DOCUMENT RESUME

ED 415 577 EA 028 857

TITLE	Investing in School Technology: Strategies To Meet the Funding Challenge.
INSTITUTION	Pelavin Research Inst., Washington, DC.
SPONS AGENCY	Department of Education, Washington, DC. Office of Educational Technology.
PUB DATE	1997-11-00
NOTE	70p.
PUB TYPE	Reports - Evaluative (142)
EDRS PRICE	MF01/PC03 Plus Postage.
DESCRIPTORS	Adolescents; Children; *Computer Uses in Education; Computers; Educational Finance; Elementary Secondary Education; Expenditures; Federal Programs; *Financial Needs; *Fund Raising; *School District Spending; *School Funds; Technological Literacy; Technology Education
IDENTIFIERS	Department of Education; *Technology Plans

ABSTRACT

The U.S. Department of Education has produced a national educational technology plan, calling for the placement of high-quality computers--one for every student-- in U.S. schools by the year 2000. Strategies for meeting the plan's funding challenges are the focus of this document. The report provides state and local policy makers some tools and pointers for thinking about their educational technology plans and for developing comprehensive strategies for funding those plans. The first chapter explores the promises of educational technology, examines cost estimates for placing educational technology in all the nation's schools, and summarizes an investment strategy for financing educational technology. Chapter 2 details some investment paradigms, laying out for state and district policy makers a systematic method of thinking about the costs of educational technology. Different funding strategies are detailed in chapter 3--strategies that feature funding mechanisms familiar to those in the public sector. The report recommends that states consider taking responsibility for the initial financial outlays required to implement district educational technology plans, use long-term financing to support training costs, prioritize technology line items in district budgets, and incorporate a 5-year planning strategy. (RJM)

EA

EA

Investing in school technology: Strategies to meet the funding challenge

November 1997

Prepared for: **U.S. Department of Education**
Office of Educational Technology
600 Independence Avenue, S.W.
Washington, D.C. 20202

Prepared by: **Pelavin Research Institute**
1000 Thomas Jefferson Street, N.W., Suite 400
Washington, D.C. 20010

Contents

Exhibits

Chapter 1

EDUCATIONAL TECHNOLOGY AND THE INVESTMENT PARADIGM

Introduction

In his State of the Union address on January 23, 1996, President Clinton challenged Congress and the American public to commit the resources necessary to ensure all students access to high-quality technology and the information superhighway:

> Our ... challenge is to provide Americans with the educational opportunities we'll all need for [the 21st] century. In our schools, every classroom in America must be connected to the information superhighway with computers and good software and well-trained teachers. We are working with the telecommunications industry, educators, and parents to connect ... every classroom and every library in the entire United States by the year 2000. I ask Congress to support this educational technology initiative so that we can make sure this national partnership succeeds.

In accord with the President's challenge, the U.S. Department of Education has produced a national educational technology plan, calling for the placement of high-quality computers—one for every five students—in American schools by the year 2000.[1] These computers will be capable of running high-quality educational software and will be connected to the information superhighway.[2] Reflecting the seriousness of the commitment to reach that goal, the President's budget provides $2 billion over five years for the Technology Literacy Challenge Fund to help states implement their educational technology plans.

---

[1] U.S. Department of Education (1996), *Getting America=s Students Ready for the 21st Century: Meeting the Technology Literacy Challenge*, Washington, DC.

[2] The National Information Infrastructure (NII), or information superhighway, is an extensive, seamless web of computers and communication networks that makes available vast amounts of information contained in databases held by libraries, universities, government agencies, commercial businesses, and many other types of organizations. Eventually, the NII will integrate telephone systems, cable systems, broadcast and radio stations, and satellite systems.

The goal of providing America's school children with access to high-quality educational technology cannot be realized without the commitment of significant resources. What is more, it cannot be realized efficiently and effectively without a concerted effort on the parts of local and state governments to coordinate their strategies for investing in educational technology.

The purpose of this paper is to provide state and local policy makers—state legislatures, state superintendents and departments of education, local school boards, and school district superintendents—some tools and pointers for thinking about their educational technology plans and for developing comprehensive strategies for funding those plans. In this first chapter, we introduce the issues involved: the promises of educational technology; existing cost estimates for placing educational technology in all the nation's schools; and an overview of the notion underlying our investment paradigm for financing educational technology.

In Chapter 2, we turn to the investment paradigm, laying out for state and district policy makers a systematic method of thinking about the costs of educational technology. The chapter also develops a framework for costing the technology plan.

In Chapter 3, we summarize different funding strategies that states and school districts may want to pursue in order to realize the objectives of their educational technology plans. These strategies include both some funding mechanisms familiar to those in the public sector and some mechanisms that may merit experimentation. Descriptions are provided of several different funding mechanisms that have been tested by states and districts.

Highlights

In summary, this report's main recommendations are:

- To minimize implementation barriers, states should consider taking responsibility for the initial financial outlays required to implement district educational technology plans.
- School districts should use a separate technology category or line item in district and school budgets to help prioritize technology, promote clear goals, and ensure that the technology is kept modern.
- School districts should use long-term financing to support training costs.

- To make it easier to meet the technology funding challenge, states and districts should look toward at least a five-year planning horizon.
- The costs associated with implementing the technology plan should be analyzed in detail to produce a better match between different components of the plan (e.g., training, equipment purchase, and maintenance) and various financing strategies or options.
- To develop experience and build competencies, districts should consider progressing through increasingly sophisticated models of technology use and implementation.

The Cost of Educational Technology and the Funding Challenge

Several attempts have been undertaken to estimate the cost of placing a number of different educational technology models in every American school. Some of the most notable of these estimates include:

- McKinsey & Company's Classroom model, which most closely resembles the plan put forward by President Clinton and which calls for classrooms with one computer for every five students. Students and teachers would have full access to the information superhighway as well as to appropriate educational software. McKinsey estimates that implementing this model nationwide would require an investment of approximately $11 billion per year over 10 years.[3]
- Based on its analysis of eight "technology intensive" schools, the RAND Corporation found that nationwide implementation of similar models would cost between $8 billion and $20 billion per year over five years.[4]

---

3 U.S. Department of Education (1996) 33.

4 Ibid.

- The Telecommunications Industries Analysis Project (TIAP) estimates that deployment of its Team of Students model, also similar (though not identical) to the President's plan, would cost $10 billion to $12 billion per year over five years. (TIAP does not estimate ongoing maintenance and operating costs.)[5]

- The MIT Research Program on Communications Policy estimates that a model similar to, but less ambitious than, the President's would cost between $12 billion and $17 billion.[6]

These numbers are imposing. However, when considered within the context of total current expenditures in elementary and secondary education, they seem more manageable. For example, McKinsey & Company estimates that deployment and operation of its Classroom Model will require 3.9 percent of current elementary and secondary education expenditures, while 1.3 percent of current expenditures are devoted to educational technology at present. In other words, McKinsey's estimates suggest that school districts, on average, need to triple their expenditures in educational technology to put in place the type of educational environment envisioned by the national educational technology plan. Yet tripling current expenditure amounts to devoting less than 4 percent of a district's total budget to education technology.

Costing the Technology Plan and the Investment Paradigm: An Overview

The objective of this report is to provide state and district policy makers with a framework for thinking about the costs of school technology plans and for developing the funding strategies for those plans. The value of this framework to state and district policy makers is premised on two assumptions: (a) school technology plans will most efficiently and effectively be implemented in those places where districts and states work together to develop funding strategies; and (b) most school districts need to revise the way in which they budget for technology expenses.

The funding of school technology plans is best carried out by a coordinated state-district effort for several reasons. First, it is at the state level that economies of scale can best

[5] Ibid.

[6] Rothstein, R.I. and McKnight, L. (1996). *Technology and Cost Models of K-12 Schools on the National Information Infrastructure*. Massachusetts Institute of Technology, Cambridge.

be realized. Second, state governments are well positioned to ensure that the costs of implementing school technology plans are borne, at least in part, by *all* the beneficiaries of those plans. Third, state governments have an important equity role to play: districts in rural areas and districts with older schools or small tax bases should be supported by states in their efforts to implement school technology plans. By establishing guidelines and goals for what school technology plans should contain, states can help districts realize economies of scale and ensure that the technology plans being implemented across the state are reasonably comparable.

Coordination between states and districts is not sufficient, however, to bring about a funding strategy that works. In addition, school districts must change the way in which they budget for and fund their school technology plans. Educational technology is unlike any other expenditure budgeted by school districts. It is neither a labor expense nor a capital expense nor a recurring material expense, but rather a hybrid. Technology resembles capital expenditures in that it usually requires significant start-up costs followed by maintenance costs, but it generally should not be funded through the same types of mechanisms available to school districts for capital expenditures.[7] Neither do expenditures on educational technology closely resemble expenditures on other educational materials, for the start-up costs are greater, and the extent of professional development required to support the program is far greater.

For these reasons, educational technology should be treated separately—in its own line item or budget category—from other items in the school or district budget. By distinguishing technology from other categories of expenditures, the various components that make up a school technology plan will become more distinct. This effect has the advantages of facilitating the projection of future funding needs, and providing information needed for revision of the school technology plan. At the same time, by creating a line item for technology, the district is acknowledging that the maintenance of up-to-date educational technology systems will require ongoing expenditures. Building these capacities into the school's or district's budget process will be crucial to the successful implementation of school technology plans.

[7] Many districts have used school bond initiatives as vehicles to support the installation of technology into new and rehabilitated schools. However, technology in general should not be subsumed under capital expenditures, for too great a proportion of technology costs recur regularly.

Chapter 2

DESIGNING AND COSTING THE TECHNOLOGY PLAN

Introduction

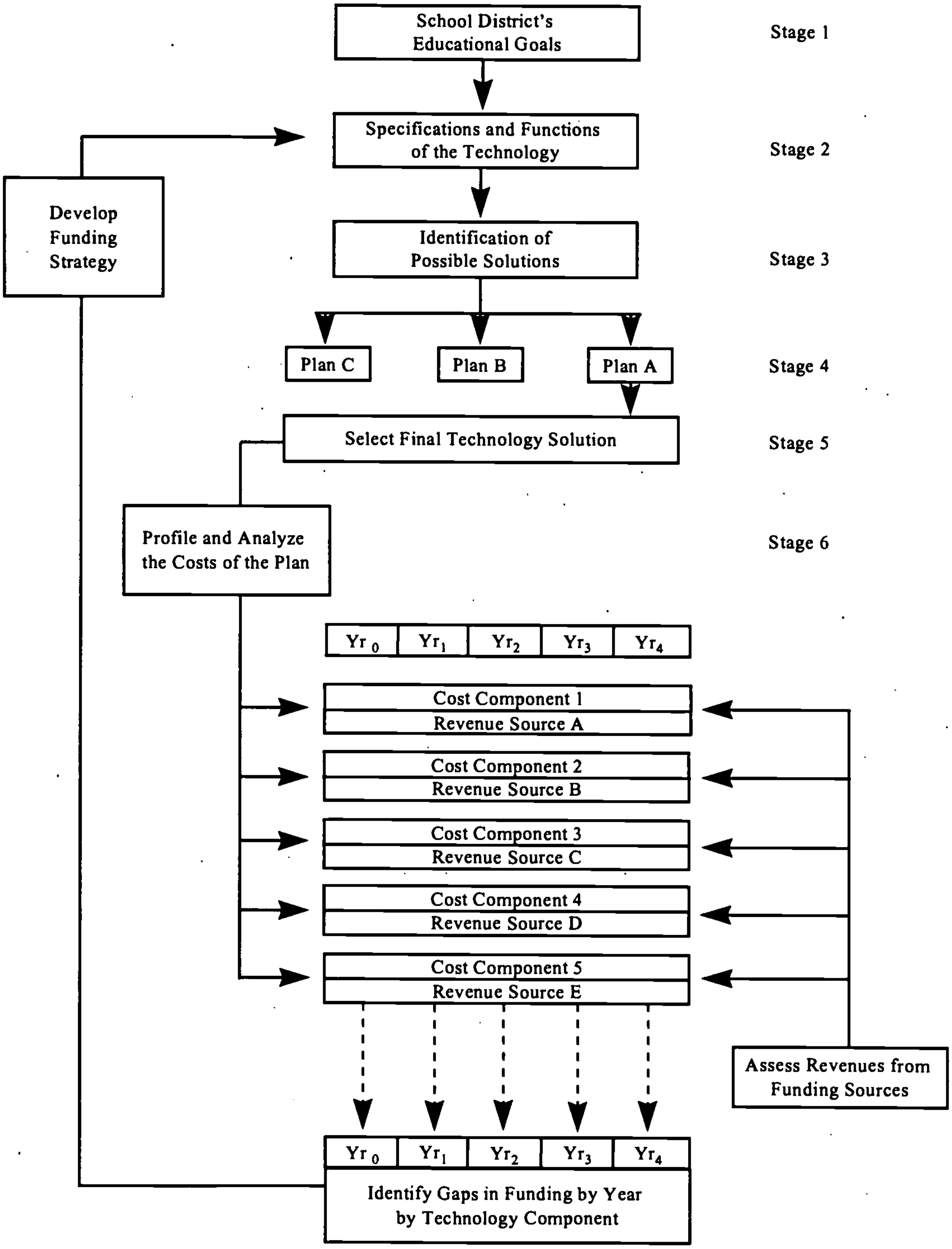
This chapter outlines the underlying cost structure of the basic components of school technology plans and examines the investment choices available. It also presents a framework for analyzing a technology plan's life-cycle costs. Chapter 3 describes a revenue model that will help assess the financial feasibility of the technology plan when used in conjunction with the cost model. The approaches to analyzing the costs and revenue sources we outline in these two chapters will provide the basis for formulating specific funding strategies at the school district level. Those strategies are discussed in Chapter 3.

In developing the plan that will put technology into schools, there are at least six stages of analysis required to properly inform the school district's funding strategy. Exhibit 2.1 illustrates an approach to developing and analyzing a district-based technology plan as a precursor to developing the funding strategy. Any technology plan should be formulated around the educational goals of the school district (stage 1). Conducted properly, this step will clearly define the technical and functional requirements needed to facilitate the district's educational goals (stage 2). Potential technology solutions will be shaped by these specifications (stage 3). Once the plan has taken shape, its technical and operational feasibility should be assessed. Usually, there is more than one alternative technical solution capable of meeting the objectives for a system (stage 4). To ensure a prudent public policy, the cost of at least one other feasible technical alternative should be evaluated.

Once the most appropriate technology has been selected (stage 5), the costs of the entire technology plan should be analyzed by developing a model of the life-cycle costs of the plan (stage 6). The technology plan should be reviewed and possibly refined in light of this analysis. A model of life-cycle revenues should be developed by assessing the funds that are available from existing sources and mapping them back to the technology's life-cycle costs to identify gaps in the available funding streams. Now, we have reached the starting point for developing a creative funding strategy. Part of this strategy may involve amending the plan's goals, technology configuration, or implementation to better accommodate funding availability.

