

Sponsoring Committee: Professor Susan Feather-Gannon, Chairperson
Professor Nancy Hale
Professor Gregg Ramsay

AN INVESTIGATION OF PROVIDING TECHNOLOGY PROFESSIONAL
DEVELOPMENT TO IN-SERVICE TEACHERS THROUGH
REVERSE MENTORSHIP: A CASE STUDY

Thomas M. Callahan

Submitted in partial fulfillment of the requirements for the degree of
Doctor of Professional Studies in Computing Studies
in the Seidenberg School of Computer Science and Information Systems
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PREVIEW

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We hereby certify that this dissertation, submitted by Thomas M. Callahan, satisfies the dissertation requirements for the degree of Doctor of Professional Studies in Computing and has been approved.



Dr. Susan Feather-Gannon
Chairperson of Dissertation Committee

Date: 12-23-2017



Nancy Lynch Hale (Jan 2, 2018)

Dr. Nancy L. Hale
Dissertation Committee Member

Date: 12-23-2017



Dr. Gregg Ramsay
Dissertation Committee Member

Date: 12-23-2017

Seidenberg School of Computer Science and Information Systems
Pace University

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PREVIEW

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PREVIEW

CHAPTER I

THE RESEARCH OBJECTIVE

Technology integration in K-12 schools has become a priority across the country and around the globe. The rate that new technologies are emerging seems to be vigorously outpacing the ability of schools to keep up with and adapt to these changes. Nevertheless, society demands that educational institutions keep pace with these trends and cultivate minds that are acclimated to the modern, digital world (Daggett, 2010).

One study, published by the Organization for Economic Cooperation and Development (OECD) in 2013, reported that the United States is still lagging behind other countries in our use of technology to analyze data and solve problems (OECD, 2013). According to the editors at *EdTech Review*, the American workforce will soon be surpassed by countries like China and India in providing talent for emerging businesses (Economy and Education, 2014). For this reason, new strategies are needed to provide teachers with the training required to respond to those demands, so that students will have access to a high quality education using up-to-date integrated technology.

Background

The OECD report placed the United States below average in its assessment of problem solving in technology rich environments. Divided into three levels, the study reported that only 5.1% of adults scored in the highest proficiency range, Level 3 (OECD, 2013). The United States Chamber of Commerce has also assessed the use of technology in American schools. In a comprehensive 2009 report entitled “Leaders and Laggards,” only 21 of the 50 states received a grade of B or better for technology use. Only six states received an A grade. The grades were based mainly on access to high-speed Internet connections, availability of virtual learning schools, establishment of technology assessments, and teacher licensing and competency requirements (Institute for a Competitive Workforce, 2007). With so many schools falling behind on the report, which is one of the most comprehensive to date, new ways of addressing these education and technology issues must be explored. One of the ways schools can approach enhancing instruction is through the in-service professional development of teachers.

Professional Development

If schools hope to meet the digital age challenges that exist, educators of the 21st century must be equipped to provide instruction that accommodates a fast-paced technologically advanced world (Tapscott, 1999). For many reasons, the task of preparing teachers to teach in the evolving digital world becomes a

daunting one. The perceptions of teacher professional development, by those who are not in the education field, are a major hurdle to implementing successful programs. McDiarmid (1994) concluded that the public perceives a teacher as working only when they have direct contact with students. This is an obstacle to effective professional development because support for allowing teachers an opportunity to learn and practice new changes outside of student contact time is not viewed as instructional work by the average taxpayer. As a result, time dedicated to improving instruction outside of the classroom is scarce (McDiarmid, 1994).

Aside from changing perceptions, finding the time, the money, and the motivation to implement sweeping changes in education that parallel the technological ones that are happening is an arduous task. For that reason, existing models of in-service teacher education must be responsive to these issues and come up with innovative strategies that create effective changes in how an educator approaches instruction in a 21st century school. According to Sykes (1996), this is the “most serious unsolved problem for policy and practice in American education today” and existing forms of professional development are “sorely inadequate” (p. 465).

Effective Versus Ineffective Professional Development

In-service professional development has long been an accepted way of helping teachers to inform their practice (Cuban, 1990). In some states,

professional development is offered through teacher centers. Professional development can also be offered online or at universities. In fact, some teachers prefer to continue their own development through additional degree or certificate programs at accredited colleges or universities. A growing number of states are beginning to require some form of continuous professional development to maintain a teaching license. Moreover, the term professional development has become expansive. It has grown to include almost any experience a teacher has that may address how instruction is provided. Those experiences may include topics ranging from classroom management to actual course content.

