



The Impact of Online Collaborative Learning on Educators and Classroom Practices

The Metiri Group

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The Movement Toward Collaborative Models of Professional Development

Over the past decade, expert opinion and design recommendations for teacher professional development have moved steadily away from traditional workshop models and toward models that involve various types of professional collaboration among teachers. Whether expressed as the peer coaching model in the 70's and 80's, Professional Development Schools in the 80's through the present, or current day professional learning communities, collaboration is increasingly central to emerging models for professional development.

Rigorous research on the impact of collaboration on teachers and teaching practices is just beginning to emerge. Literally no rigorous research is available directly linking collaborative professional development practices to improvements in student achievement or other student outcomes. That said, there are studies that suggest that collaboration, in combination with specific configurations of professional development, may result in increased student learning. For example, a longitudinal study of middle school science teachers researched the relationship between teacher participation in whole-school sustained, collaborative professional development and student achievement in science.¹ Results indicated that students of teachers in such long-term, whole school, collaborative professional development showed significant gains in science scores over students in schools without this type of professional development.

A second study involving collaboration through cognitive apprenticeship and technology demonstrated such promise. The Utah study demonstrated that students of teachers involved in collaboration through cognitive apprenticeship (constructivist coaching) that was facilitated online using Telepresence technologies, showed gain scores on content assignments that were significantly higher than a matched set of students with teachers receiving professional development in a face-to-face traditional mode. At pretest both groups were similar and students in each group answered less than 25% of the questions correctly. At posttest, the percentage of students who passed the test in the treatment group was 72% in comparison to 5% of the control group.² However, as the researchers noted, it was unclear how much of the gains can be attributed to the collaborative professional development and how much can be attributed to the direct online instruction of students in the treatment group by the expert (although the amount of instructional time with the expert was only 3 hours during the semester), which the control students did not receive.

Additional studies support a small, but compelling, evidence base supporting teacher collaboration. Studies have demonstrated that teacher collaboration can enhance teacher perceptions of professionalism and sense of efficacy. For example, a 1999 study compared teachers who worked as part of teaching teams with similar teachers working independently. It found that those working on teams reported higher levels of:

1. Skill variety in their work
2. Knowledge of students (their educational characteristics, history, and personal life circumstances)
3. Growth satisfaction
4. General satisfaction
5. Professional commitment
6. Work group helpfulness and effectiveness
7. Internal work motivation
8. Teacher efficacy³

This same study also looked at student perceptions of school climate factors and found that, in the classrooms of collaborating teachers, students were more satisfied with their relationships with other students and with safety and discipline.

A more recent quasi-experimental study⁴ of a middle school mathematics/science program, based on collaborative planning and teaching by teams of teachers, found that students in those team teaching classrooms significantly outperformed students in the classrooms of teachers teaching independently. In this study, however, it was impossible to separate the possible effects of the curriculum itself from those of teacher collaboration as a program element.

Collaboration in Online Environments

The research literature related to teacher collaboration in online environments is sparse and suffers from a problem common to virtually all literature on the use of technology in education: it is a moving target for which the velocity of that movement is increasing exponentially! With the advent of Web 2.0 technologies, the opportunities for Web-based collaboration and the diversity of the tools for supporting collaboration are increasing at a rate that seems to make the researchable platform of this week the historical reference of the following week. Just as studies began to appear for teacher use of traditional courseware platforms such as Blackboard or Moodle, teachers had moved on to platforms such as Wikispaces and Ning, which more closely mirror the type of interaction found in social networking sites such as Facebook and MySpace.

Serious research related to the impact of these new collaboration environments is also difficult because the exact nature of teacher collaboration within these environments is poorly understood.

Consider, for example the quasi-experimental design study conducted by researchers Hecht and Roberts,⁵ which compared the achievement and patterns of absences for ninth grade students assigned to one of three conditions related to teacher preparedness. Two of the groups were treatment groups, where teachers were organized into teaching

teams. Each team consisted of four cooperating teachers delivering instruction within a block schedule. Only one of the teams had enhanced access to technology, both at school and at home, and increased opportunities for support for collaboration through those technologies. A third group served as control and received the standard school curriculum delivered by teachers working independently. In this study, the students of teachers teaching in teams performed significantly better than students in the control in both quarterly course grades and in overall grade point average. Additionally, rates of both excused and unexcused absences were lower in team-teaching classrooms. However, access to collaborative technologies did not seem to provide an advantage. Students in classrooms of the treatment teachers who did not have access to collaborative technologies slightly outperformed those with access, though these differences were not statistically significant.

