industry Association. "Curriculum offerings (K- 12) are developed in consultation with recognized experts in the field with collaboration from professional organizations. Among others, these include: the International Society for Technology in Education (ISTE), the National Council of Teachers of Mathematics (NCTM) and the National Council of Teachers of English (NCTE) (Donlevy, 2005)."

CORE QUALITIES OF oTPD CONSISTENT WITH DEEPER LEARNING

Relevance

PBS TeacherLine's course catalog can be searched by either Subject or Grade Level. Many courses are designed for a "Classroom Link-Access to students recommended." Classroom Link courses ask learners to implement lessons with their class or with a small group of students; however, options for learners without access to students are available.

PBS TeacherLine Peer Connection also supports coaching via Coaching Modules, collections of "just in time" resources—videos, online interactives, articles, videos, and more—that instructional coaches and mentors can share with teachers. The modules provide guidelines and suggestions to help coaches and mentors use these resources with teachers to address specific professional development needs. Professional development (PD) modules are collections of resources specially designed to help coaches and mentors build their skills. The modules are self-paced and provide coaches and mentors with suggestions for study, reflection, and planning.

Reflection

PBS TeacherLine engages both instructors and participants in deep reflection and critical analysis of practice.

- "Reflection logs prompted instructors to articulate areas for improvement in their own performance, which converged across course terms: landscape posts, presence on the discussion board, and providing constructive, valuable and specific feedback to learners (Storandt, 2010)."
- In each PBS TeacherLine course, teachers are required to adapt the content to use in their classroom, to create their own library of teaching resources, and to modify their teaching practice by incorporating the new strategies they are learning.

Because the courses are six weeks long, teachers have adequate time to practice with the concepts and they are encouraged to do this by the course facilitators. Also, discussions give teachers an opportunity to share their experiences in the classroom with colleagues who are facing similar challenges.

In the course RDLA 155: Teaching Phonemic Awareness and Phonics (Grades PreK-3) participants study the stages of literacy development and practice assessing the performance of developing readers. In one session, they view the video, "Assessing Phonological and Phonemic Awareness" that shows a kindergarten teacher working with four students. Participants discuss the level of linguistic development indicated by these students.

In another session in RDLA 155, teachers watch another video, "Teaching Phonological Awareness," that shows first-grade students learning letter- sound correspondence. Then they are asked to complete a Self-Assessment on the activity and write in their online journal about how that activity might (or might not) be effective with their students. They are asked to discuss the factors that influence choice about how much and what kind of phonics instruction a student needs.

These are typical examples of how the PBS TeacherLine courses stimulate reflection through journaling, written papers, and discussions. Courses also include evaluation activities given at the beginning and again at the end of the course that prompt participants to record their changing expectations, goals and learning. Through these various reflection activities, the courses draw a strong connection between course content and the teachers' practice and implementation in their classrooms. (PBS/TeacherLine, 2005)

Collaboration

"Using discussion boards, video, audio and interactive enhancements, TeacherLine courses involve teachers in up-to-date dialogues using robust content presented and formatted by experts. Moderated discussions guide information sharing and allow for collaborative and cooperative learning experiences online (Donleavy, 2005)."

A Peer Connection network is a community of educators—coaches, mentors, teachers, and others—who come together to share ideas and resources and learn from each other. Individuals automatically become a member of a school/districts network. Groups are formed within networks. Any member can join a public network or group by locating a public network or group and clicking on the "join to participate" link.

Content Knowledge

When browsing the PBS TeacherLine course catalog, course titles, descriptions, and syllabi clearly point to a focus on the development of content knowledge in participants. Independent research is too yielding strong evidence of the same.

Following are among the many strong indicators that teacher's content knowledge increased with the completion of a PBS TeacherLine course. According to a study conducted by LearningPoint Associates,

- "Eighty-four percent of participants increased their ratings of their knowledge of both content and instructional strategies from pre-survey to post-survey (Margolin, Gibbs, & Tucker, 2010)."
- "Nearly three quarters of those surveyed after taking a course reported incorporating content knowledge from a PBS TeacherLine course into their teaching practice (Margolin, Gibbs, & Tucker, 2010)."

Effectiveness Data

Instructors rate the quality of PBS TeacherLine's professional development and support very highly; superior to most of the preparation they have received from other online course providers. Further, instructors have very few unmet specific learning needs related to online instruction.

An instructor's performance during a course term was assessed in three ways: by instructors through reflection logs, by PBS TeacherLine who used an evaluative rubric, and by learners (i.e. k-12 teachers) who completed post-course surveys. All feedback on an instructor's performance from each source was aggregated into one document and returned to instructors through 3D course reviews. Key findings from the 3D course review process include:

- As a whole, PBS TeacherLine's instructors excel at: course climate and community building, instruction, interaction and discussion facilitation, course organization, and implementation of assessments.
- Participation in PBS TeacherLine's 3D course review process promotes critical self-reflection, with instructors gaining the capacity to critically assess their performance over time.
- Learner evaluations, examined in aggregate across instructors and terms, also reveal high quality online instruction. Their aggregate ratings of instructor performance align with PBS TeacherLine's ratings, and both are higher than instructors' self-assessments. Learners' satisfaction with course experiences and their descriptions of instructor excellence reinforce these findings.
- Most k-12 teacher learners will immediately apply what they learned from the courses offered by PBS TeacherLine as a result of their instructor's high quality performance. (Storandt, 2010)

Cost

\$125 - \$350 per course not including institutional credits

Resources and References

Donlevy, Jim. (2005). Innovative Teacher Professional Development: PBS TeacherLine. *International Journal of Instructional Media*, 32(3), 205-207. Retrieved July 28, 2011, from ProQuest Education Journals. (Document ID: 1041520121).

Storandt, Barbara. (2010). Professional development for and evaluation of online course instructors: Research-based best practices. ALTA Solutions Group, LLC. Retrieved from http://sloanconsortium.org/effective_practices/professional-development-and-evaluation-online-

[course-instructors-research-based](#)

PBS/TeacherLine (2005). The Alignment of PBS TeacherLine to the Reading First Program: A White Paper. Available from <http://www.unctv.org/education/teacherline/resources/readingfirst.html>

Margolin, Jonathan, Debbie Davidson-Gibbs, and Natalie Tucker. (2010). "PBS TeacherLine Pre-Survey and Post-Survey Evaluation Report," conducted by Learning Point Associates and funded by the U. S. Department of Education's Ready-to-Teach grant. Available from http://www.pbs.org/teacherline/courses/common_documents/research/teacherline_program_evaluation-learningpt.pdf.