For the purpose of reviewing past practices, traditional models of professional development were examined. These forms typically have a few key characteristics. In many cases, these professional development opportunities are offered and funded by a school district exclusively for staff in that district and occur in a set block of time. In most cases, the format of the professional development is a workshop with a keynote address to teachers. Typically, a guest is invited to speak to participants and focus on a pre-selected topic that concerns educators. During the session, groups may be allowed to interact, ask questions, or respond to the topic being covered (Guskey, 2000).

According to Wilson and Berne (1999), “Teacher lore goes on to argue that traditional in-service programs consist of outside experts with little knowledge of local conditions who present irrelevant, sometimes amusing, often boring prepackaged information” (p. 174). While few would argue that

professional development is a necessary part of any good educational institution, the value of using a traditional model should be questioned. A survey by Smylie (1989) found that teachers ranked in-service workshops last out of 14 possible delivery methods for effective professional development. The same study claimed that little effort was made to even evaluate what teachers were learning (Smylie, 1989). In light of the fast-paced advances addressed earlier, these models may not be delivering instructional change quickly enough. Sykes (1996) criticized traditional forms of professional development as institutionalized in the way they manage, organize, and allocate resources. The researchers asserted that the system is set-up to inherently resist change and that the power it has to do so is exacerbated by increasingly involved state and federal regulation (Sykes, 1996).

Studies have shown that traditional approaches also lack a few essential components that characterize effective professional development. Lieberman (1995) stated, “The conventional view of staff development as a transferable package of knowledge to be distributed to teachers in bite-sized pieces needs radical rethinking. It implies a limited conception of teacher learning that is out of step with current research and practice” (p. 592). Tapscott (1999) agreed that educating “net generation” students is going to require that instructional practices evolve. Some believe that these efforts will help alleviate the “digital disconnect” between students and their schools (Levin & Arafah, 2002). In fact, Cuban (1990) suggested that reforms must deal directly with the teachers because they are the central figures in enacting improvements.

In order to change teaching practice, research supports that effective professional development should have several key features. According to Rodriguez and Knuth (2000), these features must be grounded in sound research. They also stated that there should be connections to student learning, hands-on technology use, diverse learning experiences, and curriculum specific opportunities. They also advocated teacher training experiences that involve educators in “new roles,” collegial learning situations, and active participation activities. In addition, these professional training models should include continuous funding, support from administrators, and technical assistance.

The most successful programs should also include built-in evaluation structures, sufficient time to use new skills and practice what is learned, and be an ongoing process rather than a one-time experience (Rodriguez, 2000). The State of Ohio (2014) used some of the research on professional development to distinguish between “High Quality Professional Development” and other forms. Some of the profiled approaches to professional development, and specifically technology professional development, do not take best practices into account when providing instruction for educators (The State of Ohio, 2014).

Traditional models may only last a few hours or, at most, a few weeks. In many cases, they are given and then forgotten. Good professional development is also content based and fits easily into existing patterns that teachers follow. In traditional professional development, the topics may be purely pedagogical or introduce content that does not allow for easy assimilation (Garet, Porter,

Desimone, Birman, & Yoon, 2001). Professional development that catalyzes change tends to be very collaborative and cooperative in nature, according to researchers. It emphasizes interactivity, feedback, and “hands on” experiences to deliver its message.

In many existing models, professional development involves didactic learning and the lecture method. As a result, traditional professional development models may lead to a reflection on teaching practice but may not lead to change in teaching practice (Guskey, 2000). Researchers have concluded that more professional development models need to be proposed so that changes in teaching practice result from the experience. While reflection on teaching practice may be important, professional development must cultivate a climate among teachers that produces instructional change (Zepeda, 2011).

Reverse Mentorships

Programs have surfaced that try to address the issues adults, such as teachers, face in using technology. One program, by Coppola et al. (2009) has tried to hurdle the barriers that senior citizens have faced in using technology. Students earning service-learning credit at Pace University are paired with older adults living in a local nursing home. The Pace students serve as technology mentors to their senior partners. Traditional roles where the elder participant in a learning experience takes the lead, is reversed, and the college student is charged with helping the senior learn something new. In companies, a similar partnership

may be undertaken. New employees, just out of college, may be charged with helping veteran staffers learn new technologies (Hewlett, 2009). In schools, the students may be asked to take the lead in assisting teachers with updating their technological skills (Generation YES, 2014).

