



## A Report and Estimating Tool for K-12 School Districts

### Utah District Case Study



April 2003

Engagement: 220384931

research consulting measurement community news

# Gartner

## Table of Contents

Introduction .....	1
Overview and General Setting .....	2
Total Cost of Ownership Metrics .....	3
Interpretation of Key TCO Metrics .....	4
The TCO Process .....	6
Definitions.....	7
Related Documents.....	9
Contact Information .....	10



## Introduction

In the winter of the 2002-2003 school year, four school districts participated in a Total Cost of Ownership (TCO) of Distributed Computing project commissioned by the Consortium for School Networking with the sponsorship of the U.S. Department of Education and NCREL. The scope of the project from a technical perspective included end-user computing devices, network servers, local area network hardware, and the labor costs associated with each of the components. Software, application service providers, content and curriculum development, and staff development and training were included as well.

Data from each district was used to develop a case study that reports pertinent TCO metrics, discusses the TCO process as related to the district, and provides background information on the district and the distributed computing environment. The metrics represent a baseline for the district from where they came. From this baseline, trending analysis can be performed. In addition, the process for data collection should be refined over time, as a first-time TCO analysis often requires a great deal of manual effort. Comparisons of your district to case study or other districts are difficult to analyze, as there are many variables for differentiation.

There are four sections to each Case Study. The first is an overview of the district and the general setting of the distributed computing environment. The second section contains the TCO metrics. The third section includes an interpretation of key selected TCO metrics. The fourth and final section discusses the TCO processes as they are related to the district.

Please refer to Attachment 1, “TCO Data Collection—Tables and Definitions” for a definition of any of the table fields in this section.



## Overview and General Setting

The school system contains 59 schools and serves 49,100 students in Kindergarten through grade 12. The eight high schools, eight middle schools and 43 elementary schools are for the most part located in suburban settings over a 450-square mile area.

All the buildings are networked and connected to the district central office over a wide area network. The Utah district provides the connection for the elementary and middle schools and the Utah Education Network (UEN) provides high-speed connectivity for the high schools. The UEN also provides a number of electronic teacher tools and content for curriculum integration.

The Assistant Superintendent for Instruction has line authority over Technology. Technology departmental staff is distributed among three offices, two of which—instructional technology and data services—are co-located at the district office while the third—Infrastructure—is located in a neighboring town. While the working relationship between and among the technology director and the leaders of the other two groups is strong, opportunities for synergistic brainstorming and problem solving are rare. The technical effort is further divided among two offices outside the Technology office: (1) staff development personnel for technology has been moved from the Technology department to another Instructional office, and (2) the office of applied technology, primarily responsible for vocational, business and technology education, has broad responsibilities for the purchase and deployment of computer technology. At this time, the technology staff does not have responsibility for telephony and plays a secondary role in facilities planning.

The Utah district receives its per pupil funding from the state and supplementary funding from local initiatives. Technology is partially funded locally. While the source of funding is not a cost factor, it may inhibit this district from a more comprehensive approach to the use and deployment of technology. The recognized per pupil spend seems low at \$3,757.

The state of Utah provides a suite of software services through the UEN. The costs reported by the district are in many cases their estimate of the actual cost to buy or lease the software or services. The primary Student Information System (SIS) is an older version of an off-the-shelf software and the financials/payroll software is a legacy homegrown package running on the district's AS/400.

The district has included technology as an integral part of the strategic plan for education. Among Utah graduation requirements is one for technology. Currently, the Utah district is investigating tactics for assuring that students develop the requisite knowledge and skills to pass the test before they enter high school. Otherwise, they may be required to offer a large-scale remedial program at the high school level.



## Total Cost of Ownership Metrics

### Overall Cost

Unit	Total Cost	Direct Cost	Indirect Cost
Total District Cost		\$7,583,250.00	
District Cost per Client	NA	\$653.00	\$221.32

### Direct Cost by Category

Unit	Hardware	Software	Direct Labor	External Application Providers
District Cost	\$2,512,500	\$348,000	\$4,472,750	\$250,000
District Cost per Client Computer	\$217	\$30	\$383	\$22

### Hardware Cost by Category

Unit	Client Computer	Server	Network	Printer	Supplies
District Cost	\$2,030,000	\$195,000	\$150,000	\$125,000	\$12,500
District Cost per Client Computer	\$175	\$17	\$13	\$11	\$1