INTEL TEACH

BACKGROUND

The Intel Teach program (IT) provides professional development that supports 21st-century skills. Intel Teach courses promote student-centered approaches and help teachers engage students in deeply relevant ways, with appropriate use of technology for learning, creativity, and communication.

Originally designed by classroom teachers for in-service professional development, the program was expanded to support teacher preparation. Pre-service institutions around the world now incorporate the program's curriculum in required coursework, with research evidence demonstrating positive impact.

The Intel Teach Essentials Course, which provides 40 hours of online instruction delivered in 10 modules over one to ten weeks, is consistent with calls for sustained, intensive and classroom-focused professional development. Additionally, teachers have the opportunity to participate in follow-up professional development through the Intel Teach Thinking with Technology Course.

NOTEWORTHY

IT has been rigorously evaluated in an ongoing basis. Evaluators use surveys, site visits, classroom observations, and phone interviews with program participants and administrators to determine whether and how this program is reaching its core goal of improving the integration of technology into K-12 classrooms.

CORE QUALITIES OF oTPD CONSISTENT WITH DEEPER LEARNING

Relevance

IT program offerings allow teachers to find courses that are challenging, substantive, and have an immediate practical impact on instruction. An emphasis on the teacher's own classroom is at the center of the Intel Teach experience. This emphasis mirrors research recommendations that call for strong, clear connections between teachers particular classroom experiences and the concepts addressed in professional development settings.

Intel Teach Elements provides free, just-in-time professional development that is available anytime and online. It is a series of courses that provides deeper exploration of 21st century learning concepts.

Reflection

For the Essentials Course, seven of eight modules include activities that call on teachers to reflect. Examples:

Activity 1: Reflecting on My Student Sample.

Activity 5: Reflecting on My Learning and Planning Ahead

Reflection is also presented as a core feature of project-based learning and teachers produce units that include frequent opportunities for student reflection.

Collaboration

Intel Education Teachers Engage is a global online community of educators that supports research-based best practices in effective use of technology, Project-Based Approaches, and assessment of 21st century skills. The site offers:

- Networking opportunities with expert educators worldwide;
- The ability to create a group to support your learning community with blogs, collaborative work space, and wikis all in one space; and
- Chances to participate in free webinars or host one for the community.

Content Knowledge

Participating teachers in the Essentials Course develop a project-based unit of instruction based upon material they are teaching, aligned to standards with multiple forms of student assessment. The goal is for each teacher to gain a foundation of skills to fully integrate technology into existing classroom curricula and promote student-centered learning.

Effectiveness Data

Evaluation findings from participants include (Light, 2007):

- "75% of respondents reported that they had used the unit plan they created during the workshop at least once with their students, if not more often."
- "77% of survey respondents reported that they had engaged students in new ICT-based activities (in addition to their unit plans) since the training, suggesting that the Essentials Course helps teachers use technology with students beyond just that one unit plan."
- "81.9% of respondents reported that they had used ICT more for their own lesson planning and preparation, suggesting that the course is introducing teachers to new professional resources."
- "58.6% of respondents reported that they had increased their use of project-based approaches with their students. "

Resources and References:

Light, Daniel, Wendy Martin, Vera Michalchik, and Willow Sussex. (2007). Evaluation Summary: Intel® Teach and Intel® Learn. Available from http://download.intel.com/education/EvidenceOfImpact/Evaluation_Summary.pdf .

Intel Teach Program US

http://www.intel.com/about/corporateresponsibility/education/programs/intelteach_us/index.htm

Intel Teach Evaluations, Case Studies, and Reports

<http://www.intel.com/about/corporateresponsibility/education/programs/evaluations/teach.htm>

TEACHING CHANNEL

BACKGROUND

The stated goal of Teaching Channel, a newly launched video showcase, to shine a spotlight on inspired K-12 teaching in America's public schools. There is a strong alignment with Common Core State Standards.

Teaching Channel is free and it offers:

1. Inspiring Techniques & Ideas: A video library of useful, inspiring classroom techniques and lesson ideas.
2. Community Sharing & Support: A growing community of dedicated teachers sharing best practices and classroom ideas.
3. Personal Workspace & Great Tools: Individuals can create their own personal workspace to store favorite ideas for later use and try out great tools like Teaching Channel Notes.

CORE QUALITIES OF oTPD CONSISTENT WITH DEEPER LEARNING

Relevance

The collection is searchable by subject, grade level, and or topic.

Reflection

There is also an interactive notes feature that allows viewers to timestamp a note that is embedded in the video. Notes are private, but can be shared with others.

Collaboration

Discussions are provided for channel members to bring their experience, knowledge, and vulnerabilities to the table, providing more valuable information and support than videos alone could ever offer.

Content Knowledge

At present, there are 40 videos on the site covering the subject areas of English Language Arts, Math and Science. Below is an example of a lesson that is available on the site:

Algebra Team: Overview of Teaching Styles grades 6-8, math, factoring

Common Core Standards: Math.MP.1, Math.A-SSE.3.a

<http://www.teachingchannel.org/videos/algebra-team-overview-of-teaching-styles>

Lesson Objective:

See a co-planned lesson unfold in two different classes (1 of 4) - Length: 10 min

Questions to Consider

- * How has the two teachers' collaboration impacted their algebra program?
- * How does the warm-up prepare students for the lesson?
- * How do students "tiger up" and learn that struggle is a good thing?

Potential Limitations

Many schools and businesses use a firewall to block access to YouTube.

Resources and References

<http://www.teachingchannel.org/>

APPENDIX B – TECHNOLOGY PROFILES

VOICETHREAD

VoiceThread is an online platform for posting and commenting on media. The site has been used by many teachers to post and share lesson plans, content, student work and videos of classroom practice. All of the VoiceThread K-12 Products use Ed.VoiceThread, our secure and accountable environment found at ed.voicethread.com.

A VoiceThread is a collaborative, multimedia slide show that holds images, documents, and videos and allows people to navigate slides and leave comments in five ways - using voice (with a mic or telephone), text, audio file, or video (via a webcam). Users can doodle while commenting, use multiple identities, and pick which comments are shown through moderation. VoiceThreads can even be embedded to show and receive comments on other websites and exported to MP3 players or DVDs to play as archival movies.

Core PD principles relevant to Deeper Learning: Relevance, Reflective Inquiry Process, and Collaboration

According to Atkinson and Burden, "Reflection and peer review were central design elements in the module structure and students were required to post both personal and public reflections around their learning and the artifacts we were using in each unit. Therefore we were conscious of the need to find an online tool that would enable asynchronous comments and feedback from students and tutors alike around pieces of media such as video clips, images and presentations. In VoiceThread we believe we have found a tool that meets most, if not all, of our requirements (Atkinson & Burden, 2008)."