While additional rigorous research on the impact of collaboration on teaching and learning is needed, the lack of such research is not preventing the rapid adoption of new Web technologies in collaborative professional development. The remainder of this paper will describe the latest trends in online, collaborative teacher learning.

The groups were set up to be tied to teachers' instructional content areas and across each of the six district middle and high schools.

Analysis of Trends in Online Teacher Collaboration and Professional Development

Vignette: A Model of Teacher Online Professional Development

In the fall of 2008, all secondary teachers within the Winston School District were grouped into discipline-specific teams charged with implementing a project meant to support their continued professional learning, called "a lesson study" project.

The idea was to form a community of support for teachers who had found a particular lesson plan wasn't working with their students. The goal was for teachers to work within shared-interest groups to "study their lesson plans," and develop newly revised lesson plans, or "researched lessons," when something they were doing in the classroom wasn't working. The groups were set up to be tied to teachers' instructional content areas and across each of the six district middle and high schools. Teachers were charged with devising alternative lesson plans based on their own research, and then discussing the results with, and getting feedback from, their peers. Requirements for the work specified the number of times teacher-groups were to gather to identify learning goals, design the research for the lessons, discuss progress and emerging questions, and debrief. Further, each teacher would be observed, and data would be collected, documenting how students progressed as a result of the revised, researched lesson.

Teachers were encouraged to use whatever technologies or online environments they deemed most useful to advance their work, their collaboration, and the process of collecting and disseminating data. The English department chair at Eastern High School was inspired by a colleague's work in Ning, a social networking site. The colleague had set up a community called Classroom 2.0, which supported the work of teachers who actively integrated emerging technologies into their teaching. The English department chair created a Ning community to support the work of the English teacher-groups. Once they added themselves to the community, teachers worked within Ning to post their lesson ideas, share and receive feedback on their work, post artifacts of student work, and accomplish a portion of the discussion and feedback that would have regularly been conducted in face-to-face meetings.

The participants in this teacher-group actively engaged in the project, attributing a great deal of their success to the ways in which the online environment supported their discussion, inquiry, and reporting of progress through data sharing and writing.

Initial group meetings were face to face both in an attempt to move teachers into the stage of forming their research practices and to establish the relationships needed to support the eventual online discussion and feedback. All teachers shared drafts of their revised, researched lessons for early feedback. Early participation required “low threshold” practices/skills of logging on, opening a thread, posting/attaching a document, and responding in comment fields. Within the first month, a group of ninth and tenth grade teachers began additional discussions online. They worked across schools to share resources, discuss a compelling article from a professional journal, and promote some of their students’ work through links to the school newspaper or a class wiki. As one participant explained, “This became a place to think about our teaching, and where I cared as much about what I created as what I was able to share through posts to others.”

Though early observations of the researched lessons were face to face, some participants used the growing online community to help critically consider and discuss other lessons. In these instances, teachers would post video of a segment of class, ask a critical question, and use the feedback gained to revise their teaching within later class periods in the instructional day. The technical skills needed for this work could have stretched outside of the context of the Ning, if it had required that teachers shoot and edit their videos before posting. However, as the goal was to post a rough-video that provided just enough context and content to trigger a helpful response, most were shot using a cell phone or flip video camera, allowing for sharing a raw, real-time video as opposed to something polished.

The participants in this teacher-group actively engaged in the project, attributing a great deal of their success to the ways in which the online environment supported their discussion, inquiry, and reporting of progress through data sharing and writing. The degree of reflective practice required in the tasks was challenging, as it opened teachers’ classrooms, practice, and pedagogical beliefs to a significant degree of scrutiny. However, the online environment allowed for a bridging of both the physical and emotional distance. As one teacher put it, it created “a place that was open, transparent, and where I was held as accountable for being real about my teaching and learning as I was for pushing my colleagues. I grew a new kind of teaching voice, able to revise, take time, and think for the community and for my students.” Where this was a task required for one school year, all of the teacher participants in this group continued to be active members of their group Ning for the three months following the close of the project. Further, the group expects to invite participation from colleagues in other districts in future months, explaining that expanding their community would help to broaden the perspectives shared, resources created and linked, and questions asked.

