

Balancing Teachers' Willingness to Change with Classroom Realities: Moving Towards an Error Model in Professional Development Research

Jason Ravitz
Buck Institute for Education
United States
Jason@bie.org

Abstract: A statewide evaluation in Idaho addressed whether teachers changed in teaching philosophy and technology skills following summer in-service workshops and whether these changes sustained themselves in the face of school year and classroom realities. The timing of data collection is an important factor to consider when interpreting program outcomes. Teachers' beliefs about teaching and their sense of competency with technologies varied at three different times: prior to summer workshops, after the summer workshops, and after 10 months of subsequent teaching. It is critical to distinguish changes that are temporary and due to enthusiasm immediately after a workshop from changes that sustain themselves or emerge over time as the initial impact of the workshop fades and the reality of the classroom comes to the fore. Guided by Kitzer's (1981) "error model" of research, we address time of data collection and other sources of error to improve our knowledge of program impacts.

Project Summary

Teaching with Technology (TWT) is a statewide professional development program in Idaho funded and developed by the J.A. and Kathryn Albertson Foundation (www.jkaf.org). TWT provides intensive summer workshops led by teachers who provide follow-up support as Technology Fellows during the school year. Each workshop lasts five days and covers basic technology skills, advanced technology applications and several constructivist-oriented reform models for teaching. TWT emphasizes the reform of teaching practices, not merely the development of technology skills.

In an earlier study, we concluded that technology skills are positively related to achievement gains, but we could not address causality or disentangle the effect of technology use at school or at home (Ravitz, Mergendoller & Rush, 2002; BIE, 2002a). To evaluate TWT as a professional development program we used multiple indicators of program impact including reported helpfulness of training workshop and changes in teachers' attitudes toward technology; requests for technology training; objectives for student technology use; beliefs about teaching and learning; and changes in teachers' technology skills (BIE, 2002b). This paper focuses on the last two indicators – changes in technology skills and beliefs about teaching. In our paper we examine 1) how teachers' responses varied at three different times; 2) how much their responses changed; and 3) who changed the most.

Study Methods

Prior to holding the professional development workshops TWT sent self-report surveys to all registered participants via mail; if teachers did not return the surveys they were asked to complete the instrument when they entered the workshop. A second wave of surveys was given to teachers as they left the workshop to rate their initial responses and changes after five days of intense professional development. A third wave of surveys was administered via an online survey submission form 10 months later, i.e., after a year of teaching. There were differences in the survey administration and scope, but key variables concerning teaching beliefs and technology skills were measured the same way during each administration. The survey included measures of teaching beliefs that broadly indicate a constructivist-oriented approach to teaching. These measures were

correlated with classroom practices and had strong reliability in a prior national study (Ravitz, Becker & Wong, 2000, Becker, Ravitz, & Wong, 1999; Ravitz, 1999). For our sample, the measures had similar levels of reliability and relationships to practice.

In order to limit response bias and to maximize the power of our longitudinal data we used paired-t tests to determine changes over time. Our treatments of response bias and selection bias improve the accuracy of the study, while reducing its generalizability. We do not know how non-participating teachers would have fared had they chosen to participate in TWT, or how non-respondents might have changed differently from respondents. We rely on replications to improve confidence in our findings. We used effect size differences to rate the amount of change in scores among participants between waves (Thompson, 1999). Although the number of respondents in Wave 3 was relatively low, the changes they reported were substantial and provide the basis for this report.

Findings

Participating teachers reported their technology skills increased and their thinking moved in a constructivist direction (See BIE, 2002b for additional results). However, the changes that were reported immediately after the workshop (Wave 1 and 2 changes) seem to reflect an "enthusiasm effect" so that the changes reported at the time the training ended were artificially high. This does not mean there was no real change during the five day workshop, just that one must be suspect of these reported changes until they have been tested in the classroom.

What we infer is that a number of constructivist-related reforms are more difficult to implement in the classroom than they seem at first. Enthused teachers may report a belief that is consistent with constructivist learning theories presented in a workshop, but find this belief less tenable or more difficult to put into practice in their actual classrooms. Therefore, the timing of data collection is an important source of error to address in future professional development research. In particular, after 10 months in the classroom teachers wanted quieter classrooms than they originally had indicated after the training (BIE, 2002b).