In a Swedish case study that featured VoiceThread as a Web 2.0 technology, Gunnar Augustsso found that, "the results show that use of Web 2.0: a) supports students' reflections concerning their own and others' thoughts and emotions, b) supports individual students and integrates them into a work group, and c) develops students' identification and awareness in relation to self, a task and others."

Potential Limitations

Free accounts are limited to three VoiceThreads. Microphone (or telephone access) and sound card needed for effective commenting.

Cost

Per monthly fees range from free (Free) to \$59.95 (VoiceThread Pro). K-12 & Higher Education have multiple subscription paths and options.

Resources and References

Atkinson, Simon. Burden, Kevin. Evaluating pedagogical affordances of media sharing Web 2.0 technologies: A case study. Published in the proceedings of Ascilite, 2008 (Melbourne, Australia) . Retrieved 3/30/11 from:

http://hull.academia.edu/KevinBurden/Papers/73672/Evaluating_pedagogical_affordances_of_media_sharing_Web_2.0_technologies_A_case_study

Augustsso, G. Web 2.0, pedagogical support for reflexive and emotional social interaction among Swedish students. *The Internet and Higher Education*. Special Issue on Web 2.0. Volume 13, Issue 4, December 2010, Pages 197-205. Retrieved 3/30/11 from:

<http://dx.doi.org/10.1016/j.iheduc.2010.05.005>

<http://www.voicethread.com/>

GOOGLE PLUS

Google Plus (also Google+ or abbreviated as G+) is a social networking service launched in June 2011 in an invite-only "field testing" phase. The single most convenient thing about Google+ is that it automatically integrates with the other Google apps — such as Gmail, Picasa and Google Docs — that are already a wonderful resource for educators and introduces a set of new socially focused services: Circles, Hangouts, Sparks, and Huddles. The product will also be available as a desktop application and as a mobile application, but only on Android and iOS operating systems.

Core PD principles relevant to Deeper Learning: Relevance and Collaboration

According to John T. Spencer, Teacher and Blogger at Education Rethink, "Google Plus lets the users define relevance for themselves. Instead of being differentiated, it's truly personalized. Instead of offering choice, it offers freedom. I can sort by medium, by interest or by social communities."

Liz Dwyer, Education Editor at GOOD Education said, "I've written before about the healthy sharing of ideas among teachers on Twitter, and how educators are using it to engage introverted students in learning. But Twitter also has its disadvantages—namely, that it's not archived. Educators can have a great conversation about a topic, but once a day or two has gone by, those tweets are buried in a user's tweet stream. In comparison, Google+ will allow teachers (or students) to have discussions with each other without a 140-character limit. And if a user wants to access the discussion a couple months later, they'll be able to do so."

Jeremy Littau of Leigh University said, "As a teaching tool, Plus intrigues me. I'm already planning on holding Hangout office hours this fall for students, where they can get on and ask questions about class material. And because it's multi-user, others can hang out in the lounge and listen. Sometimes I go over the same stuff with multiple students in multiple meetings; this could streamline that process." He goes on to say, "The ability to share videos you can all watch at the same time is huge for me. I can initiate a Hangout with a student in my multimedia classes, watch one of the videos they make, and then go over it with them. Real time feedback similar to a paper conference."

Potential Limitations

One challenge with adopting Google+ at the K-12 level may be whether some school districts continue to block access to Google.

Cost

Free

Resources and References

"What Google Plus Could Teach Us About Education Reform"

By John T. Spencer, Teacher in Phoenix, AZ who blogs at Education Rethink.

<http://teachpaperless.blogspot.com/2011/07/what-google-plus-could-teach-us-about.html>

"Why Google+ Is an Education Game Changer"

By Liz Dwyer, Education Editor

<http://www.good.is/post/why-google-is-an-education-game-changer/>

"Why Lehigh (and every other) University needs to be on Gplus. Now."

By Jeremy Littau, Journalism Professor and Blogger

<http://www.jlittau.net/?p=1621>

TWITTER

Twitter is a social networking and microblogging service that allows users to broadcast short text messages 140 characters in length, called "tweets", to your friends, or "followers." The brevity of the tweet is a defining characteristic of the service, allowing informal collaboration and quick information sharing. Twittering is also a more open method of communication: you can share information with people that you wouldn't normally exchange email or IM messages with, opening up your circle of contacts to an ever-growing community of like-minded people.

Core PD principles relevant to Deeper Learning: Relevance and Collaboration

According to Liz Dwyer, Education Editor at GOOD Education, "Twitter has simply become one of the best places for teachers to collaborate, share solutions to common classroom problems, and discuss education policy." With Twitter, a teacher has access to wide variety of filtered insights. Dwyer notes, "Type the hashtag #edchat in the search box, and you'll see a real-time stream of discussion about an unlimited number of educational topics. It's pretty clear teachers are collaborating with each other by sharing solutions to their challenges—links to articles, resources and practical ideas..."

Many teachers build valuable personal learning networks through Twitter sharing what they are learning and asking for help when needed. And some just follow high-profile edubloggers or prominent experts in their field who share their insights from afar via Twitter. As one Oregon teacher states, "They are so connected. It's neat to be able to piggyback on that. Through them, my world is expanding greatly."

Another aspect of Twitter's current use has been how educators have embraced the technology for accessing the backchannel at educational events or conferences. Colleagues who are not present at live events can receive instant updates and links during a presentation. A presentation to room of 400 twitter-enabled educators (say at an ISTE event) is in effect being broadcasted, in snippets, to thousands of Twitter followers.

Potential Limitations

Many people use Twitter to broadcast personal information and a constant stream of updates, whether personal or professional, requires good filtering system.

Cost

Free

Resources and References

"Twittering, Not Frittering: Professional Development in 140 Characters"

By Suzie Boss, Edutopia Blogger

<http://www.edutopia.org/twitter-professional-development-technology-microbloggin>

"Twitter Is a Teacher's Best Tool"

By Liz Dwyer, Education Editor

<http://www.good.is/post/why-twitter-is-a-teacher-s-best-tool/>

Vicki Davis, a Georgia Teacher has over 22,000 Twitter followers

<http://twitter.com/#!/coolcatteacher>

<http://www.twitter.com>

VIDEO SHARING: YOUTUBE, VIMEO & TEACHERTUBE

Video Sharing: A video hosting service that allows individuals to upload video clips to an Internet website. The video host will then store the video on its server, and show the individual different types of code to allow others to view this video. The website, mainly used as the video hosting website, is usually called the video sharing website.

