

Revamping Professional Development for Technology Integration and Fluency

SANDRA KAY PLAIR

Abstract: Despite federal legislation and national technology plans, making technology significant in K–12 classrooms has yet to happen. The difficulty lies in veteran teachers who struggle to gain technological fluency. Many identified barriers continue to prevail, not for lack of teachers’ trying but because of the overwhelming nature of technology. Professional development programs should restructure how teachers acquire educational technology knowledge so that it complements and augments curriculum standards. The author introduces the notion of the knowledge broker, who becomes an intermediary between the veteran teacher (often the least knowledgeable about technology) and constantly changing technological innovations. The author discusses why knowledge brokers are needed to provide a different level of professional development to support traditional forms.

Keywords: knowledge broker, professional development, technological fluency

The isolation is the hardest part for me, so that’s what prevents me from then carrying it [technology] to my kids, because I’m going to be alone with a room of thirty kids and something’s going to go wrong and there goes my lesson.

I get nervous that I’m going to do something wrong and I won’t be able to extricate myself when I get there and I’ll break something.

I find that as I have aged, I prefer somebody to show me. It’s like I’ve totally changed my learning style.

These quotes are from veteran teachers struggling with the need to incorporate technology into

their teaching practices and core content. Despite the National Education Technology Plan (Patrick 2004) and the No Child Left Behind Act (U.S. Congress 2001) requirements, teachers still fall short when it comes to technology fluency (Resnick, Rusk, and Cooke 1999). Despite a steady wave of how-to workshops and some longer-duration seminars, infusing technology into curriculum and teaching practices remains elusive for many teachers. The existing format for technology-related professional development lacks the continuity that teachers need to develop the confidence and efficacy leading to technology fluency. Teachers crave a constant support person, in close proximity and available to fill in the gaps that arise with the rapid changes associated with technology. In this article, drawing on years of experience working with students and teachers, I advocate revamping technology-related professional development to include knowledge brokers skilled in educational technology and pedagogy. I also explain the importance of technology fluency for veteran teachers (with fifteen or more years) in the classroom.

Defining Technology for Educators

In this article, I use the term *technology* broadly to include computers, handheld devices, and multimedia equipment such as cameras, video projectors, graphic calculators, and voice recorders. In essence, any innovation containing a microchip could qualify as technology. Gone are the days of linking technology solely to the use of a keyboard and a central processing unit.

The use of these and other technology-related tools can no longer be avoided. The No Child Left Behind Act (U.S. Congress 2001) requires technology proficiency for eighth graders, distance learning experiences

Sandra Kay Plair, MA, is a PhD candidate in the Department of Curriculum, Educational Policy, and Teacher Education at Michigan State University, East Lansing.
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for many students, and rapid access to student data to assess learning and differentiate instruction (U.S. Department of Education 2006). This is a large undertaking for veteran teachers who are struggling for technological fluency. Although we envision many of these teachers as our newest retirees, many will remain in the classroom for years and should be prepared to meet their students' needs.

The struggle for many veteran teachers is appreciating how these innovative devices fit into their content areas. After all, we are asking them to infuse their content with what was once the exclusive purview of the mystifying computer teacher. This concept is as alarming as asking that the pliers, hammers, and screwdrivers from woodshop be included in the English classroom.

Veteran teachers are often resistant to technology because they do not see it as part of their content responsibilities. Previously, students generally learned to use computers isolated from the core content curriculum. Time allotted for computers meant learning how to use a function with little or no concrete connection to the curriculum objectives. Computers were likely to be another activity station at which students would bide their time until the next structured instruction began.

Consider classes such as sewing, woodshop, and Typing 101. These areas seldom filtered into the core content areas. This meant that computers and their application were not the purview of the content-area teacher or classroom. Asking that technology become an integral part of the social science content seemed an outrageous proposal. Word-processing and spreadsheet programs were taught down the hall under the domain of another teacher.

Convincing veteran teachers to rethink the role of technology as it spans beyond the days of word processors and programming is critical to helping them appreciate the value that new technology tools have to offer to student learning. The newly coined acronym TPACK, which stands for technology, pedagogy, and content knowledge, reflects the twenty-first-century skills needed to prepare for the new information or knowledge society (Koehler and Mishra 2005; Thompson and Mishra 2007).

Knowing how to select the best technology tools to support and enhance learning and instruction in English or any other content area eludes many teachers. As in woodshop, students and teachers need to use the best tool for the job. Will the use of digital voice recorders change the way foreign-language students become fluent in a second language? Will the use of digital cameras change the way students understand how communities work when they share a visual presentation of their corner of the world? Knowing when and how to use these technology tools to enhance learning is how I define technology fluency. It is the

ease with which teachers and students decide what form of technology is best suited for the current educational objectives. It is similar to knowing when to use modeling clay versus watercolors. If technology seems out of place or more complex than the learning task allows, then perhaps it is not the best tool for learning the specific task. Helping teachers comfortably reach this stage calls for the professional development available through a knowledge broker.

