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Learning Partnerships among Educators Enabled by Technology

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This is the second of three think pieces written for Ontario school and system leaders to profile key international research findings on teaching and learning for deeper learning, enabled by technology. This think piece addresses one of four areas of focus for the Technology and Learning Fund: develop learning partnerships enabled by technology, in addition to face-to-face professional learning.

In its landmark report *Education for Life and Work in the 21st Century*, the U.S. National Research Council (2012) described "deeper learning" as an instructional approach important in preparing students with sophisticated cognitive, intrapersonal, and interpersonal skills. Modern digital tools and media now enable the use of deeper learning strategies in schools (Dede, 2014), including:

- **Connected learning** encourages students to confront challenges and pursue opportunities that exist outside of their classrooms and campuses (Ito et al, 2013);
- **Case-based learning** helps students master abstract principles and skills through the analysis of real-world situations;
- **Interdisciplinary studies** help students see how differing fields can complement each other, offering a richer perspective on the world than any single discipline can provide;
- **Collaborative learning** enables a team to combine its knowledge and skills in making sense of a complex phenomenon;
- **Apprenticeships** involve working with a mentor who has a specific real-world role and, over time, enables mastery of their knowledge and skills; and
- **Learning for transfer** emphasizes that the measure of mastery is application in life rather than simply in the classroom.

Teachers can simultaneously use all these strategies by developing instructional partnerships with people outside of school (e.g. parents, community members) who can play educational roles as mentors, coaches, and tutors about complex real-world problems. In schools, educators then can add learning partnerships that emphasize students and teachers working together to understand and act on these problems in ways that are authentic to the tasks adults perform for problem-solving, but appropriately simplified to reflect learners' developmental level, knowledge, and skills.

Combined, these instructional strategies and partnerships entail very different teaching methods than the familiar, lecture-based forms of instruction characteristic of industrial-era schooling, with its one-size-fits-all processing of students and

learning confined to the school-day and the school-place. The digital tools, media, and experiences that enable deeper learning for students can also provide learning partnerships among educators, including people in students' lives who play mentoring and coaching roles.

Ultimately, the effectiveness of a technology-enhanced model of deeper learning depends on the quality of the educators involved. The innovation is not technology, but instead the empowerment of human performance through deeper learning changing the ways education is structured and delivered. The teacher learning process should mirror the deeper learning process of students: Teachers conduct active inquiry into pedagogy about effective teaching & learning, grounded in problems of practice and contributing to professional knowledge building. This provides a means to "de-privatize practice," providing guidance and support through sharing among communities of teachers.

This type of mutually collaborative inquiry is better than traditional professional development approaches based on transmitting information because teachers not only learn new skills, but also "unlearn" almost unconscious beliefs, assumptions, and values about the nature of teaching, learning, and schooling. In addition to mastering the intellectual/technical dimensions involved, professional development that requires unlearning necessitates high levels of emotional/social support from colleagues.

A research agenda for improving teacher professional development via technology is described in Dede, Ketelhut, Whitehouse, Breit, and McCloskey (2009). The U.S. National Educational Technology Plan discusses the importance of studies on teacher collaboration and peer learning (U.S. DoEd, 2010, pg. 46):

> *More than two decades of research has demonstrated the importance of collaboration among teachers. When teachers make their work public and examine each other's work, the quality of their practice and student outcomes improve (Lieberman and Pointer Mace 2010). Social networking technology provides a platform for making teachers' work public, with opportunities for both local and global communities of practice.*

As an example of this strategy for professional learning in Ontario, a number of school districts, including Simcoe County DSB, are participating in the Fullan/ Pearson international study & professional learning community examining New Pedagogies for Deep Learning (http://www.newpedagogies.info/).