YouTube: individuals have uploaded Most of the content on YouTube, although media corporations including CBS, BBC, Vevo, Hulu, and other organizations offer some of their material via the site, as part of the YouTube partnership program. Videos that are considered to contain potentially offensive content are available only to registered users 18 years old and older.

Vimeo: does not allow commercial videos, gaming videos, pornography, or anything not created by the user to be hosted on the site.

TeacherTube: is designed to allow those in the educational industry, particularly teachers, to share educational resources such as video, audio, documents, photos, groups and blogs. The site contains a mixture of classroom teaching resources and others designed to aid teacher training.

Core PD principles relevant to Deeper Learning: Relevance, Reflective Inquiry Process, and Collaboration

According to Cyndi Danner-Kuhn, Education Technology Integration Coordinator for the Kansas State University College of Education, TeacherTube is,

"...always concerned about the safety and security.... As a result, they are now moderating 100% of all audio and video content uploaded to the site. That way, they can help ensure quality, copyright free podcasts, music instruction, song demos, audio teaching, and more

are available for our community of educators.

TeacherTube has tons of resource including a new section of Teacher resources. They have partnered with TeacherVision. Subject, grade and theme organize TeacherVision content. Theme pages feature cross-curricular lessons for every area of focus, making it simple for teachers to create a study unit that is inclusive and varied (Danner-Kuhn, 2011)."

Derrick Waddell, Instructional Technology Support Specialist for Cullman County Schools and Blogger,

"A friend and fellow educator, Nikki Robertson, is beginning a string of professional development activities for the staff at Auburn High School. When she posted the schedule on Twitter, I was interested in learning more about some of her chosen topics, so I asked if she was planning to do any recording or posting afterward. It opened up a conversation that has led to an exciting opportunity for educators and ed tech professionals in Alabama.

This week we will launch a YouTube channel for Alabama educators to post and watch tutorials and how-to videos pertaining to ed tech (Waddell, 2011)."

Potential Limitations

Some network administrators have banned YouTube and other video sharing sites on education networks citing reasons such as inappropriate usage of resources, excessive bandwidth usage, and security concerns.

Cost

Start out free, increased bandwidth and features with fee-based accounts.

Resources and References

http://en.wikipedia.org/wiki/Video_hosting_service

<http://en.wikipedia.org/wiki/Youtube>

<http://en.wikipedia.org/wiki/Vimeo>

<http://en.wikipedia.org/wiki/Teachertube>

"TeacherTube: A super resource for the classroom"

By Cyndi Danner-Kuhn, Education Technology Integration Coordinator for the Kansas State University College of Education

<http://www.technologybitsbytesnibbles.info/archives/4599>

"Guest Post By Derrick Waddell"

<http://educationrejuvenation.blogspot.com/2011/08/guest-post-by-derrick-waddell.html>

Alabama Educational Technology Professional Development YouTube Channel

<http://www.youtube.com/AlabamaEdTechPD>

PODCASTS

A podcast is a series of free digital media files (either audio or video) that are released in a series and can be subscribed to or downloaded as desired.

Core PD principles relevant to Deeper Learning: Relevance, Content Knowledge

Podcasts provide for a democracy of voice because they can be created by anyone and distributed wide through deep channels like iTunes or via a private website. A few examples of popular education podcasts that strive to support teacher learning are listed below.

Limitations:

Podcasts are an excellent way to disseminate provocative interviews or conversations. Because they take time to produce, and are a relatively passive learning experience, they are not likely to see major adoption in PD programs.

Cost:

Free

References and Resources:

The Education Podcast Network

<http://epnweb.org/>

Moving at the Speed of Creativity

<http://itunes.apple.com/podcast/moving-at-speed-creativity/id78007370>

ESL Teacher Talk

<http://www.eslteachertalk.com/>

BLOGS

A blog (a blend of the term web log) is a type of website or part of a website. Blogs are usually maintained by an individual with regular entries of commentary, descriptions of events, or other material such as graphics or video. Entries are commonly displayed in reverse-chronological order. Blog can also be used as a verb, meaning to maintain or add content to a blog.

Most blogs are interactive, allowing visitors to leave comments and even message each other via widgets on the blogs and it is this interactivity that distinguishes them from other static websites.

Many blogs provide commentary or news on a particular subject; others function as more personal online diaries. A typical blog combines text, images, and links to other blogs, Web pages, and other media related to its topic.

Core PD principles relevant to Deeper Learning: Relevance, Reflective Inquiry Process, and Collaboration

According to Karl Fisch, Director of Technology at Arapahoe High School in Centennial, CO, his blog was "...conceived as a blog to support our staff development effort.... In the beginning, the blog was simply a place to "continue the conversations" we had in staff development every two to three weeks, to extend the discussions beyond the time we had face to face. As the year progressed, I

started to post more to the blog about relevant educational issues, new technologies, and whatever else I thought might be related and thought-provoking for our teachers, even if it didn't directly relate to what we had just talked about in staff development."

Bianca Hewes, English teacher, author and blogger offers this vision for teacher professional development,

"Each teacher will be asked to create a driving question that relates directly to his/her specific [key learning area] KLA and technology. For example, 'How can bringing technology into the classroom help my students to be better writers?' (ENGLISH) or 'How can having access to the Internet in the classroom help my students become better researchers?' (HISTORY) or 'How can having access to a laptop help my students to understand the role of languages in the 21st century?' (LOTE) [Language(s) Other Than English]

The teachers will be given approximately 5 weeks to inquire into this problem, complete at least 5 blog posts on their findings (including posing questions relating to the driving question on social networking sites like Edmodo, Yammer, Twitter, Facebook), implement some of the new strategies developed in his/her classroom and then present on these findings to the whole teacher-body at a specified staff meeting. (Yes, the product is hypocritical – it is teacher-centered, but let's face it this is getting the ball-rolling, they are modeling inquiry-learning to other teachers, who hopefully will be inspired to take up their own projects!)."

Potential Limitations

It has massive benefits (following and contributing), yet blogging also requires a huge time commitment.

Cost

Free and hosted versions.

Resources and References

<http://en.wikipedia.org/wiki/Blog>

"About This Blog"

By Karl Fisch, Director of Technology at Arapahoe High School in Centennial, CO

<http://thefischbowl.blogspot.com/2006/06/about-this-blog.html>

"Teacher Professional Development – an inquiry approach"

By Bianca Hewes, Teacher and Blogger

<http://biancahewes.wordpress.com/2011/03/06/teacher-professional-development-an-inquiry-approach/>

Blogger: is a blog-publishing service that allows private or multi-user blogs with time-stamped entries. It was created by Pyra Labs, which was bought by Google in 2003.