Exhibit 2.1

Conceptual Approach to Developing the School District's Funding Plan



Technology Models for Accessing the Information Superhighway

At least five basic technology models provide schools and classrooms with access to the information superhighway. The five are based on a combination of the connectivity models described by Rothstein and McKnight[8] and the infrastructure deployment models described by McKinsey.[9] The models are listed below and presented in a stylized form in Exhibit 2.2.

1. Single PC dial-up (no LAN) that supports single-user access.

2. LAN with shared modem that supports limited multi-user access.

3. LAN with router that supports laboratory-based student and teacher access.

4. LAN with local server and dedicated line that supports classroom access.

5. LAN with local server and high-speed dedicated line supporting desktop access.

Adaptations of these models will differ from one site to another, depending on the nature of the facility, the needs of staff and students, and what technology currently exists at the site. However, we present the models in their basic form to provide a framework for considering the economics of the systems that underpin them. These considerations can be used to support the funding strategy.

Model 1 is a basic, low-cost design. Using a modem, it provides only a single line connection – such as via "plain old telephone service" (POTS) – to the district office server that limits access to one user at a time. Because of the narrow bandwidth, it is suited best to text-based applications on the Internet (i.e., limited bandwidth means that slow response times will not adequately support video or graphical applications).

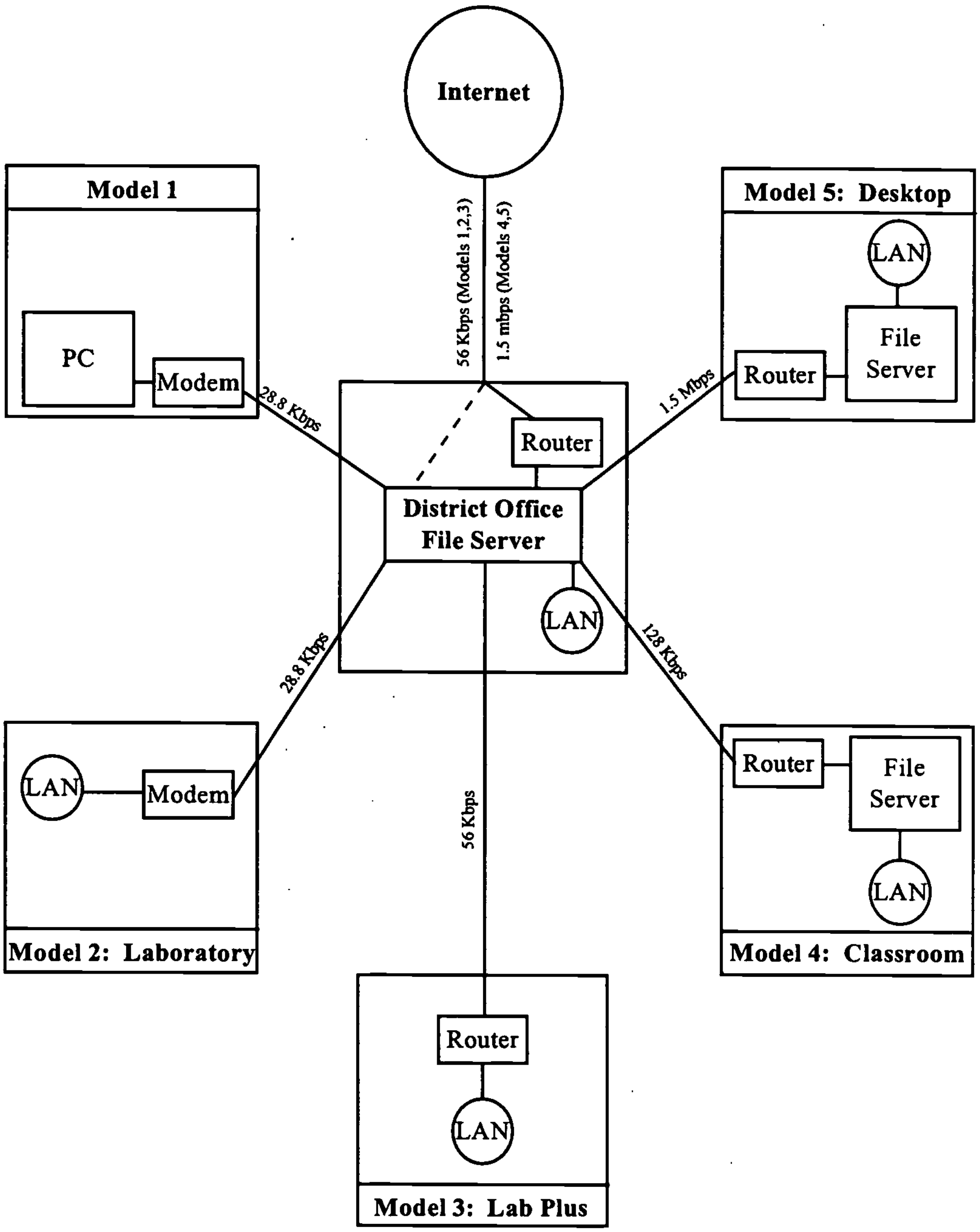
---

8 Rothstein, R.I. and McKnight, L. (1996).

9 McKinsey & Company (1995).

Exhibit 2.2

The Basic System Architecture of Technology-Based Instruction Methods



Model 2 enhances Model 1 by adding a local area network (LAN). The LAN gives every machine connected to the network the ability to access the Internet in the manner described in Model 1. The number of users able to access the Internet at any one time is limited by the number of outside access lines the school has. Apart from an increase in the number of simultaneous users, the benefits of this system are the same as those in Model 1. The technology environment sustained by Model 2 is equivalent to the Laboratory model described by McKinsey.[10] It provides very limited access to technology, and access to computers and the information superhighway must be scheduled. For these reasons, this model is unlikely to lead to full integration of technology into the curriculum.

Model 3 differs from Model 2 by using a router instead of a modem. The advantage of a router is that several users at a school can access the Internet at the same time. With a router in place, the LAN can be expanded so that it becomes possible in Model 3 for the system to simultaneously support one or more PC in each classroom. Model 3 is the equivalent of McKinsey's Lab-Plus model.[11] It can be a stepping stone toward deployment of Model 4 because it supports additional networked computers in the classroom for student use. It also gives teachers an opportunity to develop technology skills and competencies, as well as the time to adapt their courses and teaching methods to the expanded technology prior to deploying Model 4. In Model 3, the larger network increases initial start-up costs, compared to Model 2, and the larger number of users (involving all the teaching staff) increases training expenditures.

Model 4 is similar to McKinsey's Classroom Model.[12] In this model, connectivity to the information superhighway becomes widespread throughout the school. Several features of Model 4 are different from the previous models. First, there is a file server at the school that improves the performance of the network because information can be accessed locally. The increased traffic in this system will require at least an ISDN connection from the school to the district office or local telephone company central office. For the same reason, there is a dedicated high-speed T1 connection from the district office to the Internet. In contrast to the earlier models, this enables the school's network to provide some limited support for video and graphical applications. (A T3 connection would provide an even higher-speed link and support

10 McKinsey & Company (1995).

11 Ibid.

12 Ibid.

applications such as teleconferencing.) The largest cost in this model is the cost of acquiring many computers, resulting in high start-up costs. Because of the larger number of users, equipment inventory, and network complexity, training and technical support will form most of the recurrent or ongoing costs of this system. Also, the high-speed Internet connection is a significant cost item. (The "E-rate" component of the Universal Service Fund and Telecommunications Act of 1996 can reduce this and related telecommunications costs through discounts.)

Model 5, which assumes there is a computer at every student's desk, will require a high-speed link (T1) between the school and the district office. The costs of this model are high. Hardware costs (for a computer on each desk) are large, and the training and technical support function will be extensive. The large number of computers in the school will require greater modification of the existing facilities and reinforcement of several other elements in the model. For example, the large number of users will require strong system management and maintenance skills, which may inflate technical support costs. Compared to Model 4, the marginal benefits this model may produce may not be commensurate with its higher cost.

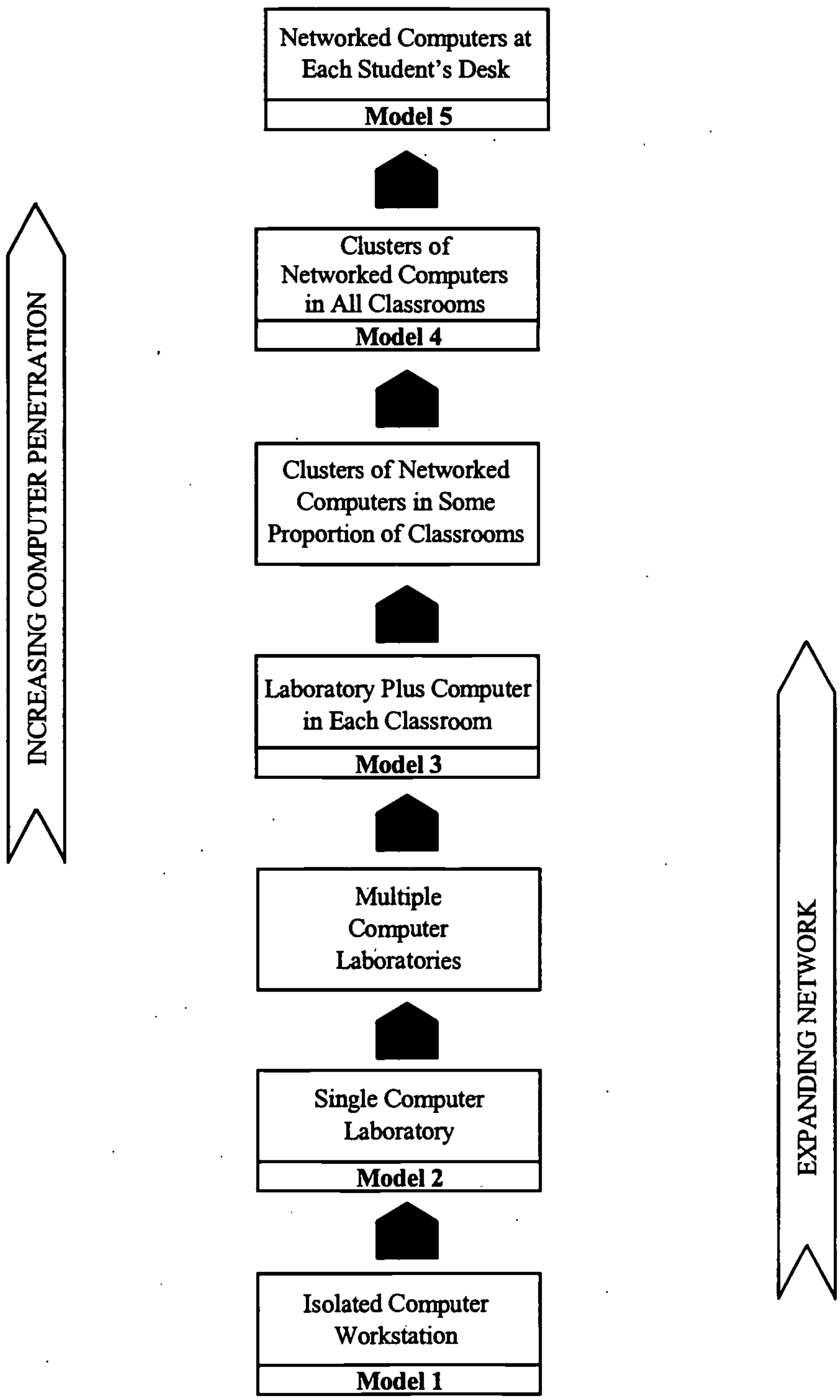
Transitioning through the Models

The five models of accessing the information superhighway described above can be regarded as a family of models in which one model is a natural precursor to the next. Higher overall implementation costs at the time of full deployment of the classroom or desktop model is traded for lower costs in the early years of deployment. Exhibit 2.3 presents a schematic of this deployment pattern for a given school.

There are other compelling reasons why a school or school district may wish to adopt this sort of developmental approach to technology deployment. At relatively low cost, the introduction of the Laboratory model in a school will enable the school to develop technical leaders from among the staff who may subsequently help develop the technical competencies of other teachers in preparation for the next phase of deployment. The next phase, the Lab-Plus model, provides a networked workstation for each teacher, which will enable teachers to

Exhibit 2.3

Transitioning Through the Technology Models



gain experience with their newly acquired technical skills and will give them the opportunity to begin integrating technology into the curriculum. Achieving these goals can smooth the way for the next stage of deployment, the Classroom model. Movement to each stage can be based on an evaluation of the success of the current stage.

So far we have discussed technology deployment and costs at the school level. Usually, though, technology planning occurs at the school district level. The developmental approach of these models can be applied similarly at the school district level. For example, although local educational goals will dictate the ultimate technology configuration the school district wants, the movement toward these goals does not have to occur uniformly in each school in the district. In practice, the implementation timetable is unlikely to be the same in each school. Different schools may require different models. For example, the method of deployment may be different for newly built schools compared to older schools, elementary schools compared to high schools, or schools with falling enrollments compared to schools where enrollments are expanding. Considerations such as these reinforce the need for a cost analysis framework to distinguish costs at the level of individual schools.