Affordances of Web 2.0 Spaces

Web 2.0 technologies open new possibilities for content creation, participation, and social engagement.⁶⁷ As Weigel and colleagues argue, “Digital media allow for nearly ubiquitous access to people and to virtually infinite amounts of information, as well as new forms of sociality, play, creativity, social activism, networking and collaboration.”⁶⁸ Of particular importance to our discussion of online teacher professional learning communities are four aspects of Web 2.0, and digital tools and learning spaces: Access to authentic, often global audiences; multimodal means of communicating meaning and knowledge; feedback that is expert and often immediate; and opportunities for identity development and self-presentation.

As in any learning space, diversity of ideas, experience, and perspective are resources for a community.

Ranging from social networks to social bookmarking to content creation/collaborative knowledge development, Web 2.0 environments invite participation. The participation spaces offer a low barrier to content creation and sharing; opportunities for involvement within an interest-driven participatory network; and the fostering of responsibility for contributions and responses.⁹ As such, new opportunities exist for creativity, participation and production, all within communities that are global and marked by participant interest and commitment. As in any learning space, diversity of ideas, experience, and perspective are resources for a community. These qualities play a significant role in online professional learning communities, as participants are not limited by geographical place or boundaries. In Web 2.0 spaces, professionals participate in global communities that align with their interests; respond to their creative, expressive or intellectual texts; aid in collaborative problem solving; help in sharing story and point of view; or allow them to move into collective action.^{10,11}

New technologies create challenges to communicate through a variety of modes and media. Artifacts of practice and participation include: images posted and shared in sites like Flickr, which bring together creative and communal practices; audio tied to RSS feeds, which push content through aggregators or podcatchers such as iTunes; and video shared through sites that allow for electronic invitations, group subscriptions, and features that allow communities to create, share, and track the work of others in the same field. Knowledge is expressed through a variety of modes, and content is shared in an attempt to advance what is known.¹² Literacy is social, multimodal, and multimedial.^{13,14}

Just as important as the space created by Web 2.0 tools for communities to gather, is the capacity for participants to engage and interact in ways that advance learning and knowledge. Participatory media provide mechanisms for feedback and exchange through rankings, critiques, comments, etc. Further, as explained by Ito and colleagues, "The [community] context is one of peer-based reciprocity, where participants can gain status and reputation but do not hold evaluative authority over one another."¹⁵ Jenkins states that social connection includes "caring what other people think about what one has created"¹⁶ as well as a drive to engage and participate within a networked public. Such feedback and engagement results in what Chavez and Soep refer to as "pedagogy of collegiality."¹⁷

The work of engaging with and creating online content inside of an invested community of learners leads to the development of expertise and an identity within that group. In research on the formation and participation of youth online communities, Boyd identifies four qualities of online participation and identity-making that differ from what we experience in face-to-face communities:

1. Persistence (i.e., electronic text has an infinite shelf-life)
2. Searchability (i.e., we search text for specific names, terms, etc.)
3. Replicability (i.e., we can easily edit, change, or re-post others' work)
4. Invisible Audience (i.e., anyone could be reading our work at any time, whether or not the original context was maintained)¹⁸

Developing an online identity requires a sense of how digital content works (and lasts), how information might be used, and the norms and practices of the community.

Teachers' Online Learning

Online professional learning communities for educators provide opportunities for teachers to leverage the capacities of Web 2.0 tools to engage in on-demand learning, access a network of invested professionals with shared interests, and, often, to practice media literacy skills that transfer into classroom pedagogy.^{19,20} Community of practice models bring together the affordances of Web 2.0 tools with frameworks for teacher learning. These models can range from completely online to blended, and are designed to provide teachers with opportunities for collaborative learning, construction of collective understandings of instructional practices, and opportunities for reflection in dialogue with colleagues.²¹ Further, effective models require attention to qualities not regularly instanced in face-to-face, traditional professional development: interest-driven participation rooted in discipline-specific knowledge, authentic inquiry and action, sustained dialogue, and identity development within affinity groups.

By definition, a community of practice is a “persistent, sustained social network of individuals who share and develop an overlapping knowledge base, set of beliefs, values, history, and experiences focused on a common practice and/or mutual enterprise.”²² Some of the goals of participation are to foster experimentation, learning, and reflection. Learning happens not through the process of a leader transmitting information to the group, but through interactions where the individual is transformed by the group,²³ while his/her participation and contributions work to transform the group. Knowledge and expertise are distributed and dialogue sustained, rather than the traditional model of professional development offering experiences that are often fragmented, decontextualized, and/or thin.

