

TECHNOLOGY AND CHANGE IN SCHOOLS: THE ROLES OF STUDENT TEACHERS

David M. Marcovitz
Florida Atlantic University

I think it's energizing to have a student teacher. I think they keep you current. I was very impressed. Jackie knew her word processor very well. She had the Powerbook since the very beginning. She was very comfortable with email. She was very comfortable with using any of the programs. It didn't scare her to go in, pop in a program, and to play around with it. That, from a technological standpoint, I think is a real breakthrough. As compared to last year, while I had a terrific student teacher, technology was not a real strong suit. She just hadn't been exposed to it. And the year before that even less.... The young people always keep me really thinking, "Am I doing what I need to be doing?" (Sarah, interview, May 5, 1994)

We do not often think of student teachers as change agents. Their role is that of apprentice and student, learning to be good teachers. Change agents come into situations as experts ready to transform a situation.

The nature of school is such that it is slow to change. From an organizational standpoint, it is almost a closed system with few avenues of input from the outside. Student teachers can be one of the few sources of input and new ideas for a school. This exaggerates their role as change agents and places them in the conflicting position of students and change agents at the same time.

Because of this conflict, student teachers can have a wide range of functions in supporting technology and change in the schools. Sometimes they initiate change and bring in new ideas; sometimes they directly support the efforts of teachers to change their classrooms with technology; and sometimes they indirectly support teachers' change efforts.

I spent several months at Burnham Elementary School (this and all other names in this paper are pseudonyms to protect the anonymity of the participants) as part of a qualitative study of support for technology and innovation. In this paper, I discuss a continuum on which student teachers live: from student to teacher, and I discuss the kinds of things I observed student teachers doing to support technology and how these things fit on the continuum. I tie student teacher support into a theoretical context of organizational theory, situated-evaluation, and a theory of support for innovation.

Research Methodology: Ethnography, Case Study and Situated-Evaluation

This study combines methods of ethnography, case study, and situated-evaluation. I combine my experience and my interpretations of the experiences of the participants to build an understanding of what I observed and how it relates to support for innovation.

In parts of the 1992-93 and 1993-94 school years, I spent several hours each week at Burnham Elementary School observing classes, talking informally to teachers, interviewing teachers, and attending school and district Technology Committee meetings.

Situated-Evaluation and Support for Technology

Situated-evaluation is an important theoretical basis for my approach to this research. Bruce (1993) contrasts traditional views of an innovation as the chief actor in a situation with the situated-evaluation view:

In reality, the innovation is but one small addition to a complex social system. Instead of seeing it as the primary instrument of change, it is better to see it as a tool that is incorporated into ongoing processes of change.

We are thus led to a different model for implementation of innovations. In this model, the active agents are not innovations, but the participants in the setting in which the innovation is placed. Participants interpret the innovation and then re-create it as they adapt it to fit with institutional and physical constraints, and with their own goals and practices. (p. 17)

In this view of innovation:

1. The participants in the setting are the chief actors.
2. The innovation is an idealization that will be achieved more or less when brought into the real situation.
3. This idealization is interpreted and recreated by the participants in the setting to adapt it to fit the context and constraints of the setting.
4. Every situation is different, so the innovation-in-context will be different for every context.

Situated-evaluation is an important way to look at support because it helps us understand why support does not always meet its objectives. A situated-evaluation approach might find that the support was inadequate because the designers of the support did not account for the contexts and constraints of the situation, or it might bring about a better understanding of how the situation and the support interact to provide different, not necessarily better or worse, support than what was originally intended.

Research Procedures

In this ethnographic study (Marcovitz, 1996), I developed new models for support and innovation by looking closely at support for technology and the use of technology in three 3rd and 4th grade classes at Burnham Elementary School. I spent most of my time with these three classes and their teachers: Sarah, Jennifer, and Cindy. I also looked more broadly at the 3rd/4th grade of Burnham Elementary School, the school in general, and the district.

I began my study by looking at the impact of changes in the school, especially the change in principal and the change in computer coordinator. Those changes were rich sources of information and comparison data, but they were not the primary focus of the study. Even the three teachers who were the primary participants in the study became the context of the study, rather than the primary focus. By the end, the study focused on models of support and innovation as they applied to the situations in the three classes and at the school and district more generally.

The Roles of Student Teachers

Student Teaching Programs

Burnham Elementary School is near a major university that provides most of the student teachers. The university has three student teaching programs: the junior practicum, the standard semester-long placement, and the Full Year Program.