### Hardware Inventory Ratios

Category of District Resource	Ratio
Students per Student Dedicated Client Computer	8.5
Teachers per Teacher Dedicated Client Computer	0.9
Non-Classroom Personnel per Non-Classroom Client Computer	6.6
Total Users per Total Client Computers	4.5
Client Computers per Printer	11.6
Client Computers per Server	79.5

### Staffing Metrics

Direct Labor Category	Total Cost	Cost Per Client Computer (\$US)	Client Computers per Staff
Operations and Financial	\$2,367,750	\$204	86.6
Professional Development and Training	\$53,000	\$5	11,600
Curriculum Development and Support	\$2,022,000	\$174	215
Total Support	\$4,442,750	\$383	82



## Interpretation of Key TCO Metrics

**Direct labor costs were \$4,442,750, or \$383 on a per client computer basis. Indirect cost data could not be validated.**

Indirect costs include "underground" technology support costs borne by the end-user community such as peer support among faculty, staff, and students, as well as the cost associated with downtime. At this time, we are not confident in the data collected for indirect costs. When the data can be validated, this report will be revised. Since the total cost of ownership metric is comprised of direct plus indirect costs, it has not been shown either.

**The cost of client computer hardware is \$2,030,000 or \$175 per client computer asset.**

The district computer inventory is aging. Fifty-four percent of the inventory is older than three years old, and 27 percent is greater than five years old. As older equipment is replaced, this district is likely to incur higher costs related to asset purchases, and deployment operations in the near future.

The maturity of the district's asset inventory systems is evolving. The technology infrastructure group and the data services group each maintain their own homegrown asset inventory systems. The determination of location of the client devices was a challenge, and required a great deal of manual effort. This information will be important as the district tries to create a plan for refreshing the assets in the future. The implementation of systems, which can track asset configuration, location, cost, and other characteristics, is critical for larger districts.

**The district spent \$53,000 on professional development and training. This represents \$5 on a per client computer basis, \$21 on a per teacher basis, and \$1 on a per student basis.**

Even without an extensive set of comparison data, it appears that professional development and training is an area that represents an opportunity for this district. The Enhancing Education Through Technology block grant requires 25 percent of all grant-funded expenditures be in the area of staff development. It should also be noted that less than 15 percent of the classes in the district have implemented educational content software or Web resources for curriculum. Therefore, while investments have been made on technology and support of that technology, the students are likely not reaping the benefits of it as much as they could be.



***The district spent \$2,367,750 on Operations and Financial labor. This represents \$204 on a per client computer basis.***

The Utah district had a very complex technology environment. On the desktop 60 percent of the devices were Macintosh-based, and 40 percent Windows-based. In the server environment Netware, Windows 2000, Windows NT, Linux, Appleshare, Mac OS X, and OS/400 were all present. This complexity tends to create interoperability issues, which drive support costs as well as downtime. In addition, the district loses economies of scale in training of staff and purchasing.

Risk may also be a factor related to diversity. Sixty percent of the devices in the district do not have a virus protection mechanism installed. One of the reasons for this is likely the amount of work involved in implementing a large number of virus protection schemes.

The district has a formal help desk in place. However, because of the diversity, it is less likely that an agent can provide a high level of service for all of the technology in place. This drives support to “niche experts” who are usually dispatched and away from the help desk. This dispatch support tends to be more than five times more costly than phone support from a help desk.



## The TCO Process

The Utah district is new to the TCO process and spent considerable time tracking down and reporting data in the various categories. The data retrieval was heavily manual, in that disparate data sources were tracked down in order to retrieve data. Throughout the interview process, the district technology staff was able to retrieve much of the required data from departmental files or from other central office staff.

The inventory maintained by the office for Technology Infrastructure was the primary source of much of the data. Unifying the two inventory systems would be a logical next step in refining the TCO process. Presently, only 50 percent of the available hardware is routinely inventoried and reconciled against previous reports; the other half of the inventory is either spot checked or collected and not reconciled with the district records. Utah should consider including categories for power consumption and energy production, for example, if energy costs for technology are to be estimated.

The unification process should include standards applied to all district offices that are given—or assume—responsibility for purchasing, deploying and maintaining computers and related technology. Otherwise, the reliability of the data collected will always be in doubt. Likewise, standard procedures for collecting indirect labor costs should be applied to each district school and office.

Going forward, a reliable TCO analysis should become an integral part of the planning process as the Utah district begins to replace aging inventories and expand the role of technology in the curriculum.