Teacher professional learning communities are marked by a sense of communal responsibility for norm setting but, more importantly, by a willingness of the whole to assume responsibility for each others' growth and development.²⁴ In a review of the technologies used within online communities meant to foster teachers' reflective discourse, Zhao and Rop identified several key requirements:

1. Low threshold for teacher use of the technology
2. Scaffolds supporting authentic participation and engagement
3. Intersection between teacher learning needs and his/her available time
4. Less of a focus on a tangible product as an outcome and more focus on supporting teacher dialogue²⁵

Baek also found the need to regularly address state-mandated standards given the escalating pressure for teachers' time to be tied to pupil performance on state assessments.²⁶ As within face-to-face professional development, a teacher's practice is most effective when grounded in reflection, inquiry, and action, with work directly related to the teacher's work and students' learning.

Recent research investigating teachers' motivation for participation or action within online communities emphasizes the importance of teachers' sense of belonging.^{27,28} Further, Hew and Hara found that teachers' participation was engaged by collectivism, reciprocity, personal gain, and altruism.²⁹

Models of Practice

Given the lack of a substantial research base in the area of the impact of online communities of practice for teacher professional development and the lack of sustained or scaled models, Looi and colleagues offered the following design tenets meant to guide the design of future models:

1. Foreground practice (i.e., situate focus on real and immediate problems specific to teachers' context and content)
2. Understand and capitalize on existing social networks (i.e., support local communities of practice rather than creating in isolation)
3. Incorporate tasks requiring collaboration and peer mentoring
4. Lead and mentor practice (i.e., provide models of participation)
5. Balance and leverage on designers and users (i.e., involve participants in the design, formation, and scaling up of the community)³⁰

These same tenets provide a useful framework for examining existing models of practice, some of which have sustained over time, and others of which have emerged with newly developed online social learning tools.

Teacher Focus

Teacher Focus is an online discussion forum developed in 2001 meant to support teacher dialogue within multiple moderated discussion boards. Postings are regularly multimodal as teachers post pictures, link to videos of practice, etc. Further, a repository of resources and lesson plans is made available through tabs separate from the forum space. Participation in this environment is self-selected, and, as of June 2009, there were over 6600 registered members and a total of 43564 posts.

Communities of Practice Using *Tapped In*

Developed by a group of researchers at the Stanford Research Labs (SRI), *Tapped In* is a multiuser environment in which educators and professionals meet in virtual rooms, offices, and meeting spaces. With over 60,000 members, *Tapped In* was designed to support a community of practice model, envisioning "self-reproducing, emergent and evolving entities that frequently extend beyond formal organizational structures."³¹ Each space offers a range of communication tools from whiteboards, to chats, to file cabinets for sharing materials and resources. Where *Tapped In* supports multiple communities of practice, collaboration with the Milwaukee Public Schools supports over 600 teachers' professional reflections, posts, and artifacts of practice as scaffolded by district goals and curriculum developers.³²

BEST (Beginning and Establishing Successful Teachers)

Built from both an existing community of teachers (cohorts enrolled in preparation courses at the University of Wollongong, New South Wales, Australia) and an existing learning management system, the *Beginning and Establishing Successful Teachers (BEST)* community of practice offers induction year support for program graduates. As Herrington and colleagues explain, "Identifying, discussing and reflecting upon issues, and accessing and building recourses relevant to the issues, are seen as the main authentic activities within this online community...as manifest in the interactions, collaborations, and responses provided by the participants themselves as they use the site to solve problems and ameliorate concerns."³³

Teachers' growth can be seen in the development of new curricular materials, new pedagogical strategies, and an evident change in beliefs.

The tool interface uses the metaphor of a virtual café, “meant to represent the type of friendly, inviting environment where teachers might meet with a more experienced friend or mentor to discuss the problems and issues they have in their new job.”³⁴ Each participant is assigned a mentor, and is also supported through the work of other community members who are either in their first years or who participated in the community when beginning their careers. Participants are provided with access to a blogging tool for documenting and sharing their insights, questions, and artifacts of practice. Further, lesson plans and curricular resources are linked and provided by both participants and the state. Where research is ongoing, the intent of the site is to “deliver collaborative support and professional development in an attempt to remove the sense of professional isolation felt so acutely by many novice teachers.”³⁵

Teacher Communities within Second Life

The online virtual world *Second Life* (www.secondlife.com) has been used to construct learning spaces (often using the constructs of a building, an environment, objects, etc.) to support teacher learning. The International Society for Technology in Education supports a community of over 4000 registered K-12 educators through speakers’ series, weekly events, socials, virtual conference sessions, and other events. Additional robust teacher learning communities in *Second Life* include the *Google Teacher Academy*, *Virtual Pioneers* (a space for secondary history teachers), and multiple spaces supporting the work of library/media specialists.