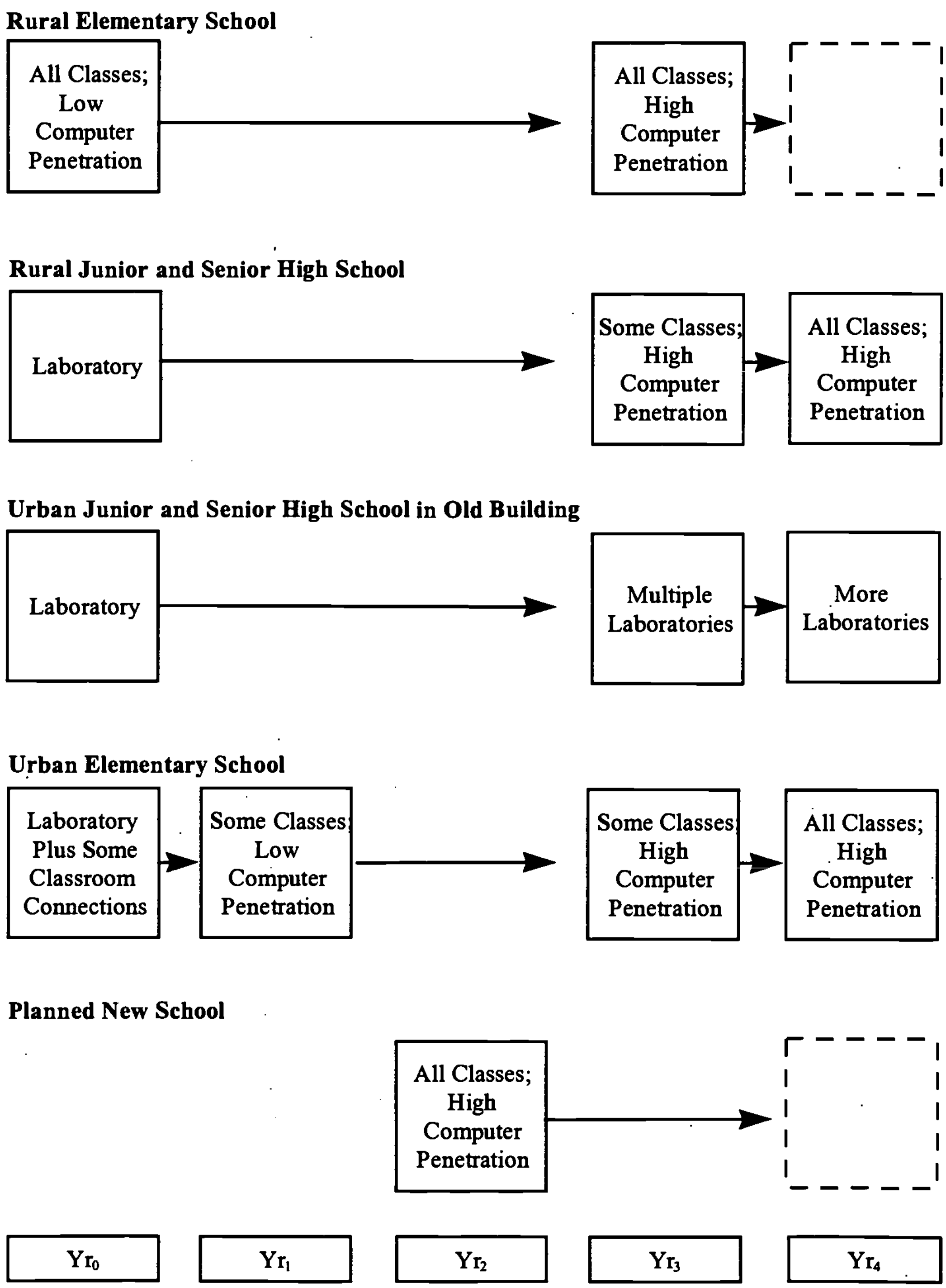
Exhibit 2.4 illustrates technology deployment patterns for five different schools in the same school district. In this example, the goal of the school district is to obtain a relatively high level of computer penetration in all its classrooms by the year 2000. Each school follows a different trajectory toward this goal, based on its individual circumstances and achievements. The technology model that ought to be deployed initially in a school depends on several external factors (such as whether the school building is old or new or whether there are teachers already on staff who have technical competencies). How long a school remains in any one stage of the technology transition may depend not only on the school district's goals but also on the school's success in that stage of development, as indicated by student outcomes, staff competencies, changes in school practices, ability to innovate, ability to raise matching funds, and other factors.

System Constraints

To minimize pressure on funding, it is important to identify system constraints in the planning process. If they are not recognized at this stage, the system will not perform as planned and is unlikely to produce the results expected of it. System constraints are most likely

Exhibit 2.4:

Different Trajectories toward Technology Goals



to occur in three areas: equipment, software applications, and staff development. In each area, the following factors will impede system performance:

- Equipment
  - Inadequate technical staff support
  - Equipment incompatibilities
  - Insufficient technical competencies of teachers and other staff
  - Inability of equipment/network to support desired performance

- Software applications
  - Lack of availability
  - Poor quality
  - Staff not properly trained in its use
  - Inability of equipment/network to support desired performance

- Staff development
  - Insufficient initial or ongoing technical training
  - Inability to integrate technology into curriculum
  - Poor support by technical staff

If any of these obstacles cannot be removed or mitigated, an action plan should be developed to facilitate overcoming them.

Costing the Technology: Current Methods

Technology costs should be *analyzed*, not simply budgeted, to ensure that the design of the plan is optimal and that it can be financially sustained over its projected life. Provided an appropriate cost analysis framework is used, the flexibility of the technology plan can be assessed, trade-offs can be considered explicitly, and other options that preserve the plan's goals can be evaluated. Using an analytical approach will increase the likelihood that technology will find its way into the district's schools and that its deployment will be successful.

Numerous estimates have been made to evaluate the cost of implementing technology plans at the national level, and school districts commonly use budgeting methods to cost plans at the local level. Whatever the method used, they all seem to have some methodological weaknesses in terms of developing the financing or funding strategies needed to implement technology.

The methods used by RAND, McKinsey & Company, and other organizations to estimate costs at the national level cannot be applied to develop cost estimates for district-based technology plans for several reasons. They typically assume only one technology model is deployed nationwide, and that the technology is deployed in uniform waves over a finite period of time, such as five or 10 years. They may use only one profile of the "average" school, and they typically assume there are no funding constraints.

Even the methods used by school districts themselves to cost their technology plans are not conducive to analyzing the financing implications of these plans because their methods tend to be borrowed from budget analysts. From the standpoint of devising a budget, this approach is fine, but in terms of devising a funding strategy for the technology plan, it is too limiting. For example, if there is no existing budget account to fund a particular element in the technology plan, that element may be excluded from the plan regardless of its potential contribution to education goals. Costs derived for budgeting purposes are rooted in concrete objectives, which limits the scope for exploring strategies, timeframes, or evaluations to gauge the effectiveness or success of the plan.

At the school district level, the methods used to cost technology should provide answers to questions other than just "How much will the plan cost?" Such questions might include: Which technology model best allows the attainment of our goals? Should all schools in the district implement technology at the same time? If not, which schools should go first? What factors can jeopardize the success of the plan? Is a technology leap required or can a series of intermediate steps be taken? Can the technology plan be funded? If not, what can be done to bridge the gap between resources in hand and the total needed?

The Economics of Accessing the Information Superhighway

In this section, we explore the underlying cost structures of the models for accessing the information superhighway examined earlier. A basic understanding of the economics of these models is necessary prior to applying the cost analysis framework presented in the section that follows. The data in this section rely on cost estimates produced by Rothstein and McKnight[13] and are used to illustrate some basic differences in the economics of these models.

Exhibit 2.5 shows that, excluding Model 1, which provides minimal benefits, there is relatively little difference in the annual operating (or ongoing) costs of Models 2, 3, and 4. Even though annual operating costs are fairly similar, on an *a priori* basis it seems clear that Model 4 (the Classroom model) should generate substantially greater benefits than Models 2 and 3 (the Laboratory-based models). This is because Model 4 offers better connectivity to the information superhighway and greater student and teacher accessibility to computers. In addition, the installed network associated with Model 4 is able to support a wider range of applications. Model 5 also offers potential benefits, but the start-up costs are significantly higher than in other models. The relative differences in start-up (or one-time) costs between Models 2, 3, and 4 are larger than is the case with ongoing costs. For example, Exhibit 2.5 shows that the start-up cost of Model 4 is almost four times higher than Model 2, and over twice as high as Model 3. However, is possible to design a funding strategy that defrays or spreads Model 4's high initial costs over a period of years. Although the start-up costs of Model 4 are four times higher than those for Model 3, Exhibit 2.5 shows that on an annualized basis Model 4 is less than twice as expensive (only 90 percent more expensive) as Model 3.

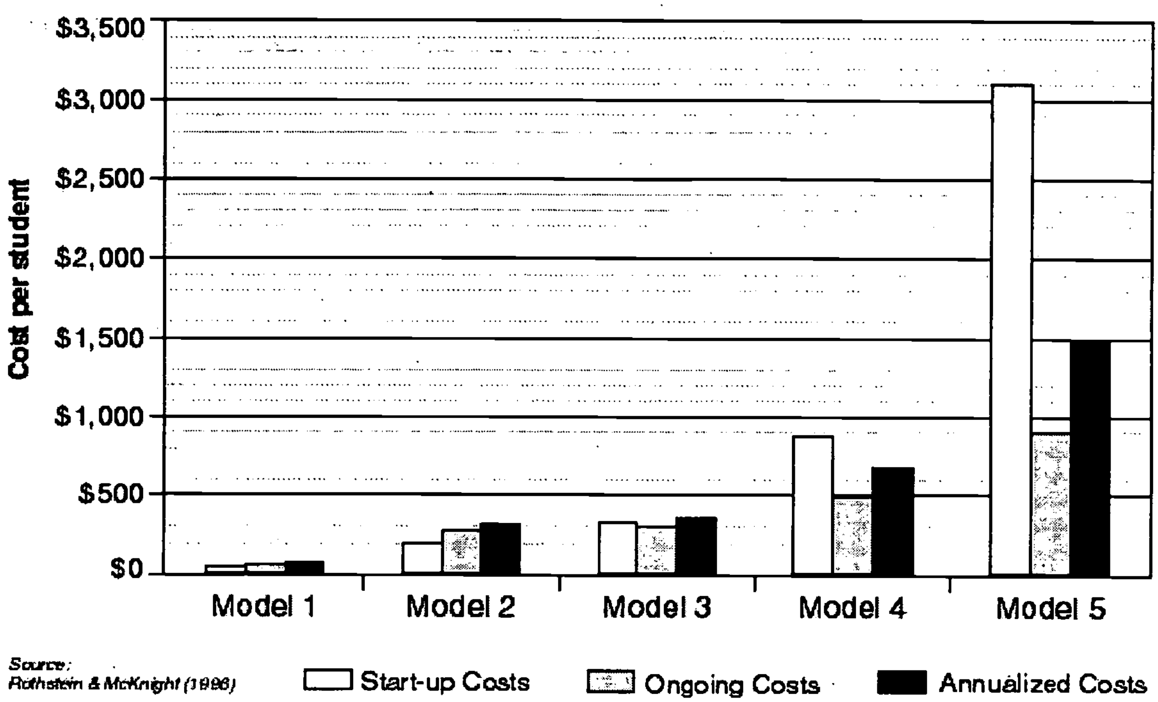
This brief analysis of the economics of different models of accessing the information superhighway contains an important lesson for the funding strategy: *as the capacity (bandwidth) and size (number of nodes) of the network increases, initial or start-up costs increase much more rapidly than annual operating costs*. This is because of the higher costs associated with increased computer penetration and the much larger technical support and staff training

---

13 Rothstein. & McKnight (1996). Rothstein and McKnight's overall cost estimates are similar to those produced by McKinsey & Company, but the former's figures tend to be higher for start-up costs and lower for ongoing costs. This seems to be because Rothstein and McKnight allocate more training costs as start-up costs. Rothstein and McKnight's data are used in this section not because their methods are superior to McKinsey's but simply because they are available at the level of detail needed for the type of analysis presented here.

required. In other words, more bandwidth and nodes mean greater start-up costs but still manageable maintenance costs. The funding strategy should focus on keeping these start-up costs to a minimum while maintaining the level of service and support required by the technology plan.

Exhibit 2.5
Comparing Costs Between Models



Source:
Rothstein & McKnight (1996)

The funding strategy may also need to focus on overcoming the potential barrier to implementation imposed by high initial costs. In these circumstances, the technology plan should be designed so that it gives the school district the flexibility to spread start-up costs over several years. This type of strategy may include phasing in different schools at different times; phasing in and evaluating implementation of different models at a school over time (i.e., moving from one stage of technology to the next); leasing equipment rather than purchasing it outright; and folding start-up costs into bond issues. Some school districts are now emulating practices found in parts of the corporate sector. In the airline industry, for example, the heavy training costs associated with introducing a new aircraft type are typically financed as part of the aircraft acquisition package and amortized over several years in the balance sheet.

Appraising the Technology Plan

In the final analysis, a school technology plan will be evaluated based on student results. But it also is important for school leaders to appraise the technology plan in terms of what strategies could fund it. The cost analysis framework presented below allows us to do this. By helping to portray the cost dynamics of the technology plan, the framework can be used to assess whether the demands placed on funding can be assuaged either by reconfiguring the main elements of the plan or by reconsidering the timing of its implementation. The latter point is important because school districts should not ignore the fact that two of the most powerful variables in the funding equation are directly under their control, i.e., the individual elements that make up the technology plan and the timing of the plan's implementation. Analyzing technology costs using this type of framework will greatly facilitate subsequent development of a school district funding strategy.[14]

The Cost Analysis Framework

As stated earlier, the purpose of developing a cost analysis framework is to obtain detailed estimates of the costs of the proposed technology plan over time *in order to assess funding requirements*. The costs that are initially developed represent the baseline case: the technology plan designed to achieve the school district's education goals. If the results of the analysis reveal there is pressure on funding, it may become necessary to compare the costs of possible alternative configurations of the plan, including an alternative implementation schedule. A comprehensive cost analysis framework also can be used to determine the impact on project cost (and funding requirements) of alternative financing options or cost assumptions. These detailed estimates of the costs of developing and operating the plan will provide the designers or managers of the school district's technology system with the information necessary

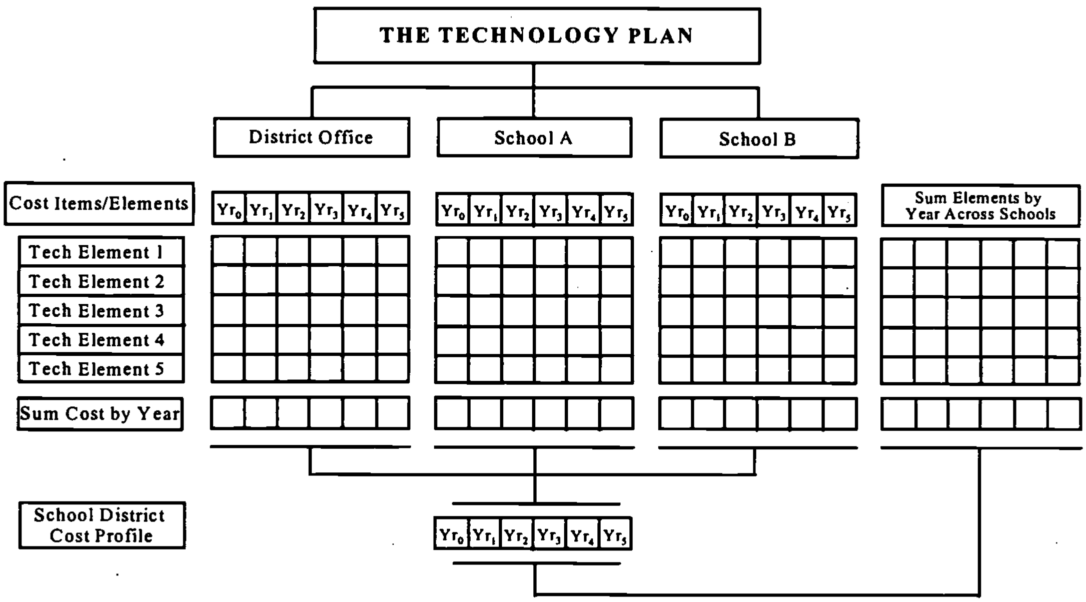
[14] Technology plans can be appraised in other ways, such as the effectiveness of different technologies or the value of investing in school technology versus another type of investment could be evaluated. See, for instance: Council for Educational Development and Research. *Plugging-In: Choosing and Using Educational Technology*. Oak Brook, Illinois: 1995; and Merrill, D. *Evaluation of Educational Technology: What Do We Know and What Can We Know?* Washington, DC: The RAND Corporation, May 1995.

to formulate alternative approaches to funding the plan. Therefore, instead of simply trying to attach a price tag to the plan, the purpose of the cost analysis framework outlined in this section is to help determine viable ways to fund the plan.

