

Duration and relevance of a professional development program: Using Intel Teach to the Future to illuminate successful programmatic features

A high level of agreement exists among practitioners, researchers and policymakers regarding the key features of effective professional development programs for K-12 teachers (Darling-Hammond, Lieberman & McLoughlin, 1995; National Commission on Teaching and America's Future, 2003; National Staff Development Council, 2001). The educational technology community has built on this consensus, articulating specific qualities that are important to creating professional development that moves beyond providing teachers with technical skills and, instead, helps them to integrate technology into their curriculum and into their students' day-to-day classroom activity (Anderson & Becker, 2001; Office of Technology Assessment, 2000).

In addition the professional development research focused on teachers' personal motivations and interests has suggested that teachers are more likely to build on what they learn from professional development experiences when their existing knowledge and priorities are acknowledged and made central to the learning process (Cochran-Smith & Lytle, 1992; Lieberman, 1995). Building on this research, many policy reports have also emphasized the importance of linking technology-focused professional development to teachers' immediate needs and interests, rather than simply delivering technical training on software independent of the curricular or instructional needs of participants (CEO Forum on Education and Technology, 1999; Office of Technology Assessment, 1995).

Despite broad agreement that particular characteristics of professional development programs and of their participants can have a significant impact on the outcomes of these programs, little empirical work has been done to test this impact or the possible inter-relationship of these two dimensions of professional development. Building on prior findings from a three-year evaluation of Intel Teach to the Future, a large-scale, technology-focused professional development program, this paper investigates how program-level and individual-level variables may be influencing the type and scope of teachers' follow-up to the program.

Conceptual Framework

We adapted a framework for understanding effective professional development proposed in a recent review of the literature (SRI International, 2002) offers seven key elements:

- **Format:** Is the training a traditional format like a workshop or more innovative like a study group or hands-on activity?
- **Duration:** How many hours of contact time are involved, and over how long a span of time?

- Collective participation: To what extent are participants currently working together as teachers in the same schools, grades, or departments?
- Inclusiveness: Are all teachers within a given community invited to participate?
- Incentives: Are teachers provided with reasonable positive motivations to participate?
- Active learning opportunities: Are teachers engaged in meaningful and relevant activities?
- Relevance of the content focus: Is the focus on teachers' classroom practice and how students learn? Is the content related to teachers' interests and needs?
- Coherence: Does the program align itself with standards or teachers' goals?

While duration is consistently included in lists of key features of successful professional development programs, some empirical evidence (e.g., Corcoran, Shields & Zucker, 1998) has suggested that the influential factor is the frequency and length of training sessions (intensity), rather than the total number of contact hours involved (duration).

Therefore, the present study focuses on examining two of these programmatic features, intensity and relevance, to consider how they may be influencing outcomes. Similar to prior research, intensity was defined as the frequency and length of the training sessions. Relevance is conceived as professional development that is directly relevant to what teachers and students do in the classroom and tightly focused on understanding students' learning processes (e.g., Garet et al, 2001; Loucks-Horsley et al, 1998).

About the professional development program. Intel Teach to the Future is a professional development program for K-12 classroom teachers that focuses on the integration of specific software applications/technology skills into students' everyday classroom work. The goal of the program is to help teachers who already have some basic technology skills begin to integrate technology more effectively into their classrooms to enhance student learning. The duration of the program is always 40 hours long, although the training sessions can be distributed across any number of days (thus, the intensity varied among the participants).

Methods and Analyses

All Participant Teachers enrolled in Intel Teach to the Future were required to fill out an application form before the training and were asked to complete a brief, end-of-training survey immediately upon completion of the 40-hour training. Then, in April of each year of the evaluation (2001-2003), all participating teachers were contacted via e-mail and asked to fill out a voluntary end-of-school-year survey.

For the purposes of the analyses we compiled a nationwide sample of 237 K-12 teachers who began their training during the school months (January-May or September-December) of 2001 or 2002 and completed their training during the 2002 calendar year who gave us follow up data a year later in April of 2003.

Measures

Outcome variables. Two levels of “successful” program outcomes were derived from questions in the 2003 follow up survey:

“Basic” outcome is considered a baseline for success, and requires only that teachers report using one or more of the software applications or technology skills covered in the training that they had not used prior to the training (these included using Microsoft PowerPoint/creating a presentation; using Microsoft Publisher/creating a newsletter or brochure, and using Microsoft Publisher/creating a website).

“Optimal” outcome requires that teachers implement with their students a new, technology-rich lesson in addition to the unit plan they had developed in their training. This optimal level of implementation is taken as an indicator that a teacher has not only used the unit developed during their training but also is now at least beginning to integrate technology into the curriculum more broadly, and in ways not done prior to their training.

Predictor variables: All five predictor variables were chosen or derived from questions in the end of training or follow up surveys.

1. Prior technology use: An index of each teacher’s prior technology use was created by calculating the number of the three key software applications/technology skills teachers reported having “Used before training” with their students in the classroom
2. Intensity of training: The number of days between the first day and the last day of the training was calculated and coded into the three categories: Compressed, Standard Length, and Expanded Length
3. Technology preparedness (composite variable): Teachers were asked four 4-point scale questions regarding how prepared they felt to use technology with their students after participating in the training.
4. Student work (composite variable). Teachers were asked three 4-point scale questions regarding how useful the program was in training them to create specific work products with students.
5. Pedagogical usefulness: Teachers were asked two questions regarding how useful the pedagogical topics and strategies covered in the training were to them.

