

# Technology-Enriched Schools: Cases and Issues

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## 1. What are Technology-Enriched School Projects? Why Should We Study Them?

### 1.1 Reaching for the potential of computers in education

We believe that computers can have a valuable impact in the school setting. We believe they can stimulate students, offer new instructional opportunities, revitalize teachers, and even contribute to restructuring whole school settings. Computer-related technology can bring new partnerships into the school—partnerships with industry, new relationships with the community, new types of collaborations with researchers, new resources from throughout the “global village” outside of the traditional classroom walls. We know that technology can be a catalyst to these possibilities.

But we also know that in most schools these possibilities are only beginning to be realized or not even happening. So many things keep the potential from developing as we think—or hope—it might. The list of problems and constraints is long:

If only we had *more:*  
*time, money, equipment, technical support, support from the administration,*

If only we had *better:*  
*ideas for instructional integration, opportunities for interaction with others, on-going support, information,*

If only we had *different:*  
*ideas about curriculum, approaches to inservice, ways of forming partnerships with others outside the school,*

Then just think what we could do!!!

### 1.2 Technology-enriched school projects

“Technology-Enriched School Projects” are initiatives in real school settings that try to reduce or remove as many of these problems and constraints as possible—to provide *more, and better, and different* environments so that, as much as possible, the current and future potential of computers in the school can be explored and enjoyed.

But, technology-enriched school projects are not based on technology. They are based on educational needs and vision. Instead of originating with technology, they focus on the uses of technology by teachers and students. They examine the atmosphere and functioning of a school that uses technology as a tool for change and stimulation. They are focused on the restructuring of education, with technology as a partner and tool.<sup>1</sup>

<sup>1</sup> See, for example, David, J. (1991, September). Restructuring and technology: Partners in change. *Phi Delta Kappan*, pp. 37-40, 78-82.

Technology-enriched school projects (or TES projects, for short) usually are multipartner, and these partnerships—involving business, the community, other schools and teachers, researchers, parents—are often innovations in themselves. Building on what we know about innovations in the school setting, TES projects are long-term, recognize the importance of the teacher, and work hard to involve teachers and administrators in the planning and decision making of the projects. TES projects generally involve the whole school, and recognize the complex interrelationships in the teaching and learning process.

And TES projects do involve new challenges with technology—not only because TES projects by definition involve extra infusions of computer-related technology relative to what is usually available to a school. An additional dimension of the technology-related challenge is that often this technology and the types of software running on it include new varieties of resources—multimedia, telecommunications, networks, scanners, interactive videodiscs—that teachers may not ever have used before.

### 1.3 Learning from technology-enriched schools

Thus TES projects offer tremendous opportunities to study both the potential and the problems that can develop in technology-enriched school environments. As more and more schools are becoming “technology-enriched” even without special projects, the value of learning from those settings that try to maximize the opportunities and minimize the problems is obvious.

But, we have difficulties learning from the experiences of current TES projects. A major reason is that we have difficulty finding out about them, or finding out enough to give us insights into our own situations. There are many TES projects going on throughout the world, but how can we find out about them? How can we learn from them?

“Learning from them” involves more than just getting some information. We need different ways of studying these projects than traditional educational experiments or surveys. We need better strategies for comparing different complicated settings as they respond in their own ways to different combinations and possibilities of new technologies in classrooms and schools. How can we better compare the:

- Goals of different TES projects?
- Motivations that inspire the different partners in TES projects?
- Strategies for support and stimulation of teachers in TES settings?



- Types of technology present and how this technology gets integrated into instruction?
- Reactions and impacts on the students in TES settings?
- Changes in the classroom, the school, even the community in TES settings?

How can we move from intuition and belief (“Think of what we might be able to do if we only had...*more, better, different*...”) to know-how and insight?

One way is to systematically collect a wide range of information from a number of TES projects that appear to be running successfully. If we collect good information from different case studies of technology-enriched schools we may be able to apply a kind of “backward mapping”<sup>2</sup> to look for trends and combinations of factors that may have made an especially important contribution to the evolution of the project. This “multiple case study” approach is the strategy for this book.

## 2. About This Book

### 2.1 Beginnings at NECC '90

This book began following a preconference workshop at the National Educational Computing Conference (NECC '90) in Nashville, Tennessee. At this workshop we invited project leaders from various technology-enriched school initiatives to describe their projects and schools and to participate in a simulation of the setting-up of a new TES project in a hypothetical school.

The response to the workshop was lively and enthusiastic. The presenters did an excellent job of capturing important insights about their schools and projects; the participants in the workshop asked challenging questions; the different simulation groups came up with innovative approaches for the hypothetical TES project. At the end of the workshop there was a clear message—this sort of exchange of ideas and experiences should be available for others, not only others involved in TES projects, but everyone interested in improving the potential of technology in school environments. Thus this book was born.

