CHAPTER 10 – TECHNOLOGY MANAGEMENT

BACKGROUND

A school district's technology management affects the operational, instructional, and financial functions of the district. Technology management consists of planning and budgeting, technical infrastructures, application support, purchasing, and inventory control. Technology management typically requires staff dedicated to administrative and instructional technology responsibilities.

Administrative technology includes systems that support a school district's operational, instructional, and financial functions. Administrative technology improves a school district's operational efficiency through faster processing, increased access to information, integrated systems, and communication networks. Instructional technology includes the use of technology as a part of the teaching and learning process. Instructional technology supports curriculum delivery, classroom instruction, and student learning.

To facilitate technology management, a school district should have a technology plan that includes the integration of technology with administrative and instructional programs. A technology plan defines goals, objectives, and actions for technology projects; assigns responsibility for implementation steps; and establishes deadlines.

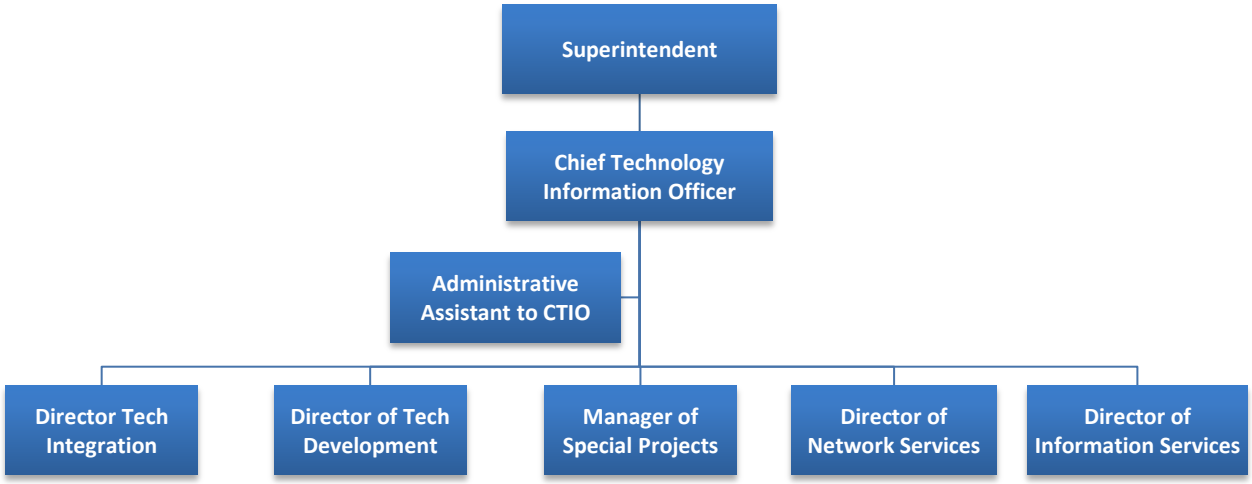
In Lamar Consolidated Independent School District (LCISD), the Technology Services Department handles administrative and instructional technology. The LCISD Technology Services Department's mission is to use the power of technology to educate all students by ensuring access to a superior education through inspired digital citizenship leadership among parents, teachers, administrators, and staff. This mission provides districtwide technology programs that allow students to achieve their full potential with technology at home and at school that enables them to participate in future social, economic, and educational opportunities in their local and globally connected communities. To handle administrative technology, the LCISD Technology Services Department is responsible for implementing and maintaining the technology infrastructure and telecommunications capabilities of the district. For infrastructure, this responsibility includes deployment, maintenance, and support of the server environment (network, application, and database), computers (desktop, laptop, and tablet), and printers. For telecommunications, this responsibility includes deployment, maintenance and support of the telephone circuits, telephones, telecommunications servers, communications switches and routers, Internet circuits, firewalls, and content filters. To handle instructional technology, LCISD Technology Services Department's responsibilities include training and support of administrators and teachers for deploying and integrating mobile, interactive, and instructional technologies in the curriculum and classroom environment.