An accurate cost profile of the school district's technology plan can be captured by ensuring that the cost framework distinguishes each individual cost item in the plan by: (a) school; (b) technology component; and (c) the year in which each cost will be incurred. The annual cost of each item in the plan will be estimated for each year in the system's projected life cycle. The timing of expenditures, and the amount, should be captured in terms of when actual cash outlays take place. Our proposed cost analysis framework is illustrated, in general form, in Exhibit 2.6.

Exhibit 2.6

The Cost Analysis Framework



The framework distinguishes the three stages in a system's life cycle: development (i.e., planning and design), implementation, and operation. In the case of a school district technology project, the planning and design task normally will be completed several months before implementation of the system (i.e., Yr_{t-1}, where Yr_1 represents the first year of the plan's operation). All the one-time, non-recurring costs that are expended before the system becomes operational—such as staff training, installation of local or wide area networks, or equipment purchases—are allocated by convention to time period Yr_0 (day one of the system's first year of operation). The sum of all expenditures occurring in Yr_0 and Yr_{t-1} represents the project's start-up costs. Recurring or ongoing costs are incurred throughout the system's life cycle. They are allocated to the year in which they are expected to be incurred (Yr_n). Clearly, recurring costs predominate in the operations stage of the system's life cycle. Some representative cost categories, organized by technology component, are included in Exhibit 2.7. These costs should be projected at the school level, and later aggregated to form a profile of costs at the school district level.

In projecting future costs, the school district should use constant dollars, even though current dollars are normally used in budget projections. Constant dollars are current dollars that have been adjusted for the effect of inflation on prices. Unlike for most production goods, the prices (in current dollars) of many technology items actually fall over time. When converted from current to constant dollars (i.e., after discounting for the effects of inflation), the price of these items will be even lower.[15] On the other hand, the price of some technology items will remain constant or increase due to the addition of new capabilities that buyers deem important to acquire.

When comparisons are being made of the costs of alternative strategies, the future streams of costs (in constant dollars) must also be discounted to their "present value."[16] Present value calculations discount future uncertainty and thereby equalize the comparison of alternative investments when expenditures or revenues are distributed unequally over time. The current year establishes the time reference point for present value calculations. The present value calculation discounts or reduces the costs projected to occur in future years to a common point in time (i.e., the present) so they can be compared on a common basis. Present value analysis is based on the principle that costs that occur in the future are less burdensome than the same level of costs that occur now, and that money promised in the future is worth less than the same amount of money obtained now.

---

15 McKinsey & Company, for example, assumed prices fell by 3 percent per year.

16 U.S. Office of Management and Budget (1992), *Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs*. Washington, DC, Revised Circular A-94, Transmittal Memorandum 64.

After the annual cost of each cost element at the school level has been projected, the system's life-cycle cost profile can be prepared. Exhibit 2.8 provides an example of the type of worksheet that can be used to develop this profile. To develop the school district cost profile for the baseline case, one of these worksheets should be prepared for each school in the district and for the district office. The costs contained in each worksheet are then aggregated to produce the cost profile for the whole school district. Charges for services shared among the district's schools can be prorated. Spreadsheet software, such as Lotus, Quattro, and Excel, provides an ideal tool for this type of analysis. A simplified summary of a school district's cost profile, based on the framework illustrated in Exhibit 2.6, is shown in Exhibit 2.7.

Exhibit 2.7A
School District Cost Profile
(Baseline case, **current** $000s)
(i.e. priced at the year of expenditure)

Plan component	Yr-1	Yr_0	Yr_1	Yr_2	Yr_3	Yr_4	Yr5	Total
Network & file servers	291	4420	844	870	896	923	950	
Computers, other hardware , sw	0	6000	257	265	273	282	290	
Technical support & maintenance	0	0	1545	1591	1639	1689	1738	
Staff development	243	1500	360	371	383	394	406	
Facility modification & wiring	194	1250	0	0	0	0	0	
Yearly total cost	728	13170	3006	3097	3191	3288	3384	29864

Total system cost in current dollars = 29.864 million

Exhibit 2.7B
School District Cost Profile
(Baseline case, **constant** $000s)
(i.e. compensating for inflation of 3%)

Plan component	Yr-1	Yr_0	Yr_1	Yr_2	Yr_3	Yr_4	Yr5	Total
Network & file servers	300	4420	820	820	820	820	820	
Computers, other hardware , sw	0	6000	250	250	250	250	250	
Technical support & maintenance	0	0	1500	1500	1500	1500	1500	
Staff development	250	1500	350	350	350	350	350	
Facility modification & wiring	200	1250	0	0	0	0	0	
Yearly total cost	750	13170	2920	2920	2920	2920	2920	28500

Inflation adjusted value = $28.500 million[17] *in constant dollars*

---

17 The following discount factors were used to adjust for inflation of 3%:

Yr-1	Yr0	Yrl	Yr2	Yr3	Yr4	*Yr5*
1.03	1.0	.971	.943	.915	.888	.863

Exhibit 2.7C
School District Cost Profile
7 Year Present Value of Total Cost Based on Constant Dollars and a 4% Discount Rate

Yearly total cost	750	13170	2920	2920	2920	2920	2920	28500
Present Value	781	13170	2808	2670	2596	2496	2400	26921

Present value = $26.921 million

In projecting future costs, the school district should use constant dollars, even though current dollars are normally used in budget projections. *Constant dollars are current dollars that have been adjusted for the effect of inflation on prices.* Unlike for most production goods, the prices (in current dollars) of many technology items actually fall over time. When converted from current to constant dollars (i.e., after discounting for the effects of inflation), the price of these items will be even lower.[18] On the other hand, the price of some technology items will remain constant or increase due to the addition of new capabilities that buyers deem important to acquire.

When comparisons are being made of the costs of alternative strategies, the future streams of costs (in constant dollars) must be discounted to their "present value."[19] Present value calculations equalize the comparison of alternative investments when expenditures or revenues are distributed unequally over time. The current year establishes the time reference point for present value calculations. The present value calculation discounts or reduces the costs projected to occur in future years to a common point in time (i.e., the present) so they can be compared on a common basis. An equivalent calculation is also made to bring the value of past expenditures (e.g. Yr_{-1}) to today's values. Present value analysis is based on the principle that costs that occur in the future are less burdensome than the same level of costs that occur now, and that money promised in the future is worth less than the same amount of money obtained now.[20] The discount rate to be used is generally the "cost of money." For the purpose of the examples noted in Exhibit 2.7C and 2.9, this is assumed to be 4 percent over the rate of inflation. If the present value calculation were to be run against the "current value" then a 7 percent discount rate would be used. When run against the "constant value," a 4 percent discount figure is used, as inflation has already been taken into account.

---

[18] McKinsey & Company, for example, assumed prices fell by 3 percent per year.

[19] U.S. Office of Management and Budget (1992*), Guidlines and Discount Rates for Benefit-Cost Analysis of Federal Programs.* Washington, DC., Revised Circular A-94, Transmittal Memorandum 64.

[20] Viscione J.A. and Roberts, G.S. Contemporary Financial Management, Merrill Publishing Inc. 1987 pp. 96-98.

Exhibit 2.8
Systems Life Cost Profile

☐ Baseline or ☐ Alternative_________ Year ☐ Constant Dollars or ☐ Current Dollars

Cost Category	Year -1	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	System Life Total
Non-Recurring Costs:									
Equipment Purchase & Fees									
Installation									
Software Purchase									
Personnel									
Training									
Subtotal									
Recurring Costs									
Equip. Lease & Maintenance									
Software Lease & Maintenance									
Personnel Salaries/Benefits									
Direct Support Services									
Training									
Supplies									
Utilities									
Security (incl Back up)									
Overhead									
Subtotal									
TOTAL Projected Costs									
TOTAL Present Value Costs									
CUMULATIVE Total Projected Costs									

After the annual cost of each cost element at the school level has been projected, the system's life-cycle cost profile can be prepared. Exhibit 2.8 provides an example of the type of worksheet that can be used to develop this profile. To develop the school district cost profile for the baseline case, one of these worksheets should be prepared for each school in the district and for the district office. The costs contained in each worksheet are then aggregated to produce the cost profile for the whole school district. Charges for services shared among the district's schools can be prorated. Spreadsheet software, such as Lotus, Quattro, and Excel, provides an ideal tool for this type of analysis. A simplified summary of a school district's cost profile, based on the framework illustrated in Exhibit 2.6, is shown in Exhibit 2.7.

Exhibit 2.7C shows that the present value of the cost of the district's technology plan over seven years (Yr_{-1} through Yr_5) is $26.9 million. However, the profile of costs shows that most costs (almost $14 million) are incurred in the first two years of the life cycle, even before the system becomes fully operational. The system's ongoing costs are relatively modest. On the basis of these results, if it appeared the district would have difficulty funding the plan's large start-up costs, refinements or modifications to the plan could be modeled using the same cost profile framework. Any alternative cost profiles produced in these circumstances should be assessed not only in terms of whether they assuage the initial funding requirements but also in terms of whether, on the basis of present value, they result in higher overall project costs. Exhibit 2.9 illustrates this type of comparison.

In Exhibit 2.9 the usable "life" used for the calculation is seven years, the first year being for planning. In all of the options it is assumed that replacement and upgrade will continue for the foreseeable future. Future years with zero cost is therefore not anticipated for the purpose of this comparison.

Exhibit 2.9

Comparing the Annual and Total Costs of Different Cases
(Constant $ Millions - 7 year life - 4% Discount)

	Yr-1	YrO	Yrl	Yr2	Yr3	Yr4	Yr5	PV-$M
Baseline	.75	13.17	2.92	2.92	2.92	2.92	2.92	$24.92
Case 1	.75	10.07	4.47	4.47	2.92	2.92	2.92	$24.75
Case 2	.75	3.07	5.99	5.99	5.99	5.99	2.92	$25.88
Case 3	.75	8.80	2.35	2.35	2.35	2.35	2.35	$18.53

Case 1: Consists of implementing the technology in the district's schools at different times over three years; 2 buildings and district office at Yr0, one building in Yr1 and one building in Yr2 (total =$19.01M, including recurring cost) which is the same as the Baseline case for the first 3 years

Case 2: Assumes that the network, computer equipment, and associated items are leased rather than purchased; lease terms are 60 months at 6.25%; an additional $2.92 M/Yr is added for recurring expenses.

Case 3: Amends the technology plan to provide a lower computer penetration ratio.

If the large up-front cash outlays in the baseline case present an insuperable funding problem, the cost of alternative configurations of the technology plan can be modeled and evaluated using the cost analysis framework. Three examples of alternative configurations of the baseline technology plan are shown in Exhibit 2.9. In *Case 1*, the technology is implemented in different schools at different times. It assumes that the district office and two schools implement the plan first (in Yr_0), followed by one other school in each of the succeeding two years. The initial cost for the plan is the same as if all the work were done in the first year (in constant dollars), but this strategy reduces outlays in the first year of the project by spreading the cost of implementation over three years. On the basis of overall present value, compared to the baseline case, this strategy produces a lower overall project cost but delays the availability of program benefits to all students.

Case 2 assumes the school district arranges for lease financing for the listed components of the technology program. This strategy smoothes the cost of implementation over the life of the project and results in the lowest initial cash outlay over the first five years compared to the baseline and Case 1 strategies, and is only slightly more expensive when measured in life time cost (on the basis of present value). This option allows all the students to participate in the technology program from its inception while providing the flexibility to change out and upgrade equipment.

Case 3 is based on a more drastic action, involving a reduction in the degree of computer penetration (e.g., by installing fewer computers per classroom or by installing the same number of computers per classroom as the baseline case but reducing the number of classrooms in which they are installed). This strategy will produce lower equivalent costs ($18.53 million overall), but it also reduces the project's expected benefits and may impair the plan's ability to facilitate the district's educational goals. In any event, if the principal concern about funding is the plan's high initial cash outlay, then case 2 provides a better option.

Preparing for the Funding Plan

A successful funding plan will attack the funding challenge from all possible perspectives so as not to place undue reliance on any one strategy. Planning funding strategies can begin after accurately profiling technology plan costs. However, even after the plan's costs have been profiled, two additional analyses using the cost analysis framework can be undertaken to examine the sensitivity of costs to variations in (a) any underlying assumptions and (b) the timing of when costs are incurred. The costs of the plan should be examined to see if they can be reduced any further. When the costs of the plan are figured at their irreducible minimum, the second analysis can determine whether the project's costs can be manipulated in ways that reduce the pressure on funding by perhaps shifting costs between different elements of the plan (if one element is easier to fund than another) or from early to late years in the project's life cycle (or vice versa).

In profiling the cost of the plan, several estimates of the expected cost of each item should be made. One of these, of course, will be the current cost of the item. But for most items in the plan there may be certain actions that would lessen these costs. For example, preferential telecommunications tariff rates are becoming more common in states and may be negotiable. Purchasing or leasing the major equipment in the plan might be achieved through consolidated or consortium acquisition arrangements. Some states, for instance, have obtained discounts of 20 percent to 50 percent for hardware and labor costs.[21] Technical support for the schools' network may be available from a local university or business, and it may also be possible to piggy-back the schools' Internet connection through that of a university or business. Parent, student, and community volunteers can reduce initial capital outlays by assisting with network installation. Staff training, another large cost, particularly in the more complex plans, can be reduced by conducting sessions during staff's own time, although that practice requires the fullest support of all staff members. The school could also try to obtain donated equipment but should carefully evaluate the equipment's quality and related maintenance and upgrade costs.

Most of the cost-reduction methods suggested above will require a supporting action plan that must be monitored to ensure that the assumptions on which the plan's final cost estimate is based are realistic and are being met.

In the second type of analysis, the cost analysis framework can be used to evaluate to what extent the demand for funding can be lessened by shifting costs between elements in the plan or from one year to another. For example, project costs can be manipulated to some extent by shifting costs from:

- One type of cost to another, e.g., shifting from non-recurrent to recurrent costs, perhaps through alternative financing arrangements or by accessing courseware through on-line services rather than outright purchase.

---

21 McKinsey & Company (1995).

- One level of service to another, e.g., from broadband to wideband access, or from high to low computer penetration. (The effect of any such action on other components in the plan will have to be reassessed.)
- One year to another, e.g., by transitioning from one model to another over time or by implementing the plan in phases.

Only when the analyst is satisfied that the plan's costs have been properly profiled and evaluated for additional savings, and that elements in the plan cannot be reconfigured to lessen the demand on funding without affecting its efficacy, can the task of designing the funding strategy begin in earnest.

Chapter 3

FUNDING STRATEGIES FOR THE TECHNOLOGY PLAN

At least three challenges must be met to fund technology in schools. First, ways must be found to fund the relatively high levels of capital expenditures needed to install school technology systems. Second, funds to sustain school technology's annual operating costs must be identified. Finally, funds must be secured to regularly retire and replenish portions of the system to keep it modern.

Irrespective of the availability of funding, the economics of school technology combined with schools' current budgeting frameworks and the realities of financing large capital investments can inhibit successful deployment of technology in schools. The usual method of financing school capital projects is through local government bonds, but bond issues are not feasible in many school districts. Voters in expanding school districts are probably well accustomed to bond issues, but elsewhere it may be more difficult to ensure their acceptance. Even when bond issues are passed, the money raised traditionally pays for only capital items.