The need for professional development that is tailored to teachers' busy schedules, that draws on valuable resources not available locally, and that provides work-embedded support has stimulated the creation of online and blended teacher professional development programs. Generally, these programs are available to teachers at their convenience and provide just-in-time assistance. In addition, they often give schools access to experts and archival resources that fiscal and logistical constraints would otherwise limit. A range of objectives for educational improvement underlie these online teacher professional development ventures, such as introducing new curricula, altering teachers' beliefs and instructional and assessment practices, changing school organization and culture, and enhancing relationships between school and community.

Exemplary Models of Online and Blended Teacher Professional Learning

Many powerful models for online and blended teacher professional development are available (Dede, 2006; Eisenkraft & Dede, in preparation). As one example, in the *Talk Science* professional development project, teachers learn to support strategic and purposeful classroom discussions in which students build coherent lines of reasoning based on their own ideas (TERC, 2013). The professional development program is comprised of eight sessions that take place over a three-month period as participating teachers teach the *Inquiry Curriculum*, which engages students in grades 3–5 in science inquiry about the nature of matter (http://inquiryproject.terc.edu). The video-rich materials help teachers to learn more about the science concepts they teach, the ideas children are likely to have about those concepts, and discussion strategies that will help students progress toward scientific understanding.

Four types of videos serve as the cornerstone of the web-based PD model: Classroom Cases, Scientist Cases, Talking Points, and Talk Strategies. The *classroom cases* provide video examples of productive discussions; delineate four types of discussions, and provide opportunity for teachers to study discussions in action in the context of an authentic setting – the curriculum they teach. The scientist cases provide interviews with seven academic scientists, each working in an area of physical science (physics, materials science, geology), as they engage in investigations from the *Inquiry Curriculum*. The *talking points* explain the goals of productive talk, the rationale for establishing shared classroom norms, and how to establish a culture of productive talk in the classroom. The *talk strategies* introduce nine specific talk moves to help teachers lead productive science discussions.

In *Talk Science*, professional learning is situated in virtual contexts with experts, in face-to-face social contexts of their classrooms and study group meetings with colleagues, and with the support of technological tools. The program supports teachers in: 1) understanding science; 2) setting a clear goal, structure, and outcome for each discussion; 3) attending to, eliciting, and anticipating the range of ideas held by learners; and 4) establishing a culture of productive talk in the classroom and using a set of strategies that keeps every discussion moving forward toward greater understanding. While *Talk Science* is about science talk, this video-based model for professional learning is applicable to many types of teacher learning. The program is freely available on the web for schools and districts to use in enhancing elementary level teachers' professional skills in classroom discourse.

As another illustration of an exemplary technology-based professional development model, the Friday Institute's Massive Open Online Courses for Educators (MOOC-Eds) initiative builds upon prior work designing, implementing and researching small cohort, facilitated online workshops through the EDC EdTech Leaders Online program (Kleiman & Treacy, 2006) and online professional learning communities, cohorts, and courses at the Friday Institute. These MOOC-Eds (http://www.mooc-ed.org/) build upon four major design principles that reflect research-based practices for educators' professional learning: multiple voices, self-directed learning, peer-supported learning and job-connected learning (Kleiman, Wolf, & Fry, 2014).

Multiple voices means that participants learn about the perspectives of other teachers and administrators along with those of students, researchers and experts in the field. *Self-directed learning* enables participants to personalize their experience by identifying their own goals, selecting among a rich array of resources, and deciding whether, when, and how to engage in discussions and activities to further their own learning and meet their goals. *Peer-supported learning* is based on participating in engaging in online discussions, reviewing others' projects, rating posted ideas, recommending resources, crowdsourcing lessons learned, and participating in twitter chats and other exchanges appropriate to the individual course. *Job-connected learning* involves the use of case studies, classroom and school related projects; developing action plans; and other activities that center participants' work on critical problems of practice and data-informed decision making in their own classrooms, schools or districts. As models of free professional development with massive enrollment, six MOOC-Eds developed thus

far show high rates of completion and satisfaction, as well as generalizability across a range of professional development goals and content.