Intergenerational Reverse Mentorships

In intergenerational reverse mentorships, the college student helps facilitate a hands-on learning experience for a senior that introduces them to computing and helps diffuse their anxieties and fears. After several weeks, elderly participants become proficient email and Internet users. They even find new ways to keep in contact with their loved ones; one of the many perks their confidence issues would not have allowed them to experience just weeks earlier. As one report on the study concludes, intergenerational computing programs provide a foundation for seniors that teach them how to benefit from technology. Upon completion of the program, elderly participants are shown to improve cognition and report feeling more comfortable using computers (Coppola et al., 2009).

This innovative program relies on an intergenerational model of computer mentoring to help seniors learn technology. If a professional development model incorporated the best practices of professional development highlighted earlier, in combination with the strategies implemented with these seniors, teachers might be

able to alter their beliefs about computing and implement technology integration practices within their classrooms.

Schools are intergenerational educational environments. An article in *Sociology of Education* suggested that intergenerational bonding within schools, and the attitudes of students towards their teachers, is a primary determinant in student scores and self-esteem. The author found that stronger incidences of intergenerational bonding led to increased student achievement in schools, based on a national sample (Crosnoe, Johnson, & Elder, 2004). A stronger intergenerational model of professional development, like the reverse mentoring approach used to assist seniors, may also help teachers experience more success in both learning and integrating technology. Although in this study the focus was mainly on reverse mentoring as a professional development model, its effect on students' self-esteem may add to its viability and value as a sound educational approach to in-service learning.

Teachers come from a variety of age groups, many with fears and reservations toward using new technology (Russell & Bradley, 1997). If one-on-one intergenerational computing models that involve service learning or reverse tutoring opportunities worked with senior citizens, they may also work within the school environment itself. Unlike seniors, teachers that avoid using technology may have fewer obstacles than the elderly participants in the mentoring programs. In many circumstances, elderly participants have vision, hearing, or even cognition problems that teachers who avoid using technology may not have.

It is likely that teacher participants, having fewer barriers, may be as receptive to using technology and changing their patterns as the elderly study participants. If supported, similar training models that utilize reverse mentoring one-on-one computing relationships might help alleviate the confidence and self-efficacy issues that keep teachers from becoming more technologically literate (Russell & Bradley, 1997). As was the case in some of the intergenerational studies, such as Coppola et al. (2009), both sides might also gain insight into the challenges their counterpart faces and lead to a new appreciation for the role the other plays in the educational experience.

A professional development model that takes into consideration these barriers might have more success in changing instructional practice than one that does not. Factors like technological confidence and planning time are not often addressed in traditional workshops. No time is allotted for teachers to use the technology, ask questions, get feedback, and brainstorm ways of using the technology in their classroom. Similarly, a model that looks to build a participant's self-efficacy may be more likely to enact change. If a participant has the same beliefs about their own skill set at the end of a professional development session as they did at the beginning, it is unlikely that their teaching practice will be altered. Lecture style professional development does not typically allow for the dispersion of the feelings that lead to doubt or inaction. In most cases, the teacher is "talked to" and is not afforded an opportunity to practice new skills over extended periods of time, leading to new feelings about their self-efficacy.

In many ways, a “print age” teacher is not unlike a senior citizen. They both may be hesitant to embrace technologies that are foreign to them. They may resist change in a way that comes across as stubborn or unwilling to adapt. In many cases, the senior would have the same self-efficacy and confidence problems a teacher may have. The benefits of using technology may be eclipsed by the person’s belief that they might fail. Seniors are often viewed as the most knowledgeable members of a social system. Admitting that they do not know something may be hard for them to do and even embarrass them. Again, the senior citizen may be analogous to the classroom teacher. In front of students, teachers may be less likely to try something with which they are not confident. In their view, like the senior citizen, it might undermine their traditional role as classroom sage. They may be unwilling to expose themselves to embarrassment. However, in a one-on-one approach, teachers may experience a greater sense of comfort.

Reverse Mentorship in Business

The emergence of reverse mentoring in educational contexts is often credited to its popularization in the business world. Jack Welch, when he was the Chief Executive Officer (CEO) of General Electric (GE), used reverse mentoring to help more veteran members of the company learn emerging technologies (Piktialis, 2009). Time Warner used a version of the mentoring program to match college students with senior executives. Their “Digital Reverse Mentoring Program” established one-on-one meetings that allowed the university enrollees