## Definitions

<b>Total Cost</b>	Includes all costs within the model. It is a balanced look at what it truly takes to support a computer for the district. The metric includes both Direct and Indirect costs.
<b>Direct Costs</b>	Include all technology and direct labor costs incurred by the school district during the study period (hardware, software, external application providers, and direct labor).
<b>Indirect Costs</b>	Include all of the labor incurred by the user community for the study period. Indirect Labor includes the costs of users supporting one another, spent in training classes, casual learning, self support, user applications development and downtime costs.
<b>Hardware</b>	Includes the annual costs for client computers, peripherals, servers, network equipment, and printers.
<b>Software</b>	Includes the annual costs for all software running on client computers and servers. This would include infrastructure software, educational administrative software and personal productivity software, as well as content and curriculum specific software.
<b>Direct Labor</b>	Includes burdened salaries from personnel whose job role includes Operations and financial support, professional training and development or curriculum development.
<b>External Application Provider</b>	Includes all costs associated with organizations that provide the use of applications, and associated services to customers.
<b>Client Cost per Client Computer</b>	Measures the annualized cost of personal computers, and peripherals divided by the total number of client computers.
<b>Server Cost per Client Computer</b>	Measures the annualized cost of servers divided by the total number of client computers.
<b>Network Cost per Client Computer</b>	Measures the annualized cost of network equipment (hubs/routers/switches, etc.) divided by the total number of client computers.



<b>Printer Cost per Client Computer</b>	Measures the annualized cost printers divided by the total number of client computers.
<b>Students per Available Client Computer</b>	Includes the total number of students divided by the total number of client computers located in classrooms, libraries, media centers, labs, etc., along with the total number of student dedicated client computers, not including student owned equipment.
<b>Teachers per Teacher Dedicated Client Computer</b>	Includes the total number of classroom teachers divided by the total number of client computers dedicated for use by these individuals.
<b>Non Classroom Personnel per Non Classroom Personnel Client Computer</b>	Includes the total number of non-classroom personnel divided by the number of client computers dedicated for use by them.
<b>Client Computers per Printer</b>	Includes the total number of client computers divided by the total number of printers.
<b>Client Computers per Server</b>	Includes the total number of client computers divided by the total number of servers.
<b>Operations and Financial Cost</b>	Measures the total personnel, and vendor costs associated with “hands-on” labor, and help desk support around client computers, servers, printers, and network equipment. It also includes any costs around planning and process management, finance and administration (budgeting, procurement, asset management etc.), and physical database administration.
<b>Professional Development and Training costs</b>	Includes training of personnel to provide familiarization, and proficiency with the operation of equipment and software to carry out school tasks whether instructional or administrative.
<b>Curriculum Development and Support costs includes</b>	Labor involved in integrating IT into the teaching and learning process.
<b>Client Computers per Staff Metrics</b>	The number of Operations and Financial, Professional Development and Training, and Curriculum Development and Support personnel are divided by the total number of client computers to create client computers per staff metrics. Looking at the data this way tends to normalize for high or low salaries when making comparisons.



## Related Documents

Please refer to these documents (available at the [www.classroomtco.org](http://www.classroomtco.org) Web site) for additional information regarding TCO in the K-12 environment.

### ***Why Total Cost of Ownership (TCO) Matters***

Necessary reading before getting started

### ***Preparing for TCO Analysis***

Input fields required for the Web-based TCO Tool and extensions for further evaluations

### ***The Web-based TCO Tool***

A review of the Web-based TCO Tool

### ***California District Case Study***

An urban district with 140,000 students

### ***Minnesota District Case Study***

A rural district with 4,000 students

### ***Pennsylvania District case Study***

A rural district with 2,500 students



## Contact Information

### ***Gartner***

Name: Eric Stegman  
Telephone: +1-203-316-3260  
E-mail: [eric.stegman@gartner.com](mailto:eric.stegman@gartner.com)

### ***The Consortium for School Networking***

Name: Sara Fitzgerald  
CoSN Taking TCO to the Classroom Project Director  
Telephone: +1-703-351-5070  
E-mail: [sfitzgerald@fundsforlearning.com](mailto:sfitzgerald@fundsforlearning.com)

Name: Rich Kaestner  
Editor/Project Coordinator  
Telephone: +1-541-929-4589  
E-mail: [richk@alyrica.net](mailto:richk@alyrica.net)