CHAPTER HIGHLIGHTS

- LCISD effectively used E-Rate and bond funds to install a robust fiber optic network infrastructure and wireless connectivity to all district campuses and facilities.
- A methodology or formalized process would help to assess and determine the number of PC technicians required to provide adequate and equitable support to the schools.
- Overall functional knowledge of the Munis business system would result in the full capabilities and benefits of the system being realized.
- An active districtwide technology committee reviews and approves technology initiatives.
- Having formalized standards and style guides is helpful for maintaining the district and campuses websites.
- A comprehensive disaster recovery/business continuity plan ensures continuity of operations in the aftermath of a catastrophic event.
- Network infrastructure redundancy provides the capability to re-route network traffic if there's a break at any location in the fiber optic network.
- LCISD Technology Services Department documented policies and procedures help govern the technology functions and operational activities.

The LCISD Technology Services Department is led by the chief technology information officer (CTIO) who reports to the superintendent. The CTIO is supported by an administrative assistant, director of tech integration, director of tech development, manager of special projects, director of network services, and director of information services. **Exhibit 10-1** shows the organizational structure of the LCISD Technology Services Department.

Exhibit 10-1
Lamar Consolidated Independent School District Technology Services Department
2016-2017



Source: LCISD Technology Services Department, February 2017.

The tech integration group is responsible for all end-user support for administrative and instructional technology through the PC technicians and Campus Instructional Technology Specialist (CITS). The tech development group is responsible for the support and training in the operation and use of the Skyward student information system. This group is also responsible for video conferencing and the professional development center. The special projects group is responsible for the acquisition and implementation of classroom technology equipment such as projectors and interactive white boards. The network services group is responsible for implementing, maintaining, monitoring and resolving network, server, storage, wireless, phones, security cameras, content filter and firewall issues. The information services group is responsible for developing and maintaining new and legacy applications used to support departmental operations throughout the district. This group also supports Crystal Reports, M-Files Reporting Services, and the Microsoft SharePoint system. **Exhibit 10-2** shows the departmental staffing chart by position for the LCISD Technology Services Department.

Exhibit 10-2
Lamar Consolidated Independent School District
Technology Services Department, Staffing Chart by Position
2016-2017

Position	Number of Staff
Chief Technology Information Officer	1
Administrative Assistant to CTIO	1
Technology Services Secretary	1
Director of Tech Integration	1
Director of Tech Development	1
Director of Network Services	1
Director of Information Services	1
Manager of Special Projects	1

Position	Number of Staff
Campus Instructional Technology Specialists (CITS)	10
Technology Services Manager	1
PC Technicians	9
AV Technician	1
Helpdesk	1
Programmer/Analysts	2
Data Specialist	1
Network Technicians	2
Server Storage Engineer	1
Tech Development Specialist	1
Title 1 Special Projects Coordinator	1
Web Developer	1
Contract Programmer/Analyst	1
Contract Network Services	1
Total Staff	**41**

Source: LCISD Technology Services Department Organization Chart, February 2017.

To drive LCISD technology initiatives and spending, in 2014 a collection of key district technology stakeholders collaborated to develop a three-year (2014-2017) technology plan that identified the most critical strategies needed to support the district's improvement goals and objectives. **Exhibit 10-3** shows the goals, objectives, and strategies of LCISD's 2014-2017 technology plan.

Exhibit 10-3
Lamar Consolidated Independent School District
2014-2017 Technology Plan Goals, Objectives, and Strategies

Goals	Objectives	Strategies
Goal 1: *To deliver, in a consistent manner, a planned, monitored instructional program that meets the needs and insures the success of all students resulting in LCISD receiving multiple distinction designations at the exemplary level.*	**Objective 1.1:** Information management systems will support the curriculum, assessment and instructional objectives of LCISD as measured by the level of automation, analytics and integrated data provided in the following areas: curriculum management system, program evaluation system, and student assessment and accountability.	**1.1.1:** Provide access to Information needed for teachers and campus teams - test scores, data, grades - in a single location that can be sorted and manipulated to drive instruction (TSDS). Data should be linked to district curriculum and resources. **1.1.2:** Provide an online curriculum management portal that is accessible to teachers, parents, and students anywhere and that provides a place for teachers to collaborate and share lesson planning ideas and resources.
	Objective 1.2: Instructional programs including Career and Tech Ed, students at risk of dropping out of school; academically advanced; students in grades two; At Risk, Title I, and LEP students; and Spec Ed and 504 including dyslexic students; will be	**1.2.1:** Implement a Prek-2 grade reading program powered by technology available in the school and at home with analytics, reporting and assessment. The PreK-2 reading program will have