All five predictor variables were entered in forward stepwise logistic regression analyses, which predicted both outcomes separately. This generated two models, one illustrating the relationship of these predictor variables to the baseline outcome (new software use) and one relating the same predictor variables to the optimal outcome (using new technology-rich lessons).

Findings

The findings suggest that, in the case of Intel Teach to the Future, different combinations of factors are influencing programmatic outcomes.

First, in achieving “basic” program outcome, teachers’ perceptions of the relevance of particular pedagogical topics emphasized in the training (specifically, supporting students’ project-based learning) is a significant predictor of whether teachers achieve the “basic” outcome of using one or more new software applications/technology skills in the

classroom. Teachers' degree of prior use of those software applications/technology skills is also a significant predictor of this outcome. Intensity was not a significant predictor.

Second, a different combination of factors was important in generating the optimal outcome of implementation of new, technology-rich lessons or units in the classroom (in addition to the unit developed during the training). Both teachers' perceptions of the relevance of the pedagogical approaches emphasized in the training and the intensity of the training were significant determining factors of whether or not teachers achieved this outcome. Further, teachers' reports of how prepared they felt to use technology with their students after their training was also a significant predictor of this outcome.

Taken together, these findings reveal that intensity of delivery has influenced this professional development program's outcomes. Specifically, teachers were more likely to follow up on their training by implementing multiple, new technology-rich lessons or units when the training had been delivered in a relatively intensive format (covering the 40-hour curriculum in approximately three months or less). This is inconsistent with the general recommendation in the professional development literature that "longer is better," both in terms of contact hours and time span of delivery (Garet et al. 2001; Porter et al. 2000). This effect did not apply, however, to the basic outcome of expanded use of software applications/technology skills, as time span was not shown to influence whether or not teachers achieved this outcome. Therefore, time span and contact hours are likely to have independent, differential effects on program outcomes. Their relationship needs to be examined more carefully in future research.

References

- Anderson, R., & Becker, J. (2001). School investments in instructional technology. *Teaching, Learning, and Computing Report*, Report 8. Retrieved August 2, 2004, from http://www.crito.uci.edu/tlc/findings/report_8/startpage.htm
- Cochran-Smith, M. and Lytle, S. (1992). *Inside/out: Teacher research and knowledge*. New York: Teachers College Press.
- Darling-Hammond, L., Lieberman, A., & McLaughlin, M. (1995). *Practices and policies to support teacher development in an era of reform*. New York: NCREST.
- Garet, M.S., Porter, A.C., Desimone, L., Birman, B.F. & Yoon, K.S. (2001). *What makes professional development effective? Results from a national sample of teachers*. *American Educational Research Journal* 38(4): 915-945.
- Lieberman, A. (1995). Practices that support teacher development. *Phi Delta Kappan*, April 1995, pp.591-596.
- Loucks-Horsley, S., Hawson, P.W., Love, N., Stiles, K.E. (1998). *Designing professional development for teachers of science and mathematics*. Thousand Oaks, CA: Corwin Press, Inc.
- National Commission on Teaching and America's Future (2003). *No dream denied: A pledge to America's children*. Washington, DC: Author.
- National Foundation for the Improvement of Education. (1996). *Teachers take charge of their learning: Transforming professional development for student success*. Washington, DC: National Foundation for the Improvement of Education.

- Office of Technology Assessment, (1995). *Teachers and technology: Making the connection* (OTA-HER-616). Washington, DC: U.S. Government Printing Office. Retrieved August 2, 2004, from <http://www.wvs.princeton.edu/cgi-bin/byteserv.prl/~ota/disk1/1995/9541/9541.PDF>
- Office of Technology Assessment, (2000). *eLearning: Putting a world-class education at the fingertips of all children*. Retrieved July 28, 2004, from <http://www.ed.gov/Technology,elearning/e-learning.pdf>
- Porter, A. C., Garet, M., Desimone, L., Yoon, K. S., & Birman, B. (2000). *Does professional development change teaching practice? Results from a three-year study*. Washington, DC: U.S. Department of Education.
- SRI International (2002, May). *Technology-related professional development in the context of educational reform: A literature review*. Prepared for the U.S. Department of Education under GSA Contract # GS-35F-5537H.
- The CEO Forum on Education and Technology (1999). *School technology and readiness report. Professional development: A link to better learning*. Washington, DC: Author. Retrieved July 9, 2003, from <http://www.ceoforum.org/downloads/99report.pdf>
- U.S. Department of Education. (1999). *Designing effective professional development: Lessons from the Eisenhower program*. Washington, D.C.: U.S. Department of Education.

ABSTRACT

(120 words)

Using survey data, the authors examined the relationship between duration/intensity of a technology-focused professional development program and specific participant characteristics in predicting successful outcomes. The five participant characteristics chosen were: teachers' feelings of preparedness to support student technology use; teachers' perceptions of the usefulness of creating technology-based projects with students; teachers' perceptions of the relevance of the pedagogical approaches emphasized; and teachers' prior use of featured software. Two outcomes were defined: 1) Use of new software applications/technology skills and 2) Implementation of new technology-rich lessons. Analyses indicated different combinations of personal characteristics predicted each outcome. In addition, intensity of the program only predicted the latter outcome. Implications of this research are discussed within the framework of the professional development literature.

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