In Ontario, an illustration of an exemplary model is the Simcoe County DSB Teachers as Leaders in the 21st Century initiative. This strategy for professional learning uses a system level inquiry model that fosters enhanced professional growth and sustains implementation of best practices. The Technology Hub Project had three ripples of inquiry: system, teachers, and students. To highlight an example from one classroom, Genius Hour was redefined to include opportunities for students to self-direct their own learning in addressing the question: "What do you want learn?" One student mobilized her inquiry as: "Can I get a book I wrote published?" She documented her journey and now concludes: "Now I don't even care if I don't get it published or if never go on to do writing in life because the journey through Genius Hour was better than I could've ever imagined. I learned so much about writing and I learned more about who I want to be."

In order to 'ripple out,' the challenge to Hub members was to pursue an inquiry honouring the intersection of technology, content, and pedagogy while connecting with teachers not currently represented in the Tech Hub. Teachers populated their inquiries on a collaborative electronic platform so that others could share the learning and join in on topics of interest. Of the 33 Hubbers who initiated inquiries, 130 other teachers became connected and inspired. Inquiry topics ranged from exploring alternative ways to provide timely digital feedback to using technology to improve consolidation strategies to Genius Hour. By the end of the school year, 95 of 105 schools were connected through the Tech Hubs to attain a 90% ripple effect.

As another illustration of an Ontario professional development strategy, the Thames Valley DSB has developed a professional learning model to enhance teachers' use of Self Organized Learning Environments (SOLES). SOLE is a model to adapt school space to facilitate collaborative inquiry. A SOLE classroom consists of several groupings of student desks with a computer available to each group. The purpose of this computer is to provide 'in the moment' access to information via the Internet. While this main computer is used for researching information that is related to the inquiry, other technology can be used simultaneously. For example, each group may have a mobile device which can be used to record the information that the group is researching. Similarly, if a classroom is set up for BYOD, students may be using personal devices to research, or record the information they are finding in the provincial virtual learning environment (VLE).

A team of thirty teachers from ten different schools, two teacher mentors, nine instructional coaches, and several learning coordinators are using Cloud- based applications as a way to support the SOLE model collaborative inquiry in the classroom. From extensive experience with SOLE centres in their own classrooms, teacher mentors model collaborative inquiry using the VLE as part of a SOLE classroom design. They invited teachers to their classrooms to view collaborative inquiry in action, using this SOLE design. Then they designed collaborative inquiry demonstration lessons that they took to some of the classrooms. As the mentors worked in these schools, they re-organized the classrooms to create the SOLE environment, and the teachers involved have not looked back. Through collected and observed data, many teachers indicate that they are changing their teaching philosophy and instructional practices.

As all these exemplary illustrations show, an important type of professional development for deeper learning is peer sharing in professional learning communities. Professional learning networks and communities are a major part of Ontario's strategies for teacher learning, as evidenced in the Round 3 project descriptors. The value of an online community lies in its ability to enable the rich and open exchange of ideas, experiences, and resources among its members. Given that getting assistance from other teachers seems to produce positive gains for teachers and for students, understanding "what works" for teachers supporting each other in an online learning community to help them raise student outcomes is a critical area for research.

Wenger, McDermott, & Snyder (2002) define an online community as a "group of people who interact, learn together, build relationships, and in the process, develop a sense of belonging and mutual commitment" (p.34). Barab, MaKinster, and Scheckler (2003) further define an online community as "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 or mutual enterprise" (p. 238). Specifically, online teacher communities potentially allow educators to learn while they are actively applying new ideas in their own work settings, to provide and receive sustained coaching and feedback, and to cultivate a reflective collaborative professional community (Dede, 2006).