The junior practicum provides juniors with a limited exposure, a few hours per week for a few weeks, to a classroom.

The standard semester-long placement is a one semester assignment in one classroom that culminates at the end of the semester in a three week take-over period

during which time the student teacher is almost completely in charge of the class.

The Full Year Program is a two semester assignment in which the student teacher spends time in three different classrooms. The Full Year students are loaned Powerbook Macintosh computers for the year to facilitate communication among the students and their university supervisors.

The Student to Teacher Continuum

Student teachers' primary function is to learn. They are students. They are not in schools to act as direct or indirect supporters of change.

First of all, that is not a criteria that they are for support. That is not at all. In fact, people who say, "I want a student teacher because I'm going to have an extra pair of hands in the room," is one of the first indicators that you don't want a student teacher for the right reasons, the reasons that you can model and teach a student. So I really disagree with that. They can be support. Daniel [Cindy's student teacher in the spring] was support, but there are many student teachers out there that are of no support; they're more work for a teacher. (Cindy, interview, May 16, 1994)

Student teachers never completely escape their student role; their function is to learn to teach and practice being teachers. But at times, they are teachers. The roles of student and teacher form the ends of a continuum of roles. At Burnham, I observed four somewhat distinct roles for student teachers that lie along the continuum: student; adult; adult plus; teacher.

These roles are not completely distinct in two ways. First, any given action can be interpreted in different ways and be interpreted, for example, as more or less like the action of a teacher. Second, the student teacher is usually acting in multiple ways, and at any one time could be in several different roles.

Student Role. In the student role, the purpose of the student's actions is to learn about teaching. This can take the form of observing and talking to the teacher. In some cases, it can interfere:

Cindy told a story about a student teacher who used to constantly take notes. She found the practice a little disturbing, especially at a parent-teacher conference. She said that parents are already uncomfortable about having a student teacher at a the conference, and it was inappropriate for him to be taking notes. (fieldnotes, informal conversation with Cindy, September 30, 1993)

Adult Role. In the adult role, the student teacher is acting like any adult volunteer would in the classroom. The student teacher's role does not require any special training or status.

Sarah [the teacher] decided that Ken [3rd grade student] should write down the directions for what he did so he could remember. Sarah got Ken to tell Anne [the student teacher] what he did so she could write it down. (fieldnotes, Sarah's after-school program, October 26, 1993)

In this example, Anne is doing something that any adult volunteer could have done.

Adult Plus Role. In the adult plus role, the student teacher is doing something special that most adult volunteers would not do. Volunteers might perform these tasks, but the tasks would generally require some training or status. The adult plus role includes disciplining students for misbehavior, spending time alone with the class (a privilege reserved exclusively for certified teachers, substitutes, and student teachers), working on special projects with students, and providing special expertise. Jennifer had a difficult class, and she spoke about how someone, such as a student teacher, could be very helpful to her.

[Jennifer] said that her class is unmanageable. She can't spend time with one student because if she turns her back, the rest of the students will be out of control. She said that if she had a student teacher or someone else who could be involved with the rest of the students, she could work with one student on the computer to show them some of the advanced features of ClarisWorks. While she is by herself, she can't work with one or a few students on the computer. (fieldnotes, interview with Jennifer, December 16, 1993)

Teacher Role. In the teacher role, the student teacher does things that are generally done by teachers. This is most evident during take-over when the student teacher has primary responsibility for the class. This also can be seen when student teachers give instructions and permission to students.

Renee and Terri finished. Connie [the student teacher] showed them how to save and told them they could go around and help others. (fieldnotes, Cindy's class at the university computer lab, October 5, 1993)

The four levels on the continuum are merely marking places, not absolutes. In most cases, student teachers are working in multiple roles, and any given role falls somewhere between the marking places listed here.

Support for Technology

Student teachers support the use of technology in different ways, some of which provide direct support to the teacher's use of technology, and others indirect support.

I observed nine functions of student teachers that support the use of technology in the classroom, and that

can be classified along the student to teacher continuum. These functions and their categories are:

1. take-over, teacher
2. teamwork, teacher
3. projects, teacher
4. future, teacher
5. alone with class, teacher or adult plus
6. university resources, adult plus
7. discipline, adult plus
8. expertise, adult plus
9. general help, adult

Take-Over. During take-over student teachers provide indirect support for technology. The purpose of take-over is to provide student teachers with a practice teaching experience. But if take-over goes well, the student teacher is in charge of the class for three weeks, giving the teacher a three-week period to spend time away from the classroom or working on special projects, including technology projects, with a few students at a time.