<http://www.blogger.com/>

WordPress: is an open source blog tool and publishing platform powered by PHP and MySQL.

<http://www.wordpress.org>

WordPress.com: a hosted version of the open source package where you can start a blog in seconds without any technical knowledge. <http://www.wordpress.com>

Openess Manifesto

<http://www.connectedprincipals.com/archives/3225>

Teacher Blogs

<http://coolcatteacher.blogspot.com/>

<http://www.thethinkingstick.com/>

<http://budtheteacher.com/blog/>

Dan Meyer blogs at: <http://blog.mrmeyer.com>

Search for his "What can you do with this?" posts, and be sure to read the comments.

Frank Noschese blogs at Action/Reaction: <http://fnoschese.wordpress.com>

His latest hot topic is using Angry Birds in physics class.

<https://fnoschese.wordpress.com/2011/06/16/angry-birds-in-the-physics-classroom/>

RSS AND GOOGLE READER

RSS stands for "Really Simple Syndication" and is a standard for providing updates to web-based content. Web content providers use RSS to publish "feeds" to which readers can subscribe to blogs, podcasts, and news. RSS allows you to stay current with a lot of information easily. A popular tool to manage RSS feeds is Google Reader, which can aggregate all of your feeds (e.g.) in a single place. Google Reader can also collect the tweets with a specific hashtag, as well as track all of the great sites that people are saving to Diigo. Even Flickr photos and YouTube video searches can be subscribed to in Google Reader.

Core PD principles relevant to Deeper Learning: Relevance and Reflective Inquiry Process

Describing the benefits of RSS, Jo Alcock, an academic research librarian based in the West Midlands (UK) states, "I've been an avid user of RSS feeds for a number of years now, mainly using them to subscribe to library blogs. When I first started blogging in 2007 (and following other blogs before that), most of the library bloggers I could find were based in the US. RSS meant that I could read all about the innovative things they were doing at the libraries and I found it really inspiring."

According to blogger Will Richardson, "The principal of an elementary school in Portland, Oregon... is infusing Weblogs throughout his school. The Meriwether Lewis Elementary Web site [<http://lewiselementary.org/>] features the latest in news and events as collected from a series of separate Weblogs that are hooked together using RSS. Not only does this allow for the school's Web site to be a timely source of information, it allows a number of staff members to contribute in what is a more distributed content creation model: The music teacher keeps a log for music news, and PTA members contribute to their own site. [The principal] keeps his own Weblog for his personal messages to staff and the community."

Potential Limitations:

When one subscribes to a huge number of RSS feeds, one could easily end up spending hour's everyday just reading feeds. To avoid RSS overload, it's a good idea to focus one's consumption, not only for one's own learning but also for one's ability to model RSS to one's students and colleagues.

Cost

Free

Resources and References

"Thing 4 - Current awareness: RSS"

By, Jo Alcock, an Academic Research Librarian and Blogger from the UK

<http://joeyannecpd23.blogspot.com/2011/07/thing-4-current-awareness-rss.html>

"8 Useful Tips To Manage And Avoid RSS Overload"

By Abhijeet Mukherjee, Web Publisher an Blogger--Jeet Blog

<http://www.dumblittleman.com/2008/06/8-useful-tips-to-manage-and-avoid-rss.html>

"Blogging and RSS — The "What's It?" and "How To" of Powerful New Web Tools for Educators"

By Will Richardson, Educator and Blogger for Information Today, Inc.

<http://www.infotoday.com/MMSchools/jan04/richardson.shtml><http://en.wikipedia.org/wiki/Rss>**NING**

Ning essentially bundles several separate technologies into a single unified, hosted platform. The technologies include, a blog, wiki, forum, photo/video gallery, micro feed, events calendar, member management and more. Nings are a popular way for teachers to network with other teachers and share similar interests. Although they are no longer free, they are not expensive and provide easy-to-navigate online software that allows you to create a social network. Once created, it can be used as a platform for sharing best practices, documents, links, media, and connections.

Core PD principles relevant to Deeper Learning: Relevance, Reflective Inquiry Process, and Collaboration

Example Organizational Use

According to Matthew Martz, Principal, "Currently in our district, we use instructional coaches and teacher-led professional development. We are slowly gaining ground in building a virtual learning community for our district (see <http://saintjosephschools.ning.com>), and even expanding our learning opportunities throughout the world wide web through Twitter, blogging, Diigo, etc. I am interested in learning more about how I could use instructional rounds and how we as a district can create an expert video clip library in order to support teacher learning and growth."

Examples Discipline/Focus Use

English Companion (28,483 members): <http://englishcompanion.ning.com/>

Where English teaches go to help each other, to ask questions and get help. A community dedicated to helping teachers enjoy their work. "A cafe without walls or coffee: just friends."

Classroom 2.0 (58,126 members): <http://www.classroom20.com/>

A social network for those interested in Web 2.0 and Social Media in education. Participants are encouraged to participate in the great discussions, to receive event notifications, and to find and

connect with colleagues.

Potential Limitations

Can be rather disappointing, due to the sparse activity. Social communities need to be tended; member engagement is more than just social networking buzzwords. It's the difference between a successful Ning Network and a stale Web site.

Cost

Per monthly fees range from \$2.95 (for small groups) to \$59.95 (for large scale and custom sites)

Resources and References

"Effective Supervision"

By, Matthew Martz, Principal and Blogger on the Principal's Pen

<http://matthewmartz.edublogs.org/2011/07/16/effective-supervision/>

What Is Member Engagement?

<http://creators.ning.com/hc/memberengagement.php>

<http://www.ning.com/>

FACEBOOK

Facebook is a social networking service and website launched in February 2004. Users may create a personal profile, add other users as friends, and exchange messages, including automatic notifications when they update their profile. Facebook users must register before using the site. Additionally, users may join common-interest user groups, organized by workplace, school or college, or other characteristics.

Core PD principles relevant to Deeper Learning: Relevance and Collaboration

Comment on *EmergingEdTech* blog posted by Sheila Dymond, "Wow! Fascinating to read all about the technology I have dismissed as frivolous. I must rethink my views of FB! Never mind all the amazing technology available for my kids! I am really excited to begin teaching in our new IPREP technology magnet next year with all the info close at hand in a community that is so open and willing to share experiences with a stranger!"