A common complaint about teaching as a profession is isolation; in Ontario, this may be caused by geography (rural/remote communities), small schools, and the context for French-language DSBs/schools. Virtual communities are one way to overcome these forms of isolation (Fishman & Dede, in press). Many studies have

explored the development of teacher collaboration and even team-teaching at a distance as a way to help teachers overcome loneliness and isolation (Maltese & Naughter, 2010) or to share materials, perspectives, and practices (Sheehy, 2008). Teachers who participate in social networks such as Facebook (Ranieri, Manca, & Fini, 2012) can use them both to identify distributed professional communities and to help them assimilate into networks of practice (Roach & Beck, 2012).

In particular, two strategies, unlearning and mirroring, may help teachers to alter their practice in transformative ways (Dede & Frumin, 2014). A significant component of learning in online communities of practice may actually be "unlearning." Transforming one's practice to a different suite of objectives, content, and instructional strategies is very challenging because teachers must not only learn new skills, but also unlearn almost unconscious beliefs, assumptions, and values about the nature of teaching, learning, and schooling. Online communities can provide this type of emotional and social support, essential since unlearning is not a purely cognitive process.

Also, teachers should experience technology-based learning (e.g., the digital teaching platforms and immersive authentic simulations described in my first position paper) as the medium of their deeper-learning professional development as well as its message. In this way, the professional development experiences mirrors, rather than undercuts, the deeper learning instructional practices that teachers are to use with their students. For example, the online community can include collaborative learning environments that enable teams of teachers to combine their knowledge and skills, similar to what occurs in students' deeper learning. This mirroring can also occur via apprenticeship-based learning in which master teachers mentor less experienced teachers through sharing of deeper learning lesson plans, answering questions, and posting evidence of what instructional practices worked well. The provincially licensed Google Apps for Education (GAFE) cloud-based collaborative environment is referenced frequently as being an effective enabler that supports various forms of "mirroring."

An exemplary model of online communities of practice is the National Science Teachers Association (NSTA) online Learning Center (http://learningcenter.nsta.org/), which now has over 165,000 teachers spending many hours completing self-directed on-demand web modules, taking formal online courses with partners, participating in web seminars and virtual conferences, and sharing online digital resource collections and professional insights through moderated discussion forums. This portal currently has over 90,000 personally uploaded resources, nearly 8,000 teacher-generated public collections, and over 33,000 user generated

posts on 3,000 topics across 14 forums. The NSTA Learning Center has formally collaborated with dozens of school districts and over 70 universities that use the Learning Center as part of their blended learning solution (Byers et al, 2011).

Individual teachers using the NSTA Learning Center receive a needs-based, on-demand, and self-directed learning experience. Teachers can select digital resources and learning opportunities from a plethora of alternatives, including NSTA Press e-Book chapters, NSTA Press e-journal articles, interactive web modules, synchronous or archived web seminars, virtual conferences, podcasts, and formal, third-party online courses. Also, NSTA has developed a series of interactive, self-directed teacher web modules called SciPacks. These SciPacks are bundles of separate Science Objects. For example, the SciPack called Force and Motion contains Science Objects entitled: Position and Motion, Newton's 1st Law, Newton's 2nd Law, Newton's 3rd Law, and a Pedagogical Content Knowledge object. These individual resources are also assembled into thematic and grade-banded collections. A suite of free tools scaffolds the self-directed learner's long-term growth. A *PD Indexer* tool helps teachers diagnose or "index" their professional learning needs by formatively assessing their understanding of disciplinary core ideas in science. The Indexer then recommends free and fee-based digital resources and online learning experiences that teachers may then add to their library or long-term growths plans by using the free *Professional Development Plan and Portfolio* tool.