After years of teaching technology skills to middle school students, facilitating numerous technology-related professional development events, and badgering and cajoling my colleagues into embracing the merits of an application or technological gadget in their classroom, the idea of knowledge brokering offered a credible solution to easing the transition to technology. Teachers have shared with me on many occasions that they need a *knowledge broker*, or an intermediary, to sort through a wealth of information about programs, tools, and Web resources and to explain and demonstrate to them how to use it in a way that supports and enhances student learning and personal productivity. Technology-related professional development needs a new phase after the workshops have ended and the basics become familiar or mastered.

Technology-Related Professional Development

Technology-related professional development is undergoing a transformation. Previously, teachers were expected to become proficient with technology through a series of sessions and limited support resources (see table 1). With this structure, teachers experience—and dislike—a lack of authentic applications for their particular content, classroom, or learning style. At the awareness and how-to skill levels, little emphasis is placed on content or grade level because the professional development event is open to all teachers. Although this may be reasonable for getting the initial message out regarding technology integration, teachers often return to their classrooms never to use the information or too confused about how to get started. Over time, teachers have expressed the need for support where the action takes place—in the classrooms.

The longer-duration programs are more effective. As an Intel Master Teacher and a teaching assistant for a university program, I have focused on content and a unit plan to increase the chance that teachers make an effort to include technology personally and professionally after they complete the program. They leave these sessions with concrete activities, contextual resources, and tools to scaffold student lessons and improve personal productivity.

Our last level, ongoing support, is the weakest link. Teachers eager to become technologically fluent need the same kind of support we provide to teachers

TABLE 1. Previous Structure of Teachers' Technology-based Professional Development

Skill level	Approach to professional development
Awareness	Short-duration sessions with news of an innovative practice
How to	Short-duration sessions or series of sessions learning software applications
Seminars or workshops	Longer-duration sessions such as Intel Teach to the Future, eMints training, or university programs
Ongoing support	District help-desk staff, online support resources, intermittent, limited follow-up on site

striving to increase their skills in the teaching of reading, writing, and math. Coaches for these areas are not unusual in many districts. Some are mandated by federal policy; however, technology skills are just beginning to be recognized as necessary for all teachers. Technology is the new literacy, and coaches or specialists should be in place to support teachers and students in all subject areas.

Knowledge Brokering

In 1997, the Canadian government and various agencies such as the International Development Research Center, the International Federation of Institutes for Advanced Study, and the Liberty Party began to discuss the notion of bartering information (Oldham and McLean). The group discussed the feasibility of marketing information to other countries, particularly third-world countries in which certain expertise might not be readily available. Simply put, they would broker knowledge that other countries needed to successfully govern or develop resources. As members of the initial group, Oldham and McLean listed five dimensions of knowledge and placed knowledge brokers in various roles to support users. They included the following:

- Creating knowledge
- Acquiring knowledge
- Assimilating knowledge
- Using knowledge
- Disseminating knowledge

Although the dimensions reflect how individuals and institutions use knowledge, those involved were described as either *integrators* of knowledge or *brokers* of knowledge. The integrators interpreted knowledge obtained from others for use in their communities. Conversely, brokers linked or connected knowledge seekers with knowledge creators. The job of the broker was to function as a go-between for those seeking information and those who could supply knowledge in various formats.

Knowledge is shared, exchanged, valued, sought, and purchased everywhere because invariably there are

those who need a particular type of knowledge and those who possess it. Realistically, having an intermediary to meet the knowledge or information needs of teachers pursuing technological fluency is an effective way to provide or strengthen those skills and knowledge. The idea of knowledge brokering is not new to the educational arena. White (1987) equated teachers to brokers of scholarly knowledge. She considered the teacher a pivotal person who mediated between the scholarly world and the classroom. Scholarly knowledge brokers have a list of responsibilities such as "agents for controlled change" (White, 20), liaisons between public knowledge and students' prior knowledge, possessors and appliers of knowledge, those who model knowledge, redirectors of knowledge, and integrators of knowledge.

Later, Wenger (2000) described four forms of brokering that could be appropriate for our purposes. He explored the idea of the broker as an intermediary assisting members in one community to gain knowledge from another. Wenger's knowledge broker could make connections in the limited area of information access, help move knowledge from place to place, explore uncharted areas and bring new knowledge back to the community, or connect key people with knowledge to the community.