There was also drop in reported technology skills between Wave 2 and Wave 3 in several skills, while some other skills continued to increase over time (e.g., attach files to email). By Wave 3 teachers were less confident in their skills to create a web page and in their multimedia skills than they were at the end of the workshop. Despite the fact that these ended up being the same skills with the greatest gains reported overall (third column), this drop from Wave 2 to Wave 3 seems to represent a "correction" that reflects the complexity of these technologies as one delves deeper into their application.

Discussion

It is important for professional development programs to show that they have played a part in changing teachers' outlook, skills or practice. More important than teachers' initial willingness to change, however, is their ability to sustain that change through a year of teaching in the classroom. Pre-post research designs that do not leave time for "reality" to set in may obtain artificially favorable results due to what we are calling an "enthusiasm effect." In contrast, changes in self-report measures that occur after training may show a decrease in self-reported changes that represent a real correction based on experience during the school year. Even if the magnitude of a change decreases over time, the result may represent a real accomplishment, if the initial changes were substantial.

Because we have allowed some time to pass we are more confident that the overall changes reported from Wave 1 to Wave 3 are real. Despite their gains in technology skills, teachers also encountered unforeseen difficulties that caused them to reassess and, in effect, downgrade the extent of their skills. This is an issue also noted by Rockwell & Kohn (1989). Continued challenges in the area of Web and multimedia tools were reflected in requests for further training in these areas. In contrast, regarding use of email, there appears to have been continued gains in skills reported (BIE, 2002b). The true difficulty associated with use of different applications is something that professional development evaluators have to consider when interpreting self-reported technology skills after a workshop.

We see the importance of disaggregating teachers' scores so that self-reported data is presented according to the key characteristics of the teachers and schools that may influence these scores. If this is not done, bottom line-only analyses can be misleading. We conclude that the impact of the program was greatest for teachers in the smaller and lower grade schools, i.e., not in the larger high schools and middle schools.

It seems to be much easier to change teachers' technology competencies than to change their beliefs about teaching and learning. Our analyses show there were substantial increases in the technology skills reported by teachers and only moderate increases in the constructivist beliefs. Only teachers in elementary schools and in smaller middle schools reported sustained changes in pedagogical beliefs through Wave 3. The least change observed - and consequently, the biggest challenge - was in changing the teaching beliefs of teachers in high schools, and larger middle schools.

We suspect these different outcomes may be less an issue of program design, and more an issue of organizational capacity. How can there be such substantial gains in technology skills among teachers in larger secondary schools and lack of change in teaching beliefs among these same teachers? This seems to confirm earlier studies showing that teachers' technology skills are a relatively small component of technology reform and other conditions are required to see a change for students (Ravitz, 1999; 2002).

Perhaps larger secondary schools had less of an opportunity to apply what they learned in the workshop. As noted in the Opportunity One evaluation, larger secondary schools had relatively low per capita school use by students (BIE, 2002a), a concern also noted by Cuban (2001). As a result, while they developed their own technology skills (Ravitz, 1999), high school teachers were less likely to change their teaching beliefs in a way that might have resulted from successful program implementation (use of reform models supported by technology as taught in TWT workshops). High school teachers may be more limited by the constraints of their environment, and less free to implement constructivist-oriented changes in teaching, regardless of their own technology skill development.

We are still trying to identify the most important issues to address in professional development evaluations. A few researchers have gone further than we have in attempting to measure the relative impact of different professional development program components (e.g., Porter, et al., 2000). This is the direction we hope to take, once we are more confident we have identified key sources of error and alternative explanations for professional development outcomes and technology-supported reforms.

We feel it has been useful to focus on *for whom and under what conditions* professional development seems to have an impact. Of course, averages for groups do not reflect on individuals and should not draw conclusions from group averages when judging individuals, or generalize from experiences with individuals to others of the same group (Popham, 2002). There is often a wide range of variation within groups, even when there are differences on average across groups. We are interested in findings from other states, particularly with larger urban populations, to see how school size may bias the results of professional development towards less constructivist-oriented change and more limited use of technology with students.

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