Using schools' existing budgeting framework, there is a real danger that staff development and training costs—a significant part of the initial investment and a large component of ongoing costs—will not be funded adequately simply because the framework provides no easy way to cover these expenditures. For a district, one of the worst possible outcomes would be to have technology deployed in all of its schools only to find that it is not used to its full potential. There is a distinct possibility this situation will prevail if the schools' existing funding mechanism facilitates the deployment of physical capital while constraining the formation of the human capital needed to exploit technology's potential contribution to education. To prevent these problems, school districts will require strong support and assistance from federal and state governments and will need to reform existing school management and budgeting practices.

Strategies that federal and state governments can use to meet the funding challenge are broader than those of local governments. For example, federal and state governments could develop and issue standards and guidance for the large-scale investment required and could strengthen the technology credentials of pre-service teachers. Such measures would reduce the long-run cost of deploying school-based technology and would help minimize future funding outlays at the school district level. The following sections examine the potential contribution of the federal and state governments and local school districts.

Federal Contribution

A role for the federal government is the use of its limited resources to leverage additional funds for technology in schools. One of the most productive uses for limited federal funds, particularly at the state level, is in planning for the deployment of technology in schools and the schools' connectivity to the information superhighway. Goals 2000 funds have already been used in most states to develop detailed state plans for school technology, with significant results. In several cases, detailed planning documents were developed and facilitated the procurement of state funds to establish structures of governance, such as public commissions or boards to guide implementation of the states' technology plans. In some states—Texas and California are examples—these bodies have been instrumental in procuring additional funds that were subsequently distributed to schools in the form of grants and in forging business partnerships to promote educational technology.

Also, the federal government could provide tax incentives to help fund school technology. Although tax incentives are not necessarily limited to federal taxes, such incentives probably work best at the federal level. These proposals usually fall into three main categories: depreciation credits, income tax credits, and voucher tax credits.[22] Depreciation benefits might encourage appropriate acquisition of school technology by allowing companies that donate equipment to schools before the equipment is fully depreciated to accelerate the remaining depreciation of the asset. Instead of allowances, income tax credits could be given to individuals or corporations that donate equipment or software to, or conduct technology training in, local schools. Also, income tax credits could be extended to teachers or administrators who take technology training courses or meet state certification guidelines for proficiency in the use of school technology.

Tax incentives given directly to businesses for donations of used computers, as provided for in the Taxpayer Relief Act of 1997 (H.R. 2014), may prove costly to the government and could result in donations of equipment that is not needed. To avoid those problems, a voucher

---

22 The Aspen Institute, Forum on Communications and Society, March 10, 1995.

tax credit scheme could be used in which the value of the income tax credit is given to the states (instead of directly to companies) in the form of vouchers (which could be capped to limit the cost of the scheme, if necessary). These vouchers could then be used by the states to purchase additional school technology.

State Contribution

This section explores the contribution states can make to the funding challenge and outlines several strategies that state governments may want to use—and, in some cases, are already using—to guide and assist school districts in the efficient and effective implementation of their school technology plans. States have a major contribution to make to the funding challenge in at least five areas: helping to raise the necessary funds; dispersing funds in ways that promote prudent investment; redressing any inequities between school districts; promoting ways to reduce the cost of technology; and monitoring progress toward the state's technology goals.

Although the federal government will have important roles to play in implementing the national educational technology plan, the responsibility for adopting coherent, coordinated funding strategies lies with state governments. They are best equipped to ensure both equitable access to high-quality educational technology for all students within the state and the efficient allocation of resources for the purchase of educational technology. For example, beginning in fiscal year 1996, Georgia appropriated state funds to provide technology specialist positions in each school system in the state. One technology specialist position is being provided for every four schools.

Not all states offer financial assistance with capital projects in school districts. From the school district's perspective, the most complete answer to the challenge of financing technology in schools would be for the state to assume the financial responsibility, at least for the initial capital outlay, as some states do with regard to new school construction and for certain aspects of telecommunications access. A similar option consists of the state providing funds on a percentage-equalizing basis. In this scenario, the school district would decide locally what technology it wants to deploy and the state would share the cost, with the percentage share depending on the district's wealth, perhaps subject to a maximum reimbursement rate.

Although this system allows much more local discretion in the deployment of technology, it provides little comfort to school districts that need additional funds to cover their share and are unable to pass a bond election or have reached their legal bonding limit.

At the far end of the local discretion scale is state provision of a fixed sum of dollars per student each year to the school district whether or not the money is needed. School districts that do not use the money immediately for technology could be given one of two options. Either they could put the funds into an interest-bearing account to be spent at some future time on technology, or they could be allowed to spend the allocation on other things. There is little to be said in favor of this dispersal mechanism except that it preserves local discretion. In between these mechanisms is a variety of arrangements, some based on a foundation program, others based simply on loans from the state fund.

Raising Funds

State governments have a critical role in securing additional resources for school technology. They have three general approaches to raising additional funds: mandates, incentives, and set-asides.

Mandates. Recent actions taken by the Maine legislature can be used to illustrate one funding approach based on mandates. To advance state policy, which aims to increase the sharing of knowledge and information by communities within the state, the Maine Public Utilities Commission recently ordered NYNEX (the state-regulated telephone company) to provide a statewide network and ensure that all libraries and schools in the state are provided access to network services using an account managed by NYNEX that obtains funds from rate overcharges.[23] Funding is to come from previous NYNEX allowable rate overcharges.

Another funding approach based on mandates might require that third parties who are likely to benefit from technology in schools should share some of the funding responsibility. Vendors of communications and information processing equipment and services are one such group. A special sales tax, levied perhaps for a limited period of time, on the services or products of these vendors would provide one method of ensuring that third parties who benefit from the proposed investment also help to pay for it.

[23] Further details of this funding strategy are provided in the final section of this chapter.

Incentives. An incentive-based approach can also be used to raise additional funds. Traditionally in the U.S., generous capital consumption allowances have been used to stimulate investment. Similar devices could stimulate investment in school technology. For example, investment tax credits typically allow firms to deduct against their tax liability a certain percentage of the amount of any new investment. Even a small credit (such as 10 percent) provides a strong incentive to invest because it reduces the cost of the investment and commensurately increases the rate of return on the investment.

As public institutions, school districts do not follow the same accounting standards and tax rules as do for-profit institutions. But the funding potential of school districts selling depreciation credits to businesses in exchange for business investments in new technologies deserves some investigation. Public-private trusts to fund and promote technology in schools could be established and, acting under commercial principles, might use these credits directly if they purchased technology assets and leased them to school districts. Education trust funds already exist, such as the Texas Learning Technology Group, but they operate mainly on a quasi-public basis and tend to limit themselves to instructional computing. If they are to assume part of the task of funding school technology and professional development, these trusts must be encouraged to accept a much broader role, including the provision of venture capital and seed money.

State technology trusts could also take a wide view of technology and society and get involved in promoting the installation of learning technologies in the homes of school children by, for example, offering low-interest loans to parents. These, or similar vehicles, could be used not only to manage, leverage, and distribute public-private partnership funds, but also to grow those funds through related entrepreneurial activities. These trusts could also be used to ensure that the funds available were distributed to their highest valued use through a competitive grants process.

Set-asides. Set-asides provide a third revenue-raising mechanism at the state level. State lotteries are an example and can supply large sums of money for educational technology. For example, $86.4 million was allocated in 1994 from Georgia's Lottery for Education.[24] Using funds obtained from the state lottery, the Florida Instructional Technology Grant Program

---

24 American Association of School Administrators (1995). *From Here to Technology*. Alexandria, Virginia.

has distributed $65 million to schools in Florida. In the first year of this program, 21 percent of the funds distributed were obtained from lottery proceeds and 27 percent in the second year. However, competing interests also look to these funds, so supporters must work to ensure that some proportion of these funds are dedicated to technology, not simply general infrastructure. Funds obtained from this source are best applied to the initial costs of technology, as this revenue may vary over time and be unpredictable.

Dispersing Funds

States should consider carefully how the mechanism through which funds earmarked for school technology are distributed, because the way funds are dispersed by the state to individual school districts may be just as essential to the success of technology in schools as the way funds are generated. Non-rigorous methods of disseminating funds (e.g., per capita allotments) to stimulate investment in school technology could produce imprudent investments. For example, student-based allocation formulas may hinder states from exercising proper oversight of technology plans. Greater oversight could be exercised, however, by attaching conditions to the money dispersed. For example, the state could specify that a certain percentage of the total allocation must be spent on staff development. Other methods of disseminating funds (e.g., competitive grants) may be unintentionally biased against certain types of schools, such as those in rural areas.

Addressing Equity

Within school districts, equity in learning environments seems to be an explicit goal. Similarly, state governments have a responsibility for ensuring equitable access to high-quality educational technology for all the school children they serve. Both federal and state governments support this goal principally through grant programs. State grant programs that support the acquisition of educational technology, if they are truly to support equitable distribution of technology resources across school districts, will be written so as to factor into the funding formula the extra expenses borne by districts in rural areas or those with large numbers of school buildings in poor condition.

Ohio has two related school technology initiatives—SchoolNet and SchoolNet Plus—that specifically address school technology equity. Under these programs, "equity grants" are provided to school districts in the lowest wealth quartile in the state. Funds are provided by the state for wiring the schools in these districts and also for computer hardware, software, and professional development.[25]

Low-income school districts are likely to face the greatest funding challenge, not only because their sources of funding may be limited but also because the cost of deploying technology in their schools may be high for various reasons, including having more older buildings and greater security problems. One potential mechanism that states could use to address differences in the cost of technology between districts is cost equalization. Cost equalization may be needed to balance differences between districts in the costs of deploying technology to reach similar goals. In general, technology costs tend to be higher in rural and highly urbanized areas, and lower in suburban areas. For example, rural districts may require more expensive wireless technology. In urban districts, which have a greater number of older school buildings, building modifications may be expensive. Unfortunately, it is easier to recognize cost differences than it is to measure them and compensate districts for them. The usual methods of compensation are funding some proportion of these costs or providing the district the difference between its costs and the estimated costs in an "average" district.

To address the funding limitations of low-income school districts, states could establish a school technology loan program, similar to the affordable housing programs established by many state and local governments for moderate-income home buyers. To fund the program, a dedicated tax could be earmarked. States could define the eligibility requirements for borrowing from the loan pool and set the borrowing terms for the loan (e.g., a term of five to seven years, commensurate with the expected life of the proposed technology, and an interest rate competitive with local government bond issues). The strategy would obviate the need for low-income districts to pass bond referendums to get their technology plans funded. An example of this type of scheme is found in Wisconsin. The Wisconsin Educational Technology Board (ETB) is a state organization that makes available to public school districts and municipal or county library boards low-interest loans for educational technology and distance-education

25 Further details of this funding strategy are provided in the final section of this chapter.

projects. This new program offers a 2 percent buydown on total interest costs for Public Lands Trust Fund loans. For the fiscal years 1996-97 through 1999-2000, the Board of the Commissioners of Public Lands must reserve $15 million annually under its State Trust Fund loan program for this purpose. Recent interest rates (without the subsidy) have been around 5.25 percent for loans with repayment periods of between 1 and 5 years and about 4.75 percent for loans with repayment periods of between 10 and 20 years.

Reducing the Cost of Technology

State governments can reduce the cost of technology in all school districts using strategies such as:

- Negotiating with providers of hardware, software, and on-line services for preferential rates for elementary and secondary schools
- Mandating wiring and provision of other services to rural and other disadvantaged schools as a requirement for licensure
- Establishing purchasing collectives of districts across the state or, alternatively, establishing itself as a sole purchaser

Negotiating preferential rates. Corporations that provide goods and services to educational organizations reap benefits from those transactions beyond the original purchase price. These benefits arise from the fact that the corporations are institutionalizing their products: the students of today are the consumers of tomorrow, and students are a captive audience to the technology suppliers chosen by their schools. Because they are familiar with those suppliers' products, they are presumably more likely to buy them in the future. A similar effect occurs with parents. Thus, since suppliers reap benefits in terms of future business when they sell their products to schools, the state may negotiate or mandate that those benefits be reflected in the suppliers' charges. The potential for obtaining favorable rates may be considerable. In Delaware, the state's Public Service Commission has ruled that Bell Atlantic Corporation can charge no more that $28.02 per month for unlimited use of an ISDN line at a home, even though Bell Atlantic has told states that unlimited residential ISDN service should cost $249 per month.[26]

[26] Washington Post, June 21, 1996.

Establishing purchasing collectives. This strategy builds on the fact that it is more cost effective to make purchases (e.g., of computers) in large numbers. By establishing purchasing collectives—comprising multiple, or even all, districts in a state—the state is supporting local districts' abilities to capitalize on this purchasing strength by negotiating lower rates. This strategy has an additional advantage in that it will foster the development of relatively similar educational technology programs across different districts in the state. Over 20 states already have either informal consortia or formal cooperatives for buying school technology.[27] These arrangements are particularly useful for small, rural, or low-wealth districts, but even large, high-wealth districts that think they have enough buying power to "go it alone" should not overlook the potential benefits of joining a purchasing cooperative or consortium. The muscle power of purchasing cooperatives can be used to negotiate not only favorable pricing terms but also non-price terms as well.

For example, when the Plano Independent School District in Texas planned to buy 7,500 new personal computers, it expected to use that equipment for five years before rolling it over into less sophisticated applications. In previous transactions, new computers had been procured with a three-year warranty. Using the buying power of this large new procurement, the district negotiated an extended five-year warranty specifically to minimize system maintenance costs. (A fuller description of Plano's approach is included later in this chapter.)

Mandating service provision. States can simultaneously lower the cost of access to technology services (particularly access to the information superhighway) and further their objective of ensuring equitable access to educational technology to all districts in the state through mandates of service provision. States could require that schools and their communities be wired to access the Internet. This strategy is being pursued actively by Maine, for example. It is more expensive—sometimes prohibitively so—to wire rural areas for Internet access than it is to wire urban and suburban areas. Similarly, it is more expensive to retrofit older school buildings for Internet access than it is to wire newer buildings. Alternatively, the state can negotiate with suppliers that, as part of a contract, the supplier wire rural regions or retrofit older school buildings.

---

27 American Association of School Administrators (1995).

This strategy can also be applied to other components of educational technology systems as well, such as provision of professional development for teachers and maintenance of computer systems. State governments can support rural districts and districts with older buildings or lower tax bases by mandating that corporations that do business with the state provide the same services to school districts in disadvantaged areas at the same prices as those offered to other buyers.

District Contribution

State and local governments provide 84 percent of the total funding for K-12 education. This burden is shared almost equally. Clearly, these parties will be substantially involved in funding technology in schools, but currently they contribute only 60 percent of total spending on educational technology.[28] Also, while state and local government share almost equally the funding of K-12 education, currently most technology expenditures are funded by local governments. For example, in fiscal year 1994, local governments contributed 40 percent of expenditures on educational technology, the federal government contributed 25 percent, state governments 20 percent, and businesses and other sources 15 percent. These shares of expenditures compare to shares of 41, 6, 43, and 10 percent respectively for total K-12 education expenditures in 1994.[29] Even though in the next few years proportionally more will probably be spent by the states, and proportionally less by the federal government, it seems likely that most responsibility for financing technology in schools will continue to belong to individual school districts.