Knowledge of educational or instructional technology is a commodity to be shared, exchanged, valued, sought, and purchased, and the concept of a broker, or go-between, fits what teachers need and want when integrating technology. A technology knowledge broker would meet a variety of needs. A knowledge broker with a combination of pedagogical, content, and technological knowledge could more effectively and efficiently scaffold instruction, match tools to content, and keep pace with innovations.

Knowledge Broker Roles in Professional Development

Harbinger of innovation. The ideal knowledge broker supplements the information available to teachers by attending conferences, participating in collaborative

efforts with other tech-savvy teachers, and staying current with the latest literature. He or she knows where to find the latest innovations. This continued learning means more information is available for the teachers they support and more opportunities exist to consider new technology tools for student learning.

Master of strategies and techniques. Knowledge brokers have time to prepare and fine-tune technology-related activities. Time is one commodity in short supply for teachers. It is probably the most significant and most identified barrier (Ertmer 1999, 2005) to the integration of technology and technological fluency. Teachers are unsure of what technology to use or how to effectively manage technology resources. In addition, they are not eager to invest time in what is essentially unknown. They want technology-rich lessons to run smoothly and need to feel high levels of efficacy before introducing such lessons to their students. The role of the knowledge broker as a model of TPACK becomes a critical asset for teachers.

Teaching artists. Knowledge brokers represent Friedman's great explainers (2007), who have time to do what most teachers cannot. They have time to learn about various technologies and how to effectively infuse them into the content. In short, their ability as teachers to explain is their greatest asset. Marcia Loughry (ctd. in Friedman) elucidated the concept: "Here is what this is going to do for you, here is how it will tie into your existing systems [think content], here is how it will benefit you [think you and your students]" (289). It is in this way that knowledge brokers move knowledge from place to place. The art of explaining allows for the conversion of what seems to be bewildering techno-babble to terms teachers and students can understand. Knowledge brokers can help with the assimilation of what may seem foreign into something usable and manageable in the classroom.

Johnny-on-the-spot. Teachers have expressed the need for on-the-spot professional development. They want knowledge brokers available when they introduce new technology-rich lessons to students. They want to know that when the unexpected occurs, a call for help will be answered in a timely manner. They want someone available to share their reflections on the merits or weaknesses of a technology-rich lesson. They do not want to contact distant, district-support technicians who are generally skilled in technology but not in pedagogy or content.

Catalyst for change and unity. Knowledge brokers make ideal resources for sharing and dispensing the promises of change, which includes the need to spread the word and increase classrooms in which change can

and does occur. Ideally the knowledge broker will take the lead in coordinating ways teachers can come together to learn about technology. As an on-site support resource, the knowledge broker will be aware of which technology resources are used by content- and grade-level teachers. By matching teachers with local organizations or online social networking groups, the knowledge broker can provide valuable opportunities for teachers to continue learning about technology and increasing their fluency. To further support change and continued learning, the knowledge broker is in a position to encourage action-research projects that identify the value of technology-rich experiences for students. Rapid changes in technological innovations make it difficult to assess the worthiness of some technology tools. However, teachers involved in action-research projects can offer much to the literature on what works in classrooms.

Conclusion

Changes in the contour of technology-related professional development, as with most reforms, will not be simple. Policymakers and school administrators need to appreciate the difficulties many veteran teachers experience with integrating technology into comfortable, existing pedagogy. This change can also be a costly endeavor that creates avoidance rather than acceptance. The opportunity to meet the needs of students who must prepare for technology in the workplace and in higher academia is at stake.

Allowing teachers to fumble along implementing technology experiences haphazardly is no longer productive or effective. Teachers and administrators must make a concerted effort to make TPACK a reality for veteran teachers lagging behind and hindered by a digital divide widening between themselves and their increasingly tech-savvy students. These students arrive with a greater level of comfort with technology but little practical experience with how technology can support their learning. Waiting for new teachers to enter the system as a solution is risky. Many of today's preservice teachers are the product of technologically illiterate teachers (Plair 2007). Brokering knowledge with a different kind of professional development resource can ensure that technology, pedagogy, and content knowledge are intersected and merged to alter the way teachers teach and students learn. The potential for these knowledge brokers to support all teachers can only lead to successful learning, and that is what it is all about.

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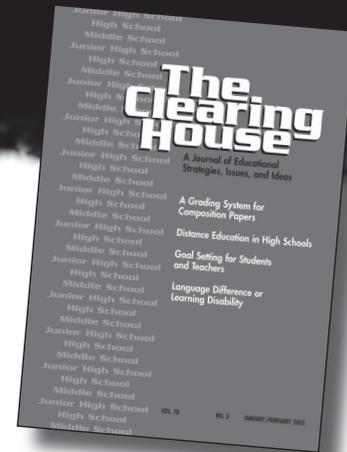
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