Sarah had several computer applications she wanted to teach her students during the school year. She said she plans to concentrate on Hypercard, Hyperstudio, Lego Logo, and ClarisWorks-in-the-Classroom.... She said she is going to pull students out to work on these things while the student teacher is in take-over. (fieldnotes, interview with Sarah, March 10, 1994)

While the three-week take-over period did not provide Sarah enough time to do everything she wanted to do with technology, it did serve as a time to take steps toward her goal of integrating technology throughout her curriculum.

Teamwork. "What's nice about having them [student teachers] is the teamwork. You feel like there is a lot of brainstorming that goes on when you're creating units" (Sarah, interview, May 5, 1994). Sarah reported a sense of teamwork from her student teachers that allows her and her student teacher to bounce new ideas off of each other and exposes her to new ideas. Cindy warned that some student teachers never reach a point where they are helpful, but others are "naturals:"

It works out lovely if you do [have a good student teacher], and many of us have very good teachers. These are the naturals, that I call them, so we didn't have to spend as much time training them, but we were able to immediately draw them into co-teaching with us, this teacher associate idea. (Cindy, interview, May 16, 1994)

Graham (1993) discusses the potential for conflict and uncertainty as well as the potential for teamwork and growth:

But this shared situation also creates an opportunity for genuine collaboration—a dynamic which

engages and alters both teacher and student teacher as they explore each other's intentions and reflect upon their shared work and teaching context. Faced with such a task, their relationship has the potential to become "joint work," the kind of collaboration most likely to lead to sustained professional growth and change. (pp. 213-214)

Projects. Cindy's class participated in the TeleOlympics, a project in which students compete in athletic competitions and email the results to other schools to be tabulated. As part of the TeleOlympics project, Daniel (Cindy's student teacher) organized the results in a spreadsheet. Cindy would have had difficulty doing this without Daniel. He offered computer expertise: while Cindy was comfortable with word processing, her experience with spreadsheets was limited. He offered an extra helper: this was a labor intensive project because the students could not do most of the computer work themselves—they had not learned spreadsheets, and the email was set up so that Daniel had to send the messages for the students—so Cindy would not have been able to spend the time on this project without her student teacher.

Future. With networking technology, schools across the country and around the world have more of an opportunity than in the past to communicate with one another and participate in joint projects. One implication for this is that student teachers can maintain a relationship with their cooperating teachers once they move to their own classrooms in other schools. For example, Daniel expressed an interest in continuing his contact with Cindy, "Daniel wants to get involved in TeleOlympics and do email with my class wherever he is."

Alone With Class. At Burnham Elementary School, only certified teachers are allowed to spend time alone with the class. The exception to this is student teachers. This issue was most prominent in Jennifer's class because she had an aide who was not certified, and Jennifer could not leave the class alone with her for extended periods of time. In take-over, student teachers provide long periods of time that the teacher is free to leave the room. At other times, when the student teacher is ready, the teacher can leave the class alone with the student teacher in order to attend meetings or prepare for the class.

University Resources. As part of the Full Year Program, the student teachers are provided with Powerbook Macintoshes. Cindy suggested that the student teachers be encouraged to bring their Powerbooks to the classroom to use as an extra computer. Both Daniel (Cindy's student teacher) and Jackie (Sarah's student teacher) brought their Powerbooks into the classroom regularly. "It was great, as far as the technology goes, to have these people because they were specifically trained [with technology]" (Cindy, interview, May 16, 1994).

The Powerbooks were brought into existing situations: classrooms that are trying to use computers and finding that they could use more. The support was being altered in two ways. First, the teachers were asking the students to bring their Powerbooks into the classroom to use as an extra computer. Second, some teachers were asking if they could use the Powerbooks outside of school. What started as support for student teachers was altered to become support for teachers and classrooms.

Discipline. In my observations, parent volunteers rarely disciplined students for misbehaving, but student teachers did regularly. This provided indirect support for technology by allowing teachers to work with small groups of students while student teachers maintained order in the rest of the class.

Expertise. Some student teachers, especially those in the Full Year Program had training and expertise with technology. This allowed them to work on additional projects and offer support for the teacher's projects. For example, when Cindy was showing her class some of the basics of Microsoft Word, Connie (her student teacher) helped her with some of the things she was not sure about.

In Connie's case, Cindy was fairly new to word processing, and Connie was more advanced, so she was able to help Cindy with some of the basic features of the word processor. In Daniel's case, he was fairly proficient with several aspects of the computer, such as email and word processing, so he was able to do computer projects with the class.