The piecemeal approach to funding technology prevalent in most schools cannot sustain widespread, substantial use of technology throughout the nation's schools. Based on the economic characteristics of the "Classroom Model" discussed earlier, the average annualized cost of technology systems in schools is about $400 to $600 per student if a reasonable amount of staff training and development is provided. However, in fiscal year 1994, state expenditures on educational technology averaged only $21 per student,[30] and a similar amount of funding,

[28] McKinsey & Company (1995).

[29] McKinsey & Company (1995), Appendix 13.

[30] Based on survey responses by 33 states conducted at Far West Laboratories by John Cradler and Elizabeth Bridgforth.

based on fiscal year 1995, was provided by federal funds.[31] Investing in school technology requires large initial capital outlays, particularly if staff development is funded appropriately. Although annual ongoing costs are considerably lower than the initial capital outlays, the Classroom Model's initial investment alone is about $800 per student and actual costs vary tremendously, depending on circumstances in the district. For example, even though staff development costs were excluded, Loudon County (VA) Public Schools' technology plan involved an initial cost of $1,000 per student (for hardware, network, and building modifications), representing 20 percent of the district's current expenditure per student.[32]

Most schools that have made significant investments in technology to date have used exceptional methods to finance their efforts (e.g., special grants, partnerships with businesses to use the school as a demonstration site, local fundraising by parents, and categorical funding from state or federal programs). Most telling of all, the critical aspect of training and staff development in these schools has been supported by a dedicated and committed teaching staff. Other factors common to many school districts that have succeeded in funding high levels of technology include:[33]

- Reliance on local funding sources (particularly bond issues)
- Restructuring central office expenses to provide additional funds
- Strong support from the local public and business community
- The availability of state funds for technology initiatives
- Large student enrollments
- Strong population or economic growth.

---

[31] U.S. Department of Education, (1995). *Connecting Classrooms, Computers, and Communities: Teaching and Learning in the Digital Age*. Washington, DC

[32] Loudoun County Public Schools, *Instructional Technology Implementation Plan for Loudoun County Public Schools*. Leesburg, VA, January 16, 1996.

[33] Keltner, B. & Ross, R. *The Cost of High Technology Schools*. MR-634-CTI/U.S. Department of Education, RAND, Santa Monica, CA, 1995.

If the above factors enable school technology acquisition, many of the nation's schools will be unable to replicate these technology initiatives because these factors are absent or weak in their districts. This being so, it becomes especially important to devise funding methods that can be applied in all districts regardless of their circumstances.

The remaining pages of this report propose ways to fund initial technology-related costs and annual operating costs; suggest financing mechanisms that can ensure the district's technology system is regularly retired and replenished; and outline a revenue model that districts could use to assess, in conjunction with the analysis of technology costs, whether any funding gap exists and, if so, to what extent local taxes or other revenue sources must be raised to bridge the gap.

Funding the Initial Capital Outlay

School districts have five basic ways to fund their initial capital outlays for technology:

- Issuing bonds
- Scheduling replacement
- Leasing
- System contracting
- Finding Grants

Issuing bonds

The deployment of technology in schools requires a substantial investment. The initial capital outlay can be large, typically between $600 and $1,000 per student. Because taxing property owners to pay for large capital expenditures in the year they are incurred would produce large hikes in tax rates and wide fluctuations in tax bills from year to year, local government long-term bonds are the traditional mechanism for funding large capital expenditures in the school system. But this mechanism has several problems. First, the period over which bonds are repaid usually is longer than the relatively short life of most technology assets. Second, in today's climate, perhaps the biggest problem impeding the ability of school districts to fund their technology plans is the difficulty they may face in passing bond elections, particularly in economically depressed districts or those with falling enrollments. Moreover, school district staff must be prepared to mount a concerted and well-planned campaign to secure passage of bonds intended for technology initiatives. Third, this traditional method of financing capital projects has limits set by states on the amounts school districts borrow. These limits usually are expressed as a percentage of the district's assessed property valuation.

There are two basic types of bonds: term bonds and serial bonds. Using **long-term bonds** that have a maturity of 20 years, for example, a school district might borrow $25 million for new school construction projects. Interest on the bond may be payable twice annually, with all the principal falling due only at the end of the 20 years. Typically, using this vehicle, the district would establish a sinking fund into which annual contributions would be made so that at the end of 20 years the original $25 million in principal will be available for repayment. A new school building that will last 30 to 50 years is an excellent candidate for this type of borrowing because many generations of school children will stand to benefit from the investment (and their parents will bear part of the costs through the bond issue). Sometimes, however, a portion of the money raised by bonds for new schools is earmarked for relatively short-lived technology items for those schools. For example, a $131 million 20-year bond passed recently in the Plano Independent School District in Texas for the construction of seven schools included almost $8 million for the purchase of educational technology. The technology installed under this initiative will be paid for long after it has become obsolete. Thus, although the technology will be used by only one or two generations of school children, the parents of several generations will pay for it.

Most school districts borrow using the second type of bond—**serial bonds**—which have varying maturity dates that are arranged so that the sum of interest and principal paid each year is about the same. Because these bonds are issued with different maturities, they seem more appropriate than long-term bonds for acquiring technology or other relatively short-lived capital improvement projects. For short-lived technology projects, it makes more sense to ask the current generation of users to pay for the system.

Long-term bonds may be appropriate for one aspect of the technology plan that is often difficult to fund from other sources, i.e., staff development. To produce effective results, staff development and training must be properly funded. Typically, that means at 30 percent of total technology-related expenditures. With adequate staff training and support in the school district, technology can be imbued into the curriculum of its schools. In these circumstances, future residents and parents of children in the school district contribute to the costs needed to effect this substantial shift in teaching methods and practices through the issuance of local government long-term bonds.

Staff in the school districts of Vancouver, Washington, and West Bloomfield, Michigan, campaigned to help pass bond referendums for school technology initiatives. In Vancouver, two separate bonds were passed, one for $45 million in 1990 and another for $135 million in 1994. The bond that was passed in 1990 funded the remodeling of five schools, the building of three new ones, and the creation of 25 computer laboratories. The bond that was passed in 1994 funded, in addition to a new high school, the implementation of technology in existing high schools and the completion of the district's wide area network. District administrators embarked on a three-month campaign, visiting local groups to explain the need for, and the planned use of, the technology proposed for the district's schools. The district now keeps the community involved and informed in its technology initiatives by offering a "patron tour" once a month for any interested party.

Residents of West Bloomfield passed a $25 million bond referendum in 1993 that contained $10 million earmarked for educational technology. A substantial amount of effort went into securing the bond passage. For example, well before the referendum, the school district negotiated with organizations, such as the Computer Curriculum Corporation and Jostens Learning Corporation, to procure equipment and software at no cost for pilot programs in the school district. These pilot programs enabled the district staff to respond with firsthand knowledge to questions or requests for additional information from residents and teachers in the district. A committee composed of community members and parents who were involved professionally with technology and school staff and administrators was formed and met for over a year to develop a vision for the district's educational technology program. Considerable time was devoted to speaking and communicating with local groups and giving tours of the pilot programs. The funds raised by the bond provided the district's elementary schools with five computers per classroom and mini-labs. Each middle school received 70 computers on carts. Each high school also received computers on carts and a computer laboratory. In addition, two technicians were employed to maintain the acquired equipment.

Scheduling Replacement

One type of capital expenditure that is not usually financed from bonds and that has some economic characteristics in common with school technology is the purchase of school buses. Because buses have shorter lives than do school buildings, it is usually considered inappropriate to finance them using bonds. The usual mechanism that is applied to keep the fleet operating is a schedule for replacement. A percentage of the system is retired and replaced each year, smoothing out the needed capital expenditures. This mechanism works reasonably well if districts do not have to buy a large number of buses at any one time. A similar schedule could be an appropriate mechanism for regularly retiring and replacing schools' technology systems.

Leasing

Leasing is a mechanism gaining general acceptance as an ongoing way to fund technology and keep it current. Not only does it save school leaders from spending the significant time and effort usually required to reach closure on grants and bonds; it also links expenditures more closely to the implementation timetable and provides flexibility for the possibility that the useful life of equipment may be shortened or extended.

The lease agreement can be made through a vendor, a finance company, or another agency. Leasing through a third-party organization instead of a particular vendor can free the lessor from committing to an organization that may lag behind others in technological development and service over the course of the lease. Agreements can cover arrangements with multiple vendors simultaneously

Lease purchase financing is one of the most flexible vehicles for supporting technology funding strategies. It is essentially a purchase agreement with the initial purchase costs spread over several years. It provides competitive interest rates often associated with bond issues, but with the ability to flex payments and terms to fit the school's timetable, the product's expected useful life, and budget constraints. These are substantial advantages over both capital expenditures and bond issues.

Lease purchase agreements are also generally quicker to approve and easier to administer than bond issues. They can be structured to include soft costs such as prepaid maintenance, installation, software, and other professional services in a "bundle" that fits the proposed technology solution. This is an important factor because these soft costs are becoming increasingly large portions of technology projects.

Lease purchase arrangements also allow school districts to operate within a fixed budget. The lease is usually structured to be funded from the operating budget, which generally is easier to access and use than the capital budget.

School districts, like other agencies of state and local governments, qualify for tax-exempt leasing. These leases usually include non-appropriations language, which means that if the institution does not appropriate funds in each subsequent year, the lease can be terminated (with return of equipment) with no legal obligation or liabilities going forward. That language also precludes the lease funds from being considered long-term debt and may eliminate the requirement for voter referendum.

Lease arrangements in which equipment reverts to the leasing company at the end of the lease sometimes are unattractive to school districts. Lease payments may be relatively high and the lease period relatively long, making a lease-purchase option generally preferable.

Prince Georges County School District in Maryland used a lease purchase arrangement to fund a $10 million initiative to upgrade computer laboratories in its magnet schools. After selecting the lowest interest rate from bids submitted by financing institutions, payments were made in annual installments over three years. The equipment purchased was used as collateral for the loan. This arrangement enabled the district to keep pace with technology development and ensured that its magnet schools were upgraded simultaneously. In a similar move, the county arranged a $5.5 million lease purchase agreement through a local bank to equip 68 elementary schools and three training sites with integrated learning system laboratories.[34]

Another example of tax-exempt financing helped the Green Local School District in Ohio to speed up implementation of its technology plan despite limited available capital. Using tax-exempt lease purchase financing to supplement funds awarded to district schools through state and federal programs, the superintendent drastically accelerated implementation of plan components while positioning the district to enjoy greater flexibility in future incorporation of new technologies. This scenario involved a variety of systems and technologies from several vendors.

[34] National School Boards Association (1989), *On-Line: Financing Strategies for Educational Technology,* Alexandria, Virginia, p.24.

Leasing's major benefits, in summary, are preservation of capital dollars, avoidance of long-term debt on a school's books, overall limitation of debts, flexible payment structure and terms, low rates, and availability of financing whole projects, including their soft costs, as units.

Whether leasing is advantageous for a particular district may depend on the state's aid formula. For example, if the formula provides aid for current expenditures but not capital expenditures, it may be better to lease. Even though interest is being paid, leasing may result in lower annual cash outlays if the lease enables the district to obtain a substantial discount by buying in bulk. These discounts may not be available if the district funds its technology plan by spreading purchases over several years. Many vendors such as Compaq, IBM, Apple, and Jostens Learning Corporation work with districts to create flexible payment plans for their products. School districts may also consider working through a third-party leasing agent such as AT&T Capital Corporation or a local or regional financing institution to tailor a vendor-neutral package that includes equipment, programs, and support from a variety of companies.

System Contracting

Contracting for the installation, maintenance, and operation of the technology system is another financing alternative. Commercial developers of educational technology have begun offering school districts a complete "one stop" package that includes hardware, networks, courseware, and training for an inclusive, annual flat fee per student.[35] This indicates that developers are beginning to tailor their selling and pricing policies to suit the funding constraints of schools and districts. However, in these arrangements the school district loses control over some aspects of the system and may have insufficient choice of suitable contractors to enable a competitive bid.

[35] Washington Post, February 7, 1996.

Finding Grants

Grants can supply funds for initial capital outlays. Consider the following scenario where they are used to fund staggered deployment of technology in a district.

A school district may want to abandon equity-based notion that investment should take place in all its schools at the same time. Instead, it would select some schools or grade levels for early development and help them lead the way for others to follow.

The district could establish an education foundation with a board that then selects and invests in individual schools based on proposals received. Funding could come from a specified percentage of district revenues; grants from state and federal governments, businesses, and philanthropic foundations; and other sources. The school district could develop policy guidance for the foundation, but leave the foundation free to invest funds to achieve the highest possible return in terms of educational outcomes.

Schools in the district necessarily would be treated differentially in the short term, as the foundation would ensure that funds were placed in their highest valued uses. But in the long term, the school district would require that schools be treated equitably. For example, it could insist that all schools attain some minimum level of technology within a specified time. The foundation's board would regularly evaluate the return on the investment in each school to determine whether further investment (or disinvestment) was required. (Other funding roles for local education foundations are discussed later in this chapter.)

Funding Ongoing Operating Costs

After a school or district makes an initial investment in technology, the dynamics of sustaining the investment are quite different from those governing the decision of whether to invest. Budget resources may need to be reallocated. In the operational phase of the investment, substantial resources will need to be devoted to staff support and development to ensure effective use of technology.

One school of thought concludes that there is not enough money in school districts to fund technology and all the other programs in the education budget. Another school of thought maintains that there are already enough funds, and that money can be made available for technology by reengineering how schools conduct their business and by reprioritizing funding. Regardless of these view points, a number of steps can be taken to improve the budget process so that additional funding can be made more readily available for educational technology.

Although the budget process is not highly visible, it is the best mechanism for coordinating and controlling most of the functions performed within the school district, including technology implementation. The remainder of this section describes areas of potential improvement in the budget and management process and examines areas within existing budget categories where money for technology might be found.

Four basic methods of funding ongoing operating costs are available:

- Capitalizing costs
- Setting budget priorities and increasing flexibility
- Increasing school autonomy in personnel decisions
- Finding additional funds

Capitalizing the Cost of Educational Technology

Many school districts try to pay for computer hardware and equipment from the general operating budget and do not consider these purchases part of the capital budget. For example, for six years the Loudoun County School Board in Virginia asked its Board of Supervisors to fund a technology plan as part of the operating budget in this fast-growing district. And each year, since 1990, the technology plan has gone without funding.[36] The plan was always one of the first things to be cut in each budget submission. Now, the School Board is pursuing $12.6 million in technology funding through a $21 million capital improvement. The construction portion of that bond, $8.4 million, has already been approved through the state. The technology portion goes to a voter referendum in November 1997. Capitalizing the cost of educational technology in the manner chosen by the Loudoun County school district may be necessary to overcome the hurdle posed by the large initial expenditure outlays that technology plans often require.

