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ABSTRACT

For technology to make a difference in transforming teaching and learning in schools, it must be accessible to students and teachers. This access is predicated on the expenditure of funds to initiate and support the technology investment. This article summarizes the analysis of the 1992-93 financial data reported to the New York State Education Department by all public school districts in the state. The data and fund groups from the ST-3 Annual Financial Report used in this analysis are: (1) grand total expenditures; (2) general fund expenditures for school library and audiovisual, educational television, and instructional technology/computer assisted instruction; (3) special fund expenditures for school library and audiovisual, educational television, and instructional technology/computer assisted instruction; and (4) management information systems/central data processing expenditures. Data indicates that public education in New York cost over $21 billion in 1992-93, and schools spent over $360 million (2.2%) on technology functions. Statewide, districts spent an average of 11.5% of their total technology expenditures on BOCES (Boards of Cooperative Educational Services) services. The average statewide expenditure for instructional computing (CAI) represents 0.5% of the total expenditure in schools. Hardware represents an average of 10.3% of the instructional computing expenditures. Overall, there is a substantial variability in the amount of funding committed to technology. Five tables include overall expenditures; BOCES related technology expenditures; technology expenditures as a percent of overall expenditures; instructional computing expenditures; and components of CAI expenditure. (MAS)

Technology Expenditures in New York State Schools

An Analysis of Expenditure Data from 717 School Districts

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Introduction

There is general agreement that technology can make a significant difference in transforming teaching and learning in schools. However, for technology to make a difference, it must be accessible to students and teachers. This access is predicated on the expenditure of funds to initiate and support the technology investment. Although much has been said, and written, about expenditures for technology in schools, the author is unaware of any statewide analysis of actual school expenditure data conducted up to this point in time. The reality is that technology discussions have been based on extrapolation from small sets of individual district data.

There are a number of questions which empirical data on technology expenditures would be invaluable in answering. For instance, what is the total amount in a state spent on technology? Or, what percentage of the total district expenditure does technology represent? Another question is what percentage of the total expenditure does hardware represent? Finally, one could ask what the trend is for technology expenditures over multiple years .

Because of the information systems put in place over the years, New York State has the unique capability to collect substantial quantities of technology-related information from all schools in the state. Therefore, is possible to present comprehensive data which can answer these technology questions for all New York State K-12 schools.

This article will summarize the analysis of the most currently available (1992-93), end-of-year, financial data reported to the New York State Education Department by all public school districts in the state. Specifically, the data used in this analysis come from the ST-3 Annual Financial Report completed by school districts after June 30 of each year. These fiscal data are reported to the Education Department on September 1 of each year in electronic form through the BOCES Regional Information Centers. The ST-3 collects expenditures by function codes within a range of major fund groups that include a general fund category and special fund groups. Since reporting through the ST-3 is a legal requirement for districts, and since the form is designed to capture all expenditures (including those for technology), it is an ideal vehicle for illuminating how much schools spend on technology. The ST-3, because it is legally required, is the most accurate accounting of technology expenditures available for comparison of schools across the State. Nonetheless, prior experience has demonstrated that school districts do make errors in subcategorizing of expenditures, or use totally incorrect categorizes.

Among the data elements and fund groups from the ST-3 used in this analysis were the following:

- Grand Total Expenditure

- General Fund Expenditures for
  - School Library and Audiovisual
  - Educational Television
  - Instructional technology/Computer Assisted Instruction

- Special Fund Expenditures for
  - School Library and Audiovisual
  - Educational Television
  - Instructional technology/Computer Assisted Instruction

- Management Information Systems/Central Data Processing Expenditures

Note that the "special fund expenditures" includes funding sources such as federal categorical programs (e.g.Title I or Title II). The separately reported expenditure areas under each of the funding sources includes non-instructional salaries, equipment, contractual/other, materials and supplies, BOCES Services and employee benefits. Instructional salaries were also included under the school library, educational television and instructional technology areas. While there are a few other functional areas on the ST-3 that could, conceivably be used by districts to report technology-related expenditures (e.g. Records Management Officer), all the major expenditures for technology are encompassed here in this analysis.

Analysis

Based on the analysis of New York's 717 public school district's data in 1992-93, the following table (Table 1) provides figures for the total expenditures of New York State public schools, as well as overall technology expenditures. As indicated, public education in New York cost over $21 billion dollars in 1992-93. Schools spent over $360 million of this amount on technology functions.

Table 1
Overall Expenditures

Expenditure Item	Total State Wide Expenditure	Average Expenditure /District
Grand Total Expenditure	$21,320,000,000	$29,733,846
Total of all Technology Related Expenditures from all Funding Sources	$360,373,546	$502,613
Total of all Expenditures for Instructional Technology	$293,246,745	$408,991
Total of all Expenditures for Central Data Processing/Management	$67,126,801	$93,622

Again, it is important to note that these total figures include all cost items related to technology, including staff, hardware, software, supplies and materials, and other service providers (including BOCES).