PD Facebook Examples:

[Professional Development at the California Science Center](#)

[Professional Development Institute](#)

[Pro.T - Professional Development Conference for English Teachers](#)

[FableVision Professional Development](#)

Potential Limitations

The majority of the social networking accounts are blocked in corporate offices, schools, workplace and educational institutions. Also, when Facebook is used with students, it is important to set expectations for its use and a policy that discourages and sets consequences for derogatory references to the school or school organization and/or members of the school or organization.

Cost

Free

Resources and References

"Facebook In The Classroom. Seriously."

By K. Walsh, Blogger on *EmergingEdTech*

<http://www.emergingedtech.com/2011/03/facebook-in-the-classroom-seriously/>

"100 Ways You Should Be Using Facebook in Your Classroom"

Anonymous, Online College

<http://www.onlinecollege.org/2009/10/20/100-ways-you-should-be-using-facebook-in-your-classroom/>

Facebook in Education

A Facebook Page for information about how educators can best use Facebook.

Objective of this Page:

To serve as an ongoing resource for information about how educators can best use Facebook

<http://www.facebook.com/>

SKYPE

Skype is a software application that allows users to make voice and video calls and chats over the Internet. Calls to other users within the Skype service are free, while calls to both traditional landline telephones and mobile phones can be made for a fee using a debit-based user account system.

Core PD principles relevant to Deeper Learning: Relevance, Reflective Inquiry Process, and Collaboration

Jacqueline Botterill leads Skype's CSR (corporate/social responsibility) initiatives for Skype in Europe. Skype in the Classroom, which launched March 30th, 2010, is one of the company's first forays into the education sphere. "We created Skype in the Classroom to help like-minded teachers collaborate on projects and share resources. Skype can connect children globally for shared learning experiences and is low-cost and simple to use," she says. Since its launch over 12,000 teachers have signed up for Skype in the Classroom."

According to Steven Krasner, Professional Developer and Blogger, he has conducted numerous professional development sessions with educators across the country, but 2010 marked the first time he, "Wasn't physically in the room with the education professionals...."

[Via Skype] I was pleasantly surprised at how interactive we could be! The placement of the camera made it difficult for me to see everyone, but I could hear just fine and it was no problem from my end to offer them suggestions as to how they can motivate and "nudge" their students along the path to becoming independent and enthusiastic writers while still being able to integrate the curriculum and address any testing issues."

Potential Limitations

Some network administrators have banned Skype on corporate, government, home, and education networks, citing reasons such as inappropriate usage of resources, excessive bandwidth usage, and security concerns.

Cost

Free and Various Pricing Plans for Premium Services

Resources and References

"How the Internet is Revolutionizing Education"

By Courtney Boyd Myers, East Coast editor of TheNextWeb (TNW)

<http://thenextweb.com/insider/2011/05/14/how-the-internet-is-revolutionizing-education/>

"Professional Development Via Skype"

By Steven Krasner, Professional Developer and Blogger

<http://www.nudgingtheimagination.com/blog/2010/10/21/professional-development-via-skype.html>

Skype in the classroom

Skype in the classroom is a free community to help teachers everywhere use Skype to help their students learn. It's a place for teachers to connect with each other, find partner classes and share inspiration.

<http://education.skype.com/>

<http://www.skype.com/>

DELICIOUS

Delicious (formerly del.icio.us, pronounced "delicious") is a social bookmarking web service for storing, sharing, and discovering web bookmarks. The site was founded in 2003.

Delicious uses a non-hierarchical classification system in which users can tag each of their bookmarks with freely chosen index terms (generating a kind of folksonomy). A combined view of everyone's bookmarks with a given tag is available; for instance, the URL delicious.com/tag/wiki displays all of the most recent links tagged "wiki". Its collective nature makes it possible to view bookmarks added by other users.

Core PD principles relevant to Deeper Learning: Relevance and Collaboration

According to Julia Hengstler, Educational Technologist & Instructor, "While you can only see about 3 months of my tweets here <http://www.twitter.com/jhengstler>. You can see almost all the resources I've bookmarked since only early 2009 on the delicious page:

<http://delicious.com/jhengstler>. Twitter + Delicious became an unbeatable combination for me as I could share my found resources quickly in both Twitter & Delicious. In Twitter they would go out to my "followers" or be seen through the webpage. In Delicious, they could similarly be seen in the webpage, but people could also add me to their Delicious "network" to follow any resources I

posted--like a subscription."

Potential Limitations

The biggest Delicious flaw is not allowing spaces in keywords, where modern tagging systems such as Diigo and Google Bookmarks do. Additionally, some time ago, Yahoo bought Delicious and was set to close the service. A new company has purchased the service, but its future isn't certain.

Cost

Free

Resources and References

"Using Twitter (and Delicious) for Professional Collaboration, Development, and Instruction"

By Julia Hengstler, Educational Technologist & Instructor--Faculty of Education, Vancouver Island University

<http://shiftinglandscapes.pbworks.com/w/page/8818814/Using-Twitter-%28and-Delicious%29-for-Professional-Collaboration,-Development,-and-Instruction>

"Delicious to re-launch later this year"

By Martin Bryant, The Next Web's European Editor

<http://thenextweb.com/insider/2011/07/11/delicious-to-relaunch-later-this-year/>

<http://www.delicious.com/>

DIIGO

Diigo (pronounced /'di:goʊ/) is a social bookmarking website which allows signed-up users to bookmark and tag web pages. Additionally, it allows users to highlight any part of a webpage and attach sticky notes to specific highlights or to a whole page. These annotations can be kept private, shared with a group within Diigo or a special link forwarded to someone else. The name "Diigo" is an acronym from "Digest of Internet Information, Groups and Other stuff".

Core PD principles relevant to Deeper Learning: Relevance, Reflective Inquiry Process, and Collaboration

According to Keith Ozsvath, a self-professed techie and blogger, "When my middle school bands were participating in a Lewis & Clark Expedition Cross-Curricular Unit, I created a private group of bookmarked websites pertaining to the Lewis & Clark Expedition. I was able to share the private group with my 2 colleagues so we could collaborate using the same websites and resources that were bookmarked in the group. Commenting and tagging these links were also very useful for our planning."

Potential Limitations

It adds a toolbar to the top of your browser page--making it less convenient moving among computers. It is a new method for organizing bookmarks, which not every user will be comfortable with.