States and districts could encourage the capitalization of technology expenditures by requiring that a given proportion (e.g., 15 percent) of the budgets for each school construction

[36] The Sterling Observer, June 21, 1996.

project be spent on technology and the supporting infrastructure. Training and staff development costs likewise could be viewed as an investment in human capital and treated in the same way as other capital expenditures, although standard accounting practices do not recognize the asset value of staff. Capitalizing and financing training and staff development through bonds or other capital investment instruments such as certificates of participation, instead of relying on the general operating budget, is more likely to result in appropriate funding in these areas – often considered to be 30 percent.

Setting Budget Priorities and Increasing Flexibility

To obtain sufficient funds to sustain the technology system, it is particularly important for the school district to send a strong signal that technology expenditures are a priority. There are several ways this could be done:

- The district could convert to zero-based budgeting, which requires a critical reexamination of all programs each year.
- The district could switch to school site management and budgeting to give individual schools wider discretion and greater flexibility in the use of funds.
- The district could specify a fixed percent of the budget for instructional expenses to be set aside for educational technology and its supporting programs.

If greater flexibility is introduced to the budgeting process or granted to schools when executing their budgets, it may be possible to "create" some funds to help sustain the ongoing costs of the technology investment. For instance, a zero-based budgeting process—involving a critical examination each year of all district programs, personnel, instructional strategies, equipment, and other services—allows technology to be given top priority.[37]

Even though there is limited ability in traditional school budgets to reallocate resources, the ongoing costs of technology deployment are relatively modest. For instance, these costs amount to only about 3 percent of the national average annual expenditure per student. Some of the money needed to provide additional staff development and training might be obtained from the resources currently allocated to instructional services, which nationally account for 4 percent of current school expenditures. Another 4 percent or so of expenditures is spent on supplies

[37] American Association of School Administrators, (1995).

(mainly textbooks), and a further 3 percent on purchased services and tuition.[38] Portions of these budget categories may provide the relatively modest amount of resources needed to sustain the technology investment. Also, savings that result from technology use may reduce costs in areas such as administrative staff, travel, acquisition of library reference materials, and excess inventory.

In the commercial world, many companies are vigorously outsourcing functions that were formerly performed in-house. School districts are now beginning to look at outsourcing or contracting-out services as a device for freeing up money for educational technology. For example, Piscataway School District in New Jersey obtained the funds for outsourcing a customized service of getting curriculum materials on demand.[39] Over three years, 10 percent of the district's budget was reallocated from non-instructional services to instructional services. By outsourcing food and transportation services, $2 million a year was saved against an annual budget of $60 million.[40] The sale of the district's bus fleet raised $1.5 million, which was then applied to school technology. Labor resistance prevented the janitorial service being outsourced to produce even more savings. The savings obtained from this aggressive outsourcing program were redirected toward the district's technology plan, which is being implemented over four years. Some funds were also directed toward teacher training and development: in the first year, $700,000; in the second year, $550,000; in the third year, $400,000; and in the fourth year, $275,000.

Increasing School Autonomy in Personnel Decisions

Giving schools greater autonomy in personnel decisions could facilitate the reallocation of costs. For example, with greater school autonomy in budgeting, a high level of investment in technology could produce savings in personnel and personnel-related costs. Incentives in the salary system could be used to encourage appropriate staff development in areas critical to technology deployment and its integration into the curriculum. With greater autonomy, a school could accept higher student-teacher ratios to free funds for creation of teacher-assistant and technology coordinator positions.

---

38 RAND (1995).

39 National School Board Association, (February 1995). *Insider's Letter*. Alexandria, Virginia.

40 American Association of School Administrators (1995).

Technology provides the opportunity to significantly adapt instructional experiences to the individual student. Technology also can blur the distinction between classes and even between age groups. In these circumstances, average class size becomes a confounded, and perhaps not very meaningful, statistic. In the long run, a shift might occur toward the physician/nurse professional model. With technology fully embraced, the status of teachers could be elevated by allowing more extensive use of teacher assistants. In this scenario, the subject expert sometimes would prescribe the instruction for the individual student, leaving the teacher's assistant to monitor the student's progress and liaise with the "prescribing" teacher.

Finding Additional Funds

Although the costs associated with operating the technology plan may appear within reach, they represent a significant cash outlay for many school districts that already operate under stringent budgets. Districts may turn to funding options that fall into three categories:

- Cost-saving measures
- Reprogramming existing resources
- Creative funding

Traditional funding methods (i.e., raising revenue from property tax) may be regarded as a last resort to bridge any funding gap.

Cost-saving measures. Measures aimed at saving costs should target the largest cost elements in the technology plan: hardware, network installation, product support, personnel, and staff development. Some of these items were discussed in Chapter 2; additional examples are listed below. In each case, it is important to quantify how much each measure will save in terms of both the initial capital costs of the project and the annual costs over the system's life cycle. Any such cost saving should be reflected in the estimated cost of the plan.

- Special rates (e.g., the "E-rate" that gives schools 20 percent to 90 percent discounts) for communication connection charges; see appendix)
- Free connections that can be negotiated directly with the provider and are most likely obtained when cable or phone companies are deploying broadband technology
- Use of volunteers, supported by a core staff of professionals, for network installation, staff training, expert advice, and other tasks
- Cooperative purchasing that can reduce the acquisition cost of hardware substantially. (The cooperative in Kentucky, for example, obtained savings of 35 percent on IBM-compatible computers.)

- Donated equipment from companies, foundations, government agencies, and individuals
- Negotiated discounts that can be used for software purchases and licensing agreements. (For example, Kentucky achieved discounts of 80 percent to 90 percent on software. Discounts may be available to teachers and students for home use of hardware and software. This tactic can make good business sense for vendors. Developers usually license software cheaply to universities in order to "institutionalize" the products, encouraging future purchases on campus and at home.)
- Cooperative ventures that can be developed with software, courseware, or curriculum developers.
- Peer training and support that can reduce the sizable training/development costs and often is more successful than bringing in outside expert trainers (Private sector training-support partnerships are another alternative.)
- Mentoring programs instituted with two-year and four-year colleges and with businesses in the district

Reprogramming of existing resources. State and school district budgets may have funds that can be earmarked for local technology initiatives. One way to create "new" money for technology is by reallocating money from other items in existing budgets to technology. Budget rules could be changed to simply allow more funding to go to this category. For example, "instructional support" includes money spent on instructional supervisors such as departmental heads. Some of these resources could be redeployed to meet some teacher training and support needs. Under this item, it may be possible to exploit savings created by technology efficiencies. After deploying its technology plan, for example, the school district in Carrolton, Georgia, was able to cut administrative staff costs 20 percent to 30 percent. Distance-learning technologies similarly may help schools bring staff development opportunities on site and reduce related travel costs.

Creative funding. The ability of school districts to raise funds from completely new sources, as opposed to fashioning them from existing sources, is much more limited than the state's. However, recognizing that a substantial portion of the costs of school technology must be raised locally, there has been a concerted effort in recent years to develop new creative funding mechanisms. Most of the suggestions outlined below are summarized from several recent publications.[41]

---

[41] These publications include: National School Boards Association, (1989) *On-Line: Financing Strategies for Educational Technology*; *Finding Funds for Technology: A Handbook for Educators* (Supplement in *Technology & Learning*, 1996); and American Association of School Administrators, (1995) *From Here to Technology; How to Fund Hardware, Software, and More*.

Working with businesses. Education foundations, if established locally, can provide a tax incentive to companies and individuals who donate technology or give assistance. The total contribution made by commercial companies to the costs of school technology is relatively small, but in special cases they stimulate a great deal of action. At the local level, supermarkets and telephone companies can be talked into offering a percentage of sales as a contribution toward school technology. Usually, these schemes are marketed through the school's PTA. Through its foundation, the Fairfax County Public Schools system in Virginia raised more than $100,000 in the first year of a credit card program. One percent of the average annual $2,000 in credit card purchases by the 5,000 participants in the program was credited by the credit card company to the foundation.[42] Additional revenues that cover the foundation's operating costs are raised from membership dues from 30 to 50 local businesses.

Some advocates of school technology believe that tax incentives are the most politically and economically feasible means of funding technology in schools. As non-profit, non-taxpaying organizations, schools cannot take advantage of tax deductions for depreciation. Thus, some suggest that schools be allowed to sell "depreciation credits" to businesses, with the proceeds being used for educational technology. Schools could use the credits to bargain with vendors for better prices. This suggested scheme is similar to one in the Clean Air Act that allows third-party traded credits.

Dedicated funding sources. To cover the cost of new school construction, sometimes part of the payment burden is placed on those who create the demand. Thus, some districts levy a special tax (of say $1,000) on each new residence constructed in the district to fund the new schools these developments require. Through voluntary contributions of $300 to $500 per house, the school district in Galloway Township, New Jersey, raised $2 million for technology by granting housing developers minor density concessions.[43]

Local taxes levied on the local cable TV company, phone company, and other service providers are another potential funding source for school technology. The school system in Prince Georges County, Maryland, obtained part of the county's 5 percent cable

42 American Association of School Administrators (1995) 15.

43 American Association of School Administrators (1995) 11.

revenue tax in the form of a one-year grant for school technology.[44] Calcasieu Parish schools in Louisiana went directly to consumers, imposing a half percent increase in the local sales tax to raise funds for educational technology.[45]

Bridging the Funding Gap

The prudent planner should project future revenues and expenditures over the system's life cycle, or for at least five years. However, many school districts respond to little more than their mandate, i.e., to prepare a budget for the coming fiscal year. In general it is probably unwise to make detailed projections more than five years into the future because the degree of uncertainty increases with time until the projected data have so much uncertainty surrounding them that they are virtually worthless.

As shown earlier in Exhibit 2.6, the costs of the technology plan should be developed using a bottom-up approach. In other words, each element in the technology plan in each school should be costed and then aggregated to produce a series of cost figures for the whole school district. Projections of revenues, on the other hand, typically are developed using a top-down approach. The key set of numbers to derive is the statement of expected revenues, i.e., the dollars the district expects to receive from each major source and the proportion of each of those funds available to pay for the technology plan.

In developing a projection of expected revenues, separate lines should be used for each item. Where one funding source provides several different types of money, several lines should be used for each type of aid. For example, state aid may be specifically designated for children with special needs, library books, school nurses, or other items that have been given special priority by state legislators. Additional lines may be needed for the receipt of lump sum revenues for general education purposes under a title such as "general state aid," "foundation grant," or "equalization program."

44 American Association of School Administrators (1995) 13.

45 Further details of this funding mechanism are provided in the final section of this chapter.

Funding Mechanisms at Work

We conclude this report by illustrating several funding mechanisms or approaches to funding used in states and districts across the nation. One describes how excess earnings generated by a state utility company have been used by the state to install and fund the community's basic network infrastructure. Another describes the approach one state has chosen to address the issue of technology equity and the vigorous attempts it has made to ensure low-wealth districts are not left behind in the race to equip schools with technology. In some states, a portion of the proceeds from the state lottery goes to elementary and secondary education. We look at one state where substantial funds from this source are distributed for instructional technology.

While there are many competing uses for the proceeds generated by state lotteries, taxes dedicated to producing funds for school technology obviate this type of competition. Though new taxes may be unpopular, they do provide in some instances an irresistible source of funding for school technology. We examine two dedicated taxes that have been levied to raise money for school technology— one by state government, the other by local government. Approaches to funding technology will be quite different not only across states but also across school districts. We illustrate the way two districts have self-funded their school technology plans. One is a relatively high-wealth district, the other is relatively low-wealth. Perhaps paradoxically, the high-wealth district has borrowed to fund its technology plan, while the low-wealth district avoided borrowing in implementing its plan. Finally, the role of local education foundations is explained and illustrated.

Building the Infrastructure with Public Utility Revenues

In April 1995, the Maine Public Utilities Commission approved an Order for NYNEX (the state-regulated telephone company) to develop a plan to provide schools and libraries in the state with access to advanced information networks and services. The initiative underlying the commission's order was a general policy statement in the state's utilities legislation aimed at promoting community interaction and the sharing of knowledge and information across all telecommunications technologies and networks. To advance this policy, NYNEX was directed to provide a statewide network to allow schools, libraries, and other users to access network services, including the Internet and its World Wide Web.

In addition to establishing the mechanism for developing the backbone network, the commission's order also instructed NYNEX to ensure that each eligible school and library has available the services and facilities it needs to connect to the backbone tier. This service connection is referred to as the access tier. There are 1,200 schools and libraries eligible for the program, and 97.8 percent of the connections were made by September 1997. On completion, the program will have established a statewide network interconnecting all of Maine's schools and libraries.

The program provides 56 Kbps access from the backbone network to the location of each school and library. Schools that obtained advanced communications services and equipment prior to the program are given "equivalent value" funding to remove any "pioneer penalty." The commission's order also provides a funding mechanism through which schools can buy a computer and obtain system training. Up to $2,000 is available to each school and library to buy a computer should the school not already have one capable of connecting to the access tier. Funds for training are capped at about $750,000 overall. Using a train-the-trainer concept, two individuals from each school will receive three days of comprehensive training on access tier services. Based on feedback from early participants, the program appears to produce a substantial leverage effect with additional technical assistance and donations of equipment being offered to schools by local phone and cable TV companies.

To implement the plan, the Maine Public Utilities Commission created an advisory board. The plan itself was developed by NYNEX in conjunction with school and library representatives, but it was initially ordered by the commission in a NYNEX rate case. In examining NYNEX's intrastate rates, the commission found that intrastate rates generated revenues that were $14.4 million in excess of what the utility company was allowed to earn. The commission instructed NYNEX to reduce rates to eliminate $10.4 million of the excess earnings. NYNEX continues to collect the remaining $4 million, but this sum is now applied to the state's program for providing and improving network access and services for all the state's schools and libraries. The program provides $4 million per year for five years and the money accrues into a NYNEX account at the rate of $333,000 per month. Under the program, all services or facilities are provided either directly by NYNEX or by other providers with money obtained from the NYNEX managed account.

Also, a mechanism similar to universal service is contained in the legislation that will provide a similar amount of annual funding for the program after the initial five years. This law establishes a *telecommunications access fund* and gives the Maine Public Utilities Commission the authority to *require* all telecommunications carriers to contribute to the fund. The fund will be made available to assist schools and libraries in paying the cost of acquiring and using advanced telecommunications technology. The legislation ensures that the annual cost that each carrier may be required to contribute will not exceed 1.5 percent of its intrastate revenues.

Originally, the cost of providing the network was estimated by NYNEX at about $20 million using discounted tariff rates. The commission, however, instructed NYNEX to base its estimates on incremental or out-of-pocket expenses. The commission reasoned that the state's NYNEX rate payers had already paid for allocated costs under the discounted rates. The commission's action reduced the estimated cost of the network to about $10 million.

Achieving Technology Equity through State Funding

Established as a state-funded partnership with the goal of improving student learning, Ohio SchoolNet is a $95-million initiative that facilitates the installation and use of network technology in Ohio's public schools. These funds represent a considerable expansion of Ohio's funding for educational technology.

Through the sale of bonds, $95 million is funding two major components of SchoolNet: $50 million is targeted to wire Ohio's public school classrooms (at a cost of $500 each for approximately 100,000 classrooms) and $45 million is funding the purchase of computers and peripherals for classrooms in 25 percent of Ohio's public school districts with the lowest adjusted property valuation per pupil (at $3,200 per computer for 14,000 classrooms). Each classroom telecommunications connection will be capable of accommodating voice, video and data transmissions.