Because BOCES are a major provider of technology services to many school districts, it makes sense to examine the BOCES related expenditure as displayed in Table 2.

Table 2
BOCES Related Technology Expenditures

Expenditure Item	Total State Wide Expenditure	Average Expenditure /District
Total of all Technology Related Expenditures from all Funding Sources for BOCES Services	$65,727,016	$91,669
Total of all Expenditures for Instructional Technology for BOCES Services	$31,692,961	$44,202
Total of all Expenditures for Central Data Processing/Management for BOCES Services	$34,034,055	$47,467

It is important to note that not all districts participate in BOCES services. However, the averages and ranges displayed here are based on all 717 school districts. An analysis of the total BOCES technology expenditure shows that statewide, districts spent an average of **11.5%** of their total technology expenditures on BOCES services and that the range of expenditures was from 0% to 100% of the total district technology expenditure.

Another way to look at technology expenditures is as a percentage of the total district expenditures. Table 3 provides these technology percentages for various groupings of technology.

Table 3
Technology Expenditures As A Percent
of Overall Expenditures

Expenditure Item	Statewide Average Percent of Total Expenditure	Minimum Percent Statewide	Maximum Percent Statewide
Percent for all Instructional Technology	1.9%	0%	8.0%
Percent for all Central Data Processing/Management Technology	0.3%	0%	2.7%
Percent for all Technology, Including BOCES	2.2%	0%	8.0%
Percent for all BOCES Instructional Technology Services	0.3%	0%	4.9%
Percent for all BOCES Management Technology Services	0.24%	0%	2.2%
Percent for all BOCES (Management and Instruction)	0.52%	0%	5.4%

Because the instructional technology expenditure category includes other technology expenditures which may (or may not) be directly relevant to an analysis of computer-based expenditures, the following table (Table 4) examines only the instructional computer/CAI component of expenditure. The actual ST-3 form uses the somewhat narrow term of "Computer Assisted Instruction" to collect information from schools. This item is used by schools to reflect all instructional computer-related components of the total instructional technology expenditures. Obviously the library and educational television expenditure

categories also contain technology, and may also contain computer-related expenditure. The only complete instructional technology expenditure figure will be, therefore, the figure that includes the library and public television figures, as reflected here in the "total instructional technology figure." This figure includes the instructional computing (CAI) figure which is the largest single component of the total instructional technology expenditure.

Table 4
Instructional Computing Expenditures

Expenditure Item	Total State-wide Expenditure	Average Expenditure/ District	Range (Min - Max)
Total Instructional Computers (CAI)	$85,122,270	$118,720	$0-$19,897,062
Total BOCES Instructional Computers (CAI)	$16,335,811	$22,783	$0-$911,829

The average statewide expenditure for instructional computing (CAI) represents 0.5% of the total expenditure in schools with a range from 0% to 6.55%.

The Education Department has encouraged school districts to do technology planning as a part of their overall school improvement initiatives. As part of the planning process, the Department has also strongly encouraged a focus on staff development and technical support for technology, not just a focus on hardware acquisition. Life cycle cost analyses suggest that hardware and software are only a small portion (30-40%) of the total, life cycle cost of technology systems. While a single year's data cannot fully answer the question, it is interesting to determine whether schools expend a large portion of their total instructional technology dollars on hardware, or whether they include other critical components for success. Table 5 presents this information.

Table 5

Item	Total Amount or Percent	Average Statewide	Range
Total Expenditure for Computers (CAI)	$85,122,270	$118,720	$0-$19,897,062
Total Expenditure for Hardware within Instructional Computer (CAI) Expenditure	$8,146,079	$11,361	$0-$2,571,599
Percent of Total Expenditure for Computer (CAI) Hardware	N/A	.06%	0%-3.2%
Percent of Computer (CAI) Expenditure for Hardware	N/A	10.3%	0%-100%

As this table indicates, hardware represents an average of 10.3% of the instructional computing expenditures. However, as the range of percentages shows, some districts have a computer hardware expenditure which represents 100% of their total instructional computing (CAI) expenditures. This means that there are no funds available for staff development, software, or technical support of systems--a less than appropriate situation.

Conclusions

As these data indicate, there is substantial variability in the amount of funding committed to technology. The overall average expenditure of 2.2% of the school budget for technology support (including hardware, software, network, technical staff, instructional staff and supplies and materials) must be put in the context of what other enterprises such as business and industry spend on information technology. Based on limited industry related expenditure figures (See *IS Budget*, August 1994), it would appear that school district expenditures for technology are low. General Business expenditures for information technology average over 3%, and are much higher in information intensive business areas. School districts may need to assess their present level of expenditure for technology and determine whether they can increase this technology expenditure in order to increase access for teachers and students.

In subsequent years, comparisons will be made with this 1992-93 "base year" in order to identify trends in technology expenditures. Ideally, the ST-3 categories used for reporting should be expanded to include telecommunications costs, as well as capital improvements for technology.