In contrast to individual, self-directed participation in this online community of practice, many institutions of higher education facilitate blended, year-long teacher professional learning programs through district collaborations or as part of an onsite university science methods course. Many universities use the *PD Indexer* tool as a pre- and post-assessment to guide pre-service teacher SciPack selection and lesson unit planning and implementation. The initial data collected by the indexer provides a baseline of teacher understanding within a particular science content area. The *PD Indexer* can then be revisited to help determine learning and growth. SciPacks award a certificate and virtual badge if teachers complete all of the embedded and end-of-chapter quizzes in a module, as well as pass a final assessment. Districts often offer additional rewards and incentives as teachers pass SciPacks, such as teacher stipends, release time, and/or continuing education credits. Also, universities many times integrate SciPacks as part of the requisites for overall course completion and graduate credit. Such courses and district initiatives model an online, community-based strategy for teacher professional learning.

In Ontario, an illustration of an exemplary model for online communities of practice is the Renfrew Catholic DSB initiative. 17 teachers were selected from their elementary panel and linked to a "partner" or two from their own grade level. The DSB provided technology for the classroom and for individual teacher use. The tools varied based on the grade level and included iPads, Chromebooks, and various streaming and projection hardware. At four professional learning sessions, teachers worked together to explore the technology, and to collectively plan and discuss ways to integrate the technology into the classroom. The process was one of self-discovery. At each stage, teachers were responsible for thinking of ways they can use the technology in the classroom effectively. All participants were also included in an online collaborative space where they engage in regular input and sharing.

During a trial-and-error process between sessions, teachers implemented their new ideas and strategies in their classrooms, and reported their progress at the next session. For the last two sessions, teachers invited a fellow teacher from the school or from the system to join them as a way of spreading the knowledge base. As a result, the group of participating teachers expanded from the original 17 to a total of 42 teachers who are involved.

As all these exemplary models illustrate, the process and delivery of professional development on deeper learning can reinforce and be consistent with its substance to achieve the desired impact. The U.S. National Educational Technology Plan provides an extended discussion of this type of professional learning in its section on Teaching (U.S. Department of Education, 2010), as well as in its follow-on research on connected educators (http://connectededucators.org/). In connected teaching, classroom educators are fully instrumented, with 24/7 access to data about student learning and analytic tools that help them act on the insights the data provide. They are connected to their students and to professional content, resources, and systems that empower them to create, manage, and assess engaging and relevant learning experiences for students both in and out of schools. These are the tools and capabilities available in Ontario through the provincially-licensed virtual learning environment that is available to all school districts and schools to support online & blended learning.

Thus, these technologies can provide powerful mechanisms for teacher learning, by which educators deepen their professional knowledge and skills in ways that mirror the types of learning environments through which they will guide their students. Recent research on online tools to support teacher learning finds, overall, no difference between online and face-to-face approaches (Fisher, Schumaker,

Culbertson, & Deshler, 2010; Fishman, Konstantopoulos et al., 2013). The issue, as with much research on technology and learning, is with the questions being asked. The question should not be "Does technology help teachers learn," but rather a design-oriented question focused on *how* online media can best be utilized to help teachers learn.

Developing an Action Plan for Learning Partnerships among Educators Enabled by Technology

The Ontario Technology and Learning Fund Action Plan report provides an excellent template for planning how to use digital media in fostering and sustaining learning partnerships among educators. Steps in the template include:

- deciding what evidence-informed innovative technology-enabled practices to scale (in this case, learning partnerships among educators),
- developing inquiry questions and theories of action for answering those questions,
- formulating measures of success to track progress along the implementation pathway,
- forming a team that involves instructional and change leaders at every level and across departments in the system, plus a range of stakeholders in education, and
- preparing a budget and timeline.

Ontario district school boards, provincial schools and school authority boards are all part of the province-wide collaborative Technology and Learning Fund Innovation Research effort and related professional learning community. This presents a valuable opportunity to build on others' successes and insights, while also making unique contributions to improving education across the province, and potentially in the international arena.

There is evidence from the reports of phases of the Ontario Technology and Learning Fund that significant progress has been made in learning partnerships among educators enabled by technology. The current report provides a practical template for planning initiatives. Directors and system leaders would be well served to share best practices and results within and across boards in order to capitalize on the good work that has been done.

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