An especially valuable aspect of the workshop was the contribution of persons from projects in a number of different countries. Becoming more aware of the different educational contexts and strategies in which TES settings occur gives us new ideas for our own environments. And the many similarities in problems and results, despite very different contexts and approaches, gives us stronger insights into what we can expect from technology infusion in the school.

### 2.2 Organization of the book

This book is thus organized as a set of nine case studies, each written by a person or persons in leadership positions in a technology-enriched school setting. The case studies describe 19 different schools in 6 countries. Of the 14 authors of the case studies, six were presenters at the NECC '90 workshop; the editors of this book were the organizers and chairpersons of that workshop. Table 1 gives an overview of the case studies in this book, the age of students involved, the locations of the schools. These case studies appear in Section 2 of the book.

## 3. Toward Synthesis and Recommendations

### 3.1 Organizing questions for the book

But this book is not only a collection of rich and interesting case studies. Synthesis, looking for trends and messages for other projects and schools, requires a methodology. Ours, the multiple case study approach with backward mapping, required us to impose a certain framework on the case study authors so that we would have similar categories of information from each of the cases for comparative purposes. Thus we asked our case study authors to organize their reports around five major headings:

- Background, context, and goals of the project
- Organization of the project
- Teacher involvement, training, and support
- What's happening now in the project?
- Results (to date) and recommendations

For each of these headings we asked the authors to make sure they gave us various types of information, so that we could address questions such as the following:

1. How did the “technology-enriched school” projects get started?
2. How do the goals of the projects compare?
3. How are technology-enriched projects organized from a point of view of personnel and time?
4. How is technology being integrated into instruction in technology-enriched schools?
5. What about technology-enriched schools from the perspective of the classroom teacher? What are strategies for teacher involvement, motivation, support, and training?
6. What results are emerging from technology-enriched school situations?

<sup>2</sup>Fullan, M., Miles, M. E., & Anderson, S. E. (1988). *Strategies for implementing microcomputers in schools: The Ontario case*. Toronto: Ministry of Education.

Table 1  
Overview of the Cases

| <i>Authors</i>              | <i>Case</i>      | <i>Number of Schools</i> | <i>Level<sup>1</sup></i>   | <i>Location</i>                | <i>Number of Students</i> |
|-----------------------------|------------------|--------------------------|--|--------------------------------|---------------------------|
| Elder                       | Mt Newton        | 1                        | Grs. 6-8<br>(Ages 11-14)   | Saanichton<br>British Columbia | 640                       |
| Matray                      | Monterey<br>MTSS | 4                        | 2x Grs. k-5<br>(Ages 5-11)<br>1x Grs. 6-8<br>(11-14)<br>1x Grs. 9-12<br>(Ages 14-18) | Monterey, California           | 3162                      |
| Howard & Pratt              | West             | 1                        | Grs. 9-12<br>(Ages 14-18)  | Columbus, Ohio                 | 120 <sup>2</sup>          |
| Moonen & Beishuizen         | Dutch TES        | 3                        | Grs. 7-12<br>(Ages 12-18)  | Netherlands                    | 3700                      |
| Diamandi                    | School No. 56    | 1                        | Grs. 1-8<br>(Ages 6-14)  | Bucharest,<br>Romania          | 2500                      |
| Peled, Peled &<br>Alexander | Comptown         | 6                        | Grs. 1-8<br>(Ages 6-14)  | Emory,<br>Israel               | 2000                      |
| Smith & Sassi               | F.M. Black       | 1                        | Grs. 6-8<br>(Ages 11-14)   | Houston,<br>Texas              | 1200                      |
| Holt                        | Quinte           | 1                        | Grs. 9-12<br>(Ages 14-18)  | Belleville,<br>Ontario         | 900                       |
| Wells                       | Netherhall       | 1                        | Grs. 7-12<br>(Ages 12-18)  | Cambridge,<br>United Kingdom   | 1400                      |

*Notes:*

1. Expressed in equivalent U.S. grades
2. Participating in the TES project

7. What recommendations do persons involved in technology-enriched situations make to others moving into similar projects or situations?

lighting our own reflections on the case studies, on technology-enriched schools—and on our methodology for studying technology-enriched school settings.

### 3.2 Overview of Section 3

The case study authors did an excellent job in addressing these and many other questions in a limited number of pages. Because of the common format, our attempts at synthesis and trend-spotting were much facilitated. Section 3 of the book includes our synthesis of the nine case studies and the 19 technology-enriched schools described in these studies. In the first chapter in Section 3 we summarize the case studies around the seven questions listed above.

We conclude Section 3 with a short chapter high-