General Help. Although the purpose of student teachers is not to provide an extra pair of hands for the teacher, they often serve this purpose. For technology, this was especially evident when the teacher took classes to the university computer laboratory. In this lab, the students worked on computers to learn educational games and computer applications. As the students played the games, or worked on the word processing activities, they asked many questions, including: asking permission to go to the bathroom; asking basic technical questions such as "Where is the delete key;" asking questions about the assignment; asking for reading help. When student teachers or other adults were present, they answered these questions. In many cases the questions were simple enough that any adult could answer them, but this helped relieve the burden for the teacher.

Discussion

Student Teachers and the Organization of Schools

Scott (1987) discusses organizations in terms of open systems. The way an organization interacts with its environment can have a major impact on the organization—the more open the organization, the more significant the role of the environment.

Structurally, schools' organizations are set up in such a way that contact with the environment is limited. Other than contact with their students and students' parents, teachers get a great deal of information filtered down to them through principals. This limitation on the interaction with outside limits the information which teachers can receive.

Teachers do have contacts with the environment. One of the significant contacts can be through student teachers. As Sarah said, "The young people always keep me really, 'Am I doing what I need to be doing?'" (Sarah, interview, May 5, 1994). Firestone (1989) suggests that district-level policies filtering down to the schools are the main influence on school change. But he also discusses support: "Sometimes a school lacks the knowledge or skills to do what is required to use reform. Sometimes it lacks the personnel, time, and materials" (p. 161). While Firestone (1989) discusses what the district should do to target support to the needs of the school, in some cases, support exists from factors in the environment, such as student teachers.

Rising Credibility and Rising Proximity

Marcovitz (1996) extends models of innovation and support (e.g., Hall & Hord, 1987; Strudler, 1991) by creating a model of support for technology in which the goals of support are support-received and inspiration. These goals are influenced by credibility of the supporter, proximity of the support, and relevance of the support.

In addition to support teachers receive from student teachers, student teachers provide inspiration. Sarah spoke about the student teacher as "energizing," giving her the opportunity to discuss ideas and reflect on her practice. In a way, the student teacher provides the opportunity for the teacher to inspire herself by reflecting on her practice, validating some of her old ideas and challenging others.

In terms of support-received, student teachers have high proximity: they are in the classroom on a daily basis. Credibility and relevance vary based on the student teacher's different roles.

In the *adult* role credibility and relevance are not an issue because the student teacher is generally being directed by the teacher to what the teacher feels is relevant. However, both credibility and relevance can be a factor based on the teacher's trust in the student teacher (credibility) and the student teacher's abilities. Anyone can monitor students at the computer, but the teacher might not rely on someone with no computer background to be of any assistance.

As credibility and relevance increase, the teacher can place the student teacher into more of an *adult plus* role, relying on the student teacher for expertise and discipline.

With enough credibility and relevance, the student teacher can take the *teacher* role. All student teachers are placed in the *teacher* role for the take-over period, but the amount of support that is to the teacher varies based on

relevance and credibility. The class remains the responsibility of the teacher, who must feel comfortable leaving the student teacher alone with the class to go work on other projects.

The amount of support-received from the student teacher varies as the teacher can use the student teacher in roles of increasing responsibility along the student to teacher continuum. This generally follows how relevant the ideas of the student teacher are perceived to be and how much credibility the student teacher has.

Summary

Although student teachers are not placed in classrooms to provide support to the teachers, they often do provide support at various levels in roles ranging from student to teacher.

Technologically knowledgeable student teachers can provide direct support by being technical consultants, working on projects with students, and bringing teachers up-to-date information about the use of technology in classrooms.

Student teachers can provide indirect support for technology by taking care of students (teaching large or small segments of the class, disciplining students, providing an extra pair of adult hands), allowing the teacher to do technology projects with the whole class, small groups, or individuals.

Student teachers can bring new ideas to teachers, energize teachers, and provide a sense of teamwork for teachers.

Regardless of the intention of student teacher programs, student teachers can provide support to teachers. For at least a short time, student teachers are part of the classroom, not isolated from the teachers, and in some cases, are able to help implement projects on a day-to-day basis. Due to a need for day-to-day help with technology, some teachers have partially recreated the role of the student teacher to be an integral part of support for technology.

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David M. Marcovitz is a Visiting Assistant Professor in the Department of Educational Foundations and Technology, Florida Atlantic University, 2912 College Avenue, Davie, FL 33314.

Voice: 954-236-1992, fax: 954-236-1050.

Email: marcovd@mail.firn.edu

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