Teacher Reciprocal Peer Coaching through Social Digital Technologies

As seen in the earlier example, multiple teacher communities are creating their own social networks (i.e., supported by Ning.com or other virtual environments) to support their learning, share resources, discuss classroom artifacts of practice, etc. An active example emerged in late 2008 when secondary English teachers from across the U.S. began to meet, populate, and engage within the *English Companion Ning*, an online community started by Jim Burke and other writer/practitioner English teachers in the field. Within six months, several thousand English teachers at all stages of their careers (i.e., pre-service, practicing, retirees) had joined the community. Participation is entirely self-selected but ranges from “lurking” (i.e., reading the posts and content posted by other community members but not actively posting), to leading discussions of current professional texts.

The secondary English education program at Virginia Tech has built on this framework, creating induction year and pre-service support through a Ning community. Cohort members take their participation further by posting video of their teaching for community feedback and response. Here, the traditional model of teacher peer coaching for professional development is taken in a more immediately responsive direction as observations can occur when teachers self-select a moment from their teaching to record and post for feedback. Further, subsequent videos demonstrating practice adjusted in response to feedback received were posted by every cohort member; none of whom were working under a prompt or requirement.³⁶

Self-Generated Teacher Resource Groups

Social media are, by definition, social spaces in which participants gather, question, discuss, explore, etc. There are multiple instances of formal learning environments (i.e., *Tapped In*) or structures (i.e., graduate programs utilizing Ning), which support teacher practice and collaborative learning. In several of these, communities have grown in spaces where teachers previously worked as individuals to support, capture, and spur their own learning. Many of these tools serve dual functions: On one hand, they are useful

in supporting individual work or productivity, and, on the other, they support additional functions through the networks of users that can be brought together. For example, the social bookmarking tool *Delicious* can be used simply to collect and organize a user's bookmarks across workstations. However, the user is also supported to connect and interact with others who have shared interests (as revealed through their use of tags, notes, similar sites, etc.). Informal communities of teachers have developed communities and networks of practice using the connective facets of social media including twitter, *GoodReads*, and *diigo*. Where some are organized around content areas (i.e., English teachers), others have developed around texts, curriculum, and even state/local standards.

Issues and Challenges

As Web 2.0 technologies and social media are, especially in K-12 contexts, “new” or emerging environments and spaces, supporting teachers' professional development through online communities can require navigating obstacles that are both continual (i.e., requiring sustained attention) and foundational. Many of the technologies which demonstrate the most promise in bringing together, fostering, and sustaining collaborative communities of practice are blocked by the content filters in place on school networks.³⁷ Beginning this work requires, at a minimum, teachers' access to emerging tools.

The metric of “success” used to determine the impact of teachers' professional learning, whether online or offline, is an evident change in pedagogy and instructional practice. While difficult to assess, working through collaborative online communities often supports a transparency in pedagogy leading teachers to post and share lessons, examples of practice, samples of student work, etc. As Fullan argues, teachers' growth can be seen in the development of new curricular materials, new pedagogical strategies, and an evident change in beliefs. The challenge in this work is steeped in the design of and practice within the online community rather than the toolset needed to support learning and engagement in online communities of practice. Many of these are low threshold, frictionless tools. That said, new tools make new interactions possible, while supporting a high degree of transparency and reflection around practice. It is therefore expected that teachers' learning would demonstrate subsequent gains in pupil understanding as a result of their newly revised, and enriched practice.

Conclusions

While the literature on teacher collaboration in online environments is in its infancy, early results are quite promising. But even this meager evidence base seems to allow for some conclusions, though these conclusions need support from future research.

First, while the direct link between online teacher collaboration and student achievement is tenuous, the effect of collaboration on teacher variables such as professional efficacy, job satisfaction and access to research and new practices seems firm. With the explosion of collaborative technologies through Web 2.0, there is also compelling evidence that these technologies are related to an acceleration in the distribution and adoption of many positive, research-based practices in ways that are almost assuredly causing these practices to be propagated at rates unimaginable even a few years ago. Finally with the rate of technological innovation growing exponentially, it is likely that the most powerful environments for professional collaboration are yet to come.

The literature is clear in advocating for teacher professional learning that is situated in authentic groups, tasked with real outcomes, which provides the professional time needed to learn, collaborate, discover, and reflect. In other words, moving the space of interaction to a virtual environment presents new opportunities that still require our continued attention to lessons learned when working with teachers in face-to-face contexts.

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