Cost

Free

Resources and References

"Using Twitter (and Delicious) for Professional Collaboration, Development, and Instruction"

By Keith Ozsvath, Teacher, Professional Developer, & Blogger

<http://teacherchallenge.edublogs.org/2011/07/12/pln-challenge-7-using-diigo-as-part-of-your-pln/>

Diigo Educator Accounts

<http://www.diigo.com/education>

<http://www.diigo.com/>

TINYCHAT

Tinychat is an Internet chat service that allows users to communicate via instant messaging, voice and video chat. It offers thousands of chat rooms and the ability for users to create their own virtual chat room on any topic and category. Tinychat is a web-based system that also works on some smartphones. The chat rooms can contain a rolling maximum of 12 video feeds and dozens of audio feeds at the same time. One can be in several such rooms at the same time.

Core PD principles relevant to Deeper Learning: Collaboration

Teacher PD programs can provide learners a synchronous collaboration space (video chat rooms) by simply embedding Tinychat on their native website.

Cost

Free

Resources and References:

<http://tinychat.com/>

PBWORKS

PBworks hosts over 300,000 educational workspaces, and has helped transform teaching and learning for millions of students, parents and teachers. It is a commercial real-time collaborative editing (RTCE) system. Users can independently set notification via starred pages. Sites also feature a sidebar workspace navigator, and a simple mechanism for sharing page links with others.

Core PD principles relevant to Deeper Learning: Relevance, Reflective Inquiry Process, and Collaboration

According to Sharon Grimes of the Baltimore County Public School, "The wiki, Teaching Thoughtful Learners, that the PBworks staff cloned for all 172 schools is helping us deliver instruction that is rigorous, relevant, and consistent across the district; in addition, it is an essential tool in helping us

build students' 21st Century Literacies."

Brenda White, Technology Integration Coordinator, Katy Independent School District talked about how their LEA used PBworks, "We are a fast growth district employing 3,916 teachers. Curriculum specialist find it harder and harder to meet face to face with their content specific teachers. Curriculum specialists have developed workspaces to keep their teachers informed of the latest updates, provide instructional resources, and provide a place for teachers to collaborate. Teachers access the workspace to collaborate on ideas, lesson plans, and different instructional strategies that are effective within the content they teach."

Potential Limitations

Though users can comment on pages, it lacks a discussion forum and a blog. The free version could be too limited for large academic settings.

Cost

Freemium basis: basic features being offered for free and more advanced features for a fee.

Resources and References

"Case Study: Baltimore County Public Schools"

Interview with Sharon Grimes of the Baltimore County Public School

<http://pbworks.com/content/casestudy-BCPS>

"Case Study: Katy Independent School District"

Interview with Brenda White, Technology Integration Coordinator, Katy Independent School District

<http://pbworks.com/content/casestudy-katysid>

Using PBworks in Education

http://pbworks.com/content/edu+overview?utm_campaign=nav-tracking&utm_source=Home%20navigation

<http://pbworks.com/>

GOOGLE APPS EDUCATION EDITION

Google Apps Education Edition provides email, sharable online calendars, instant messaging tools and a dedicated website to faculty, students and staff for free. There is no hardware or software to install or maintain, since everything is delivered through a standard web browser -- anytime, from anyplace.

Core PD principles relevant to Deeper Learning: Relevance and Collaboration

According to John Krouskoff, Director of Technology for Clarkstown Central School District, "Constructing lesson plans and unit plans is no longer a solitary activity. It's a collaborative process that's happening not only with teachers on a building level team, but with teachers at a grade level from a variety of schools. Our teaching is made better as a result of this collective intelligence."

Potential Limitations

It must be an organization wide decision to use the service as you either need to be admin or have access to the domain registry of your school or district.

Cost

Free

Resources and References

"Case Study: Clarkstown Central School District"

Interview with John Krouskoff, Director of Technology

<http://www.google.com/apps/intl/en/edu/schools.html>

Google Apps Education Edition

http://www.google.com/educators/p_apps.html

EDMODO

Edmodo is a free and secure social learning network for teachers, students and schools. It provides classrooms a safe and easy way to connect and collaborate, offering a real-time platform to exchange ideas, share content, and access homework, grades and school notices. Accessible online and from any mobile device via free smart phone applications, Edmodo has grown from a teacher tool into a district-wide resource as word of the free online service spreads through schools around the world.

Edmodo promotes anytime, anyplace learning. Functionally, it allows teachers to post messages, discuss classroom topics, assign and grade classwork, share content and materials, and network and exchange ideas with their peers.

Core PD principles relevant to Deeper Learning: Relevance, Reflective Inquiry Process, and Collaboration

According to Edmodo's blog, "The Maine Department of Education has selected Edmodo as the platform to share their results of their recent Open Education Resources research project with the education community. We think this will be a great opportunity to expose the Edmodo community to the wealth of high quality open resources, and hope you will join in the discussions in the communities (topic: Open Resources) and share the resources with your peers!"

"Edmodo was honored in the technology category, which focuses on technology tools and applications intended to help in instruction, management, assessment and professional development."

Potential Limitations

To use Edmodo effectively teachers need to set clear rules and expectations for their students about the use of and purpose of Edmodo. Otherwise it can result in just another medium for social interaction without constructive learning.

Cost

Free

Resources and References

"Maine Dept. of Ed: Open Education Resources Project"

http://blog.edmodo.com/2011/05/19/maine-dept-of-ed-open-education-resources-project/#disqus_thread

"Edmodo Honored with Distinguished Achievement Award"

<http://blog.edmodo.com/aepaward/>

Edmodo's Professional Development Community

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BLACKBOARD COLLABORATE

Blackboard Collaborate is web conferencing software used to create virtual classrooms and meeting spaces and offers opportunities for peer-to-peer learning and coaching-led help while involving learners on an individual level. The technology integrates with most learning management systems.

Web conferencing is a broad term used for technology tools that allow you to meet online through a network or on the Internet no matter what the location. The technology has a relatively long history in relationship to the Internet. Chat rooms, for example, are predecessors of today's Web conferencing. Web conferencing today has broad appeal in business as it allows you to:

- * Meet with others while being located in different locations—involving a handful to several hundred people.
- * Display online slide show presentations.
- * Interact with others online, using video, audio, and text.
- * Use an electronic whiteboard to visually display ideas.
- * Watch another user perform a task on his or her system as a learning exercise.
- * Take control of another user's system to walk them through correct procedures for completing a task on their system.

Core PD principles relevant to Deeper Learning: Relevance, Reflective Inquiry Process, and Collaboration

Discussing professional development via web conferencing, Bradley Mitchell, Office of eLearning LMS Technical Support and Training Manager, South Carolina State Department of Education said, "we can conduct the trainings basically same way we did them face-to-face. A lot of other offices are using Blackboard Collaborate in similar ways. So instead of conducting a training in which state trainers went to into a school to meet with the principals or teachers, now, because we're unable to provide reimbursements, we simply offer online sessions with administrators from the school districts rather than travel."