Since 1995, the Ohio General Assembly has appropriated $430 million from the state's FYs 1996, 1997 and 1998 operating budgets to fund SchoolNet Plus. A complementary program to SchoolNet, SchoolNet Plus provides eligible, targeted districts with financial resources to purchase one interactive computer workstation for every five students enrolled in grades K-4. In addition to computer hardware, districts can use SchoolNet Plus funds to purchase software and two-way audio and video equipment and to offset costs for training and related services. SchoolNet Plus funds are allocated based on a district's average daily membership count for students enrolled in grades K-4 from October of 1995. If an eligible district already meets the minimum requirement of one multimedia computer workstation for every five students grades K-4, the district may use SchoolNet Plus funds to purchase workstations for students in grades 5-12.

In addition to SchoolNet and SchoolNet Plus, Ohio provides financial appropriations to further the implementation of education technology in the state's public schools. An appropriation of $3.3 million in the FY98-99 state budget bill continues Ohio's technology equity program, which was appropriated at $12.1 million in FY 96-97. Eligible Ohio public school districts will receive, in addition to their SchoolNet and SchoolNet Plus entitlements, state-provided funding to purchase computer hardware and software and to offset costs for professional development. A $9.2 million state-sponsored appropriation provides for competitive grants for districts and consortia comprised of districts, institutions of higher education, businesses, community centers, and other organizations to create and maintain prototypes that demonstrate engaging use of two-way interactive video resources for distance education.

The Ohio General Assembly also appropriated $30 million in the FY 98-99 budget bill to upgrade electrical capacity in Ohio's existing public school classrooms to use Ohio SchoolNet technologies. All public K-12 districts are eligible to apply for these funds.

The Ohio SchoolNet Telecommunity provides start-up grants for distance education to Ohio's public and private schools. This six-year, $26-million project is a partnership among the Public Utilities Commission of Ohio, the Ohio Department of Education, and nine telephone companies. The grants are state administered and provide to consortia (composed of schools, museums, zoos, institutions of higher education, government agencies, and businesses) opportunities to use two-way video teleconferencing to expand access to technology for Ohio's students.

Raising Revenues through a State Lottery

Schools and districts in Georgia have received substantial funds for technology from the Lottery for Education Program. Program allocations from 1994 through 1997 have provided a total of $144,650,577 for classroom technology ($33 per student per year) and $76,310,000 for other technology grants targeting areas such as assistive technology, model technology projects, and vocational learning. Lottery proceeds will fund the following K-12 public school technology initiatives through Georgia's FY 97 supplemental and FY 98 regular budgets:

- $15,401,836 for on-site technology specialists at each school system. The technology specialists have responsibility for providing training for K-12 teachers in the use of computers and advanced electronic technology for classroom instruction
- $36,841,431 to provide each K-12 school with $27.485 per student full-time equivalent for purchasing technology hardware and software. Each school system will receive a minimum grant of $53,000.
- $689,836 to purchase equipment for the two new regional training centers and to upgrade equipment at nine existing regional training centers. The centers provide teachers, principals, and administrators with opportunities to learn about and apply new technologies.
- $2,000,000 to provide assistive technology for students with special needs.

In addition, $500,000 in lottery funds will be spent on alternative school programs and $8,505,830 in combined lottery and state funds will provide a comprehensive fund accounting, student information system and financial analysis model. The fund accounting system will replace an outdated, 10-year-old system. The student information system will allow school systems to transmit to the state department of education the mandated student record in electronic form and to collect and transmit student full-time equivalent funding data. Implementing all three systems simultaneously will provide the advantages of system compatibility and interfacing.

On top of those expenditures, the state received $4.8 million in FY97 federal funds from the Technology Literacy Challenge Fund. The grant monies will be awarded to local school systems on a competitive basis to assist in implementing their local plans for technology.

Raising Additional Tax Revenues

Missouri raises funds for its Video Instructional Development and Educational Opportunities (VIDEO) Program by levying a sales tax on video rentals. This tax first went into effect in 1988, and was extended in 1992 and 1994. In FY 97, the tax is projected to generate over $2.5 million in funding for schools. The VIDEO Program encourages all educational institutions in Missouri to supplement educational opportunities through the use of telecommunications technology, including instructional television programming and satellite broadcast instruction. School districts obtain funds from the VIDEO Program by requesting:

- Initial access grants: $6,000 per building.
- Extension grants: $1,000 per building per year.

More than 500 school districts, accounting for 2,200 buildings across the state, participated in the program in FY 97. These funds helped schools to add satellite dishes, antennas, TV monitors, VCRs, CD-ROMs, modems, videodisc players, video projectors, and distance learning courses for students and staff. Since the program's inception, more than 1,600 teachers have received training in various aspects of video technology and video information usage for education using VIDEO funds.

The Calcasieu Parish School Board in Louisiana uses revenue obtained from a local sales tax to fund school technology. This school district has an enrollment of 35,000 students in 59 schools, including 33 elementary schools. There are 25 percent to 30 percent minority students in the parish.

In 1988, the school board superintendent asked voters for a half percent add-on to the local sales tax for four years to raise money for classroom enhancements. Residents were informed that they would have the opportunity to judge for themselves whether the money raised was being well spent before they voted on retaining the additional tax. The tax money was spent specifically on classroom technology and its support, and the community was pleased with the results. When the superintendent asked voters in 1992 to support retaining the additional sales tax for another 10 years, 80 percent of them approved.

Using Bonds for Self-funding by Wealthy School Districts[46]

The Plano Independent School District in Texas, which has a student enrollment of 39,000, used the proceeds of a $19 million bond that was passed in 1990 to network 53 sites in the district. A second bond issue for additional technology funds was attempted in 1993 but failed. But with a full-tilt public information campaign, the district persuaded voters in just five months to pass in 1996 a $175 million bond package that includes significant new funds for school technology. The first of three propositions on the ballot was for $131 million in bonds to build seven schools; it passed with 70 percent of the votes cast. About 5 percent, or $8 million, of this sum is earmarked for technology items in the new schools. The second proposition, which passed with 60 percent of the votes, was for $20 million for technology in the district's elementary schools. The third proposition provided $24 million for technology in secondary schools and passed with 65 percent of the votes. The turnout for the ballot was 8 percent, which is normal for a bond vote.

One aspect of the bond had special appeal for voters. Residents of the district were feeling the effects of state legislation that captures and redistributes local tax dollars to equalize districts' property wealth statewide. For example, in 1996, against an operating budget of $200 million, Plano returned $16 million to the state and expected to give back $27 million in 1997. The revenue from bonds, however, is not subject to recapture, so every dollar raised stayed within the district.

Other features of this bond issue also were important to its passage. For instance, the committee that first evaluated the school district's technology needs was community-based, and teams of teachers and other district staff spent more than a year researching technology options and costs by reviewing what other districts were doing. District leaders visited all district schools to brief staff on the bond package proposal. And local community groups received over 200 presentations by district staff and committee members. Literature was disseminated to clearly identify what technology each individual school would receive and when it would be received.

46 Most of the details in this account were obtained (with permission) from the May/June 1996 issue of *Insider's Letter* newsletter, published by the National School Boards Association, Institute for the Transfer of Technology to Education.

Some large companies are headquartered in the district (e.g., EDS, JC Penney, Frito Lay, and Digital Switch), and residents are quite technology aware. Even so, the extensive outreach effort described earlier was instrumental in dissipating community concerns about issues such as student safety on the Internet, the adequacy of staff training, and whether acquisition of technology would lead to the federal government in Washington, DC, accessing information about children.

As a result of the successful passage of the bond ballot, beginning in fall 1997, every teacher in the Plano Independent School District received either a Pentium or Macintosh computer. Every classroom in its elementary schools will receive seven Pentium 100 computers (or better), a videodisc player, VCR, 29-inch monitor, and upgraded technology in their libraries. The middle and high schools will receive industrial technology labs each costing $157,000 on average. Each high school will also get a foreign language lab costing on average $180,000, and science classrooms in secondary schools will get over $4.5 million in hardware and software.

The funding for the new schools is being obtained through 20-year bonds, but five-year bonds are funding the technology acquisitions. These five-year bonds will be sold over three years. The district counts on a five-year life for its computers, so expects 20 percent of them to be retired each year. Further bond issues are planned to fund the replacement of systems, and residents are already aware that the district will be coming back to them in just a few years for additional funds.

The district's staff regularly evaluates the financial benefits of leasing but has not found advantageous terms thus far. The district expects to keep its computers for five years, and under the existing four- and five-year leasing terms available to it, it could own the computers outright after three years.

With regard to passing bonds, it pays to persist, provided lessons are learned from earlier failures. Like Plano, the New Haven Unified School District in California first failed in its attempt to pass a $55 million bond issue in 1992 for retrofitting schools for technology.[47] With a two-thirds requirement for passage of the bond proposition, the District just failed with 65 percent of the vote. The District went back to the voters in 1993. Little organized effort had been given to the first initiative in 1992, but much more organization went into the second attempt, with the result that 75 percent of the voters favored passage of the bond.

Developing a Reliable Revenue Stream to Fund the Technology Plan

Most of Florida's 67 school districts have large enrollments. The Volusia County School District has 68,000 students distributed among 75 schools, placing it just above the midpoint in size for the state. The district raises some education should be encouraged to take up the task of funding technology. Some advocates of education technology believe that dollars through local taxes, which are restricted to capital projects such as new school construction and school buses—and now school technology. All unspent local dollars revert to the state to be redistributed to school districts statewide. The Volusia County School District has an impressive and sophisticated technology plan, with funding derived from tax dollars raised locally for capital projects. All schools in the district are wired, and there are 19,000 personal computers in the district's schools and administrative offices.

Despite being one of Florida's poorer school districts, Volusia County began developing a technology plan about eight years ago. The plan was ambitious and came with a relatively high price tag of about $30 million. It was developed with little thought of implementation costs. Not surprisingly, it never got funded.

Another technology plan was developed two years later, this time based on firmly budgeted money. The county committed to the school board to provide a specific level of local tax dollars (intended for capital projects) to fund school technology for a specified period of time. The district now spends about $17 million annually on capital items, of which $4 million to $5 million is devoted to technology. Although the technology plan provides for some pilot programs, it is based on equity across schools within the district, and it is claimed this feature of the plan facilitates the acquisition of funds based on local tax dollars.

47 Newsletter, Computer-Using Educators, Inc., May/June 1996.

A key element of the district's success with its technology plan has been the school board's ability to maintain a constant revenue stream through both good and bad cycles of the local economy. With a secure revenue stream that's not subject to the vicissitudes of local government budgeting, staff have been able to plan with confidence and to avoid wasting resources. And knowing exactly which parts of the plan will be executed over, say, each of the next three years saves scarce dollars in the long run. A firm plan, backed by secure funding, enables the district to make special deals with suppliers. The technology plan is also reinforced by ensuring that all aspects of school technology are controlled by the district. For example, even though the state sends categorical dollars for technology directly to schools in the district, the schools have reached an agreement that allows these dollars to come directly to the district to help fund the technology plan. In another example, the district has established a district-based repair process that handles an average of 400 machines per week.

So far, the district has avoided borrowing money to fund the technology it has acquired. However, it anticipates additional sources of funds will be needed when the time comes to buy additional hardware for its high schools and middle schools, and it expects to obtain these funds by tagging onto a bond issue for new school construction and other capital improvement projects.

Using District Education Foundations[48]

Local education foundations provide one of the most viable long-term solutions to the problem of creating dollars to fund technology, according to some educational technology advocates. Currently, most education foundations are established simply as tax-exempt 501(c)(3) fund-raising organizations that supplement and enhance the standard educational fare. Contributions are tax deductible, and donors may be given the option of making contributions for general or designated projects. Usually, teachers are allowed to apply for the funds raised by the foundation through mini- or horizon- (i.e., innovative) grant programs.

[48] Some of the details in this account were obtained (with permission) from "The Funding Puzzle" in the June 1996 issue of *Electronic School*, published by the National School Boards Association.

Typically, foundations establish in their by-laws what percentage of their earnings goes to mini-grants and what percentage goes to an endowment. For example, one education foundation in St. Vrain Valley, near Boulder, Colorado, invests 50 percent of all contributions to make the foundation self-perpetuating. The Williamston Schools Foundation in Michigan ensures that a proportion of the $50,000 raised annually is reserved to fund large-scale projects. Usually, all grant expenditures by a foundation are approved by an executive committee.

Some foundations take advantage of their status to act as a "front" for the school district by applying for grant opportunities that, in the foundation's absence, would not be available. The education foundation in Perry Township School District, Indiana, for example, has found that it is eligible to apply for about three times as many grants as the school district can. Although most state and federal grants come through the local school district, most grants overall come from private foundations. Also, in some districts there are per-student limits on school expenditures, so foundations are sometimes used to overcome constraints imposed by spending caps.

Education foundations may also consider expanding their traditional role by providing venture capital, seed money, or other funding to provide technology and professional development. For example, a 501(c)(3) foundation is eligible to obtain technology systems under a tax-exempt lease and provide the systems to schools at a competitive interest rate. Although the boards of some education foundations are composed of local politicians and businessmen who would have little difficulty managing and overseeing this type of activity, others may lack that sophistication. This is an unfortunate situation because, in this role, foundations could provide a good mechanism for leveraging support, involving the community, and bringing a sense of fair play to the school technology decisions made within a school district.

Many school districts are so small that individually their chances of attracting grant funds are small. In these circumstances, a foundation can be established to serve several small districts. For example, 17 small school districts, with a total of 35,000 students, are encompassed by the Cape Educational Technology Alliance (CETA) in rural Cape May County, New Jersey. CETA was established to help obtain grant money for educational technology, but the foundation also facilitates technology planning, staff development, purchasing, and maintenance for county schools. Setting up accounts and establishing non-profit status can be considerable hurdles to the formation of educational foundations, so it is essential to get professional help. In CETA's case, for example, an accountant and an attorney on the board helped to establish the organization.

In Pendleton County, Kentucky, the school district foundation initially planned to fund student scholarships, but a growing emphasis on technology in the district and state led the foundation to earmark most of its disbursed funds for the purchase of peripheral computer equipment. The foundation's goal for 1997 is to award $50,000 to the county's four schools to complement state-supported school and district computer networks.

The funds raised by foundations are not limited grants, and the spending of funds is not limited to equipment acquisition. For example, in California, Saratoga's education foundation recently funded a technology media specialist to assist teachers, a science teacher and a science aide, as well as hardware for technology labs. The foundation raised $48,000 last year by direct mail solicitation to each property owner in the district, and about 70 percent of the parents in the district made a donation. In addition, a one-day telephone solicitation raised $67,000.

NOTICE

REPRODUCTION BASIS

☐ This document is covered by a signed "Reproduction Release (Blanket)" form (on file within the ERIC system), encompassing all or classes of documents from its source organization and, therefore, does not require a "Specific Document" Release form.

☑ This document is Federally-funded, or carries its own permission to reproduce, or is otherwise in the public domain and, therefore, may be reproduced by ERIC without a signed Reproduction Release form (either "Specific Document" or "Blanket").