Potential Limitations

Bandwidth is a significant issue when you have people connecting to the Internet or a network at

speeds of 56 Kbps or less. You can successfully use Web conferencing with low bandwidth if you limit the types of features you use.

Cost

Fee-based normally on size of institution.

Resources and References

"Web conferencing can lower cost of training"

By Lauri Elliott, writer for TechRepublic

<http://www.techrepublic.com/article/web-conferencing-can-lower-cost-of-training/1040337>

"South Carolina Saves Money and Improves Student Success via Blackboard Collaborate: A Case Study" By Matt Wasowski, Blackboard Collaborate

<http://www.blackboard.com/Platforms/Collaborate/Client-Stories/Case-Studies.aspx#panel5>

<http://www.blackboard.com/Platforms/Collaborate/overview.aspx>

SLIDESHARE

SlideShare is an online slide hosting service. Users can upload files in the following file formats: PowerPoint, PDF, Keynote or OpenOffice presentations. Slide decks can then be viewed on the site itself and embedded on other sites. SlideShare also supports documents, PDFs, videos and webinars.

SlideShare features a vibrant professional and educational community that regularly comments, favorites and downloads content. Content hosted on the site spreads through blogs and social networks such as LinkedIn, Facebook and Twitter. Individuals & organizations upload documents to SlideShare to share ideas, conduct research, connect with others, and generate leads for their businesses. Anyone can view presentations & documents on topics that interest them, download them and reuse or remix for their own work.

Core PD principles relevant to Deeper Learning: Relevance and Collaboration

Potential Limitations

With the free account, files cannot be larger than 100 MB and there are no sharing or privacy options.

Cost

Free with fee-based Pro accounts offering additional features.

Resources and References

<http://www.slideshare.net>

REFERENCES

- Campus Technology, (2011). Quo Vadis, LMS? Trends, Predictions, Commentary. <http://campustechnology.com/Articles/2011/07/01/Quo-Vadis-LMS-Trends-Predictions-Commentary.aspx>
- Carney, K., (2011). Think Outside the Book. *Learning & Leading with Technology*, Volume 39 Issue 1, 10-14. Retrieved August 6, 2011, from http://www.learningandleading-digital.com/learning_leading/201108?pg=4#pg12
- Cormier, D., (2009). Presenting with Live Slides, Dave's Educational Blog, November 6, 2009. Accessed at <http://davecormier.com/edblog/2009/11/06/presenting-with-live-slides-oer-literacies-libraries-and-the-future-pres0/> on June 10, 2011.
- Cormier, D. & Siemens, G., (2010). Through the Open Door: Open Courses as Research, Learning, and Engagement, *Educause, Review*, vol. 45, no. 4: 30-39. <http://www.educause.edu/EDUCAUSE+Review/EDUCAUSEReviewMagazineVolume45/ThroughtheOpenDoorOpenCourses/209320>
- Darling-Hammond, L., Wei, R., Andree, A., Richardson, N., & Orphanos, S., (2009). Professional Learning in the Learning Profession: A Status Report on Teacher Development in the U.S. and Abroad. National Staff Development Council.
- Downes, S., (2010). A World to Change, Huffington Post. Posted on October 18, 2010
- Ellis, R., (2009). A Field Guide to Learning Management Systems, *Learning Circuits*.
- Feldstein, M., (2010). Instructure Canvas: A New LMS Entrant, e-literate. Posted on June 30, 2010 <http://mfeldstein.com/instructure-canvas-a-new-lms-entrant/?utm>
- Feldstein, M., (2011). Instructure Goes Open Source, e-literate. Posted on February 1, 2011 <http://mfeldstein.com/instructure-goes-open-source/>
- Fera, R., (2011). Ken Robinson On The Principles Of Creative Leadership, n.d., <http://www.fastcompany.com/1764044/ken-robinson-on-the-principles-of-creative-leadership>.
- Gewirtzman, L., (2011). Personal communication, July 10.
- Johnson, L., Adams, S., and Haywood, K., (2011). The NMC Horizon Report: 2011 K-12 Edition. Austin, Texas: The New Media Consortium.
- McLeod, S., (2011). What are educators' professional obligations to learn from social media channels? Big Think Blog. <http://bigthink.com/ideas/38964>

- Nielson Wire, (2009). Social Networking's New Global Footprint. <http://blog.nielson.com/nielsenwire/global/social-networking-new-global-footprint/>
- Nussbaum-Beach, S., (2011). Personal communication, July 16.
- OECD (2008). ["New Millennium Learners. Initial findings on the effects of digital technologies on school-age learners"](#), OECD/CERI International Conference "Learning in the 21st Century: Research, Innovation and Policy", May 15-16, Paris.
- Preston, M., (2010). Examining Student Thinking through Video Analysis Educational Technology, v50 n1 p23-27.
- Rich, P. & Hannafin, M., (2009). Video Annotation Tools, Technologies to Scaffold, Structure, and Transform Teacher, Reflection Journal of Teacher Education. <http://jte.sagepub.com/content/60/1/52.abstract>
- Rich, P., (2011). Personal communication, July 22.
- Richardson, W. & Mancabelli, R., (2011). Personal Learning Networks: Using the Power of Connections to Transform Education. Bloomington, IN: Solution Tree Press, 3.
- TEDxTalks. (2010b). Wesch, M., From knowledgeable to knowledge-able. [Video file]. Accessed at <http://www.youtube.com/watch?v=LeaAHv4UTI8> on June 24, 2011.
- TEDxTalks. (2010a). Wiley, D., [Video file]. Accessed at <http://www.youtube.com/watch?v=Rb0syrgsH6M> accessed on June 20, 2011.
- Truss, D., (2011). My Open Educator Manifesto. Connected Principals Blog. <http://www.connectedprincipals.com/archives/3225> accessed on May 17, 2011.
- U.S. Department of Education, Office of Educational Technology, (2010). Transforming American Education: Learning Powered by Technology, Washington, D.C.
- Wesch, M., (2011). An Anthropological Introduction to YouTube, presented at the Library of Congress, June 23rd 2008. http://www.youtube.com/watch?v=TPAO-lZ4_hU, accessed on June 25, 2011.
- Wiley, D., (2009). Openness and the Disaggregated Future of Higher Education Slideshare presentation. <http://www.slideshare.net/opencontent/openness-and-the-disaggregated-future-of-higher-education-presentation>, accessed on June 14, 2011.