Goals	Objectives	Strategies
	supported by technology programs, access, devices and content to increase student academic success as measured by the associated program objectives.	digital content for readers of all levels and a device program that ensures every student with 24/7 access to the program resources. **1.1.2:** Ensure the same tools that are used by industry are available in our classrooms; and connect classes, businesses and professional organizations to support CTE's ability to offer certification opportunities. **1.2.3:** Provide alternative options for learning using technology for At Risk, Title I, and LEP students beyond the traditional classroom model such as Online courses, MOOC, Texas Virtual Schools. **1.2.4:** Provide alternative options for learning using technology for academically advanced students to include, Online courses, MOOC, Texas Virtual Schools.
	Objective 1.3: Teaching and learning will be supported by quality hardware/software and just in time, campus-based instruction and technical support as evaluated by the success in the areas of TEKS, TAKS/STAAR and the district curriculum.	**1.3.1:** Provide 24/7 access to Standardized Digital Instructional Resources based on need within the district curriculum for teachers and students. **1.3.2:** Provide an instructional program that ensures that every student has the technology skills needed for learning within the LCISD environment based on the State of Texas technology applications and LCISD Digital Citizenship requirements. **1.3.3:** Connect classrooms across the district so that students have access to other teachers and students. **1.3.4:** Utilize Online conferencing system to connect curriculum leaders (specialists, dept. chairs, etc.) to campuses, between campuses and within campuses to minimize lost instructional time. **1.3.5:** Implement a BYOD program that is focused on teaching and learning. Ensure security and training for all stakeholders.

Goals	Objectives	Strategies
Goal 2: *To attract, retain, and develop talented and highly effective personnel using equitable, efficient procedures; high quality, on-going professional development; performance monitoring and evaluations that result in professional growth.*	**Objective 2.1:** Provide a Technology Professional Development Program that results in certifications and/or skills for advancement, promotes new teachers' professional competence and growth, allows staff members to learn from one another through peer observation, feedback, and other collegial learning processes, and that impacts student achievement and behavior and promote the LCISD district curriculum. Results in certifications and/or skills for advancement, promotes new teachers' professional competence and growth. Allows staff members to learn from one another through peer observation, feedback, and other collegial learning processes, and that impacts student achievement and behavior and promote the LCISD district curriculum.	**2.1.1:** LCISD will adopt a system wide expectation for educator technology skillsets. **2.1.2:** Adopt a system wide expectation for teachers, staff and admin to participate in a professional learning network to build culture and professional growth. **2.1.3:** Assess individual's technology skill levels and develop a technology professional development program to meet the needs of LCISD. **2.1.4:** Provide an ongoing professional development program to support educators in developing expected skillsets. **2.1.5:** Provide professional development personnel to adequately support the technology goals identified.
	Objective 2.2: Provide the technology infrastructure and services to support the professional development objectives of the LCISD. 1. Research, initiate, and continue recruiting and hiring practices that result in hiring and maintaining highly qualified teachers and other staff members. 2. Review recruitment, selection, and develop processes to assure that creative, innovative district and building administrators with the ability to facilitate and manage change are hired and retained. 3. Provide incentives, recognition, rewards, and other structures that help to build staff morale and motivation and retain excellent teachers.	**2.2.1:** Provide access to consistent and equitable technology infrastructure throughout district. **2.2.2:** Provide 24/7 equitable access to district supported technology when and where needed.
Goal 3: *To establish a structure for planning that assures that all aspects of maintenance, growth, and improvement are systematically addressed and reviewed to meet both long and short-term needs.*	**Objective 3.1:** Provide technology training, systems, data and planning processes to support the administrative objectives of the district including training and support for campus, district, and department planning and decision making that enable monitoring of the implementation of administration regulations and best practices, and that support systematic processes that improve and ease data management.	**3.1.1:** Create a dashboard and a data analytics platform to support research based decision making focused on student success. **3.1.2:** Provide access to data and digital resources to staff and administrators in a secured manner, when and where they need access. **3.1.3:** Utilize web, online meetings and video to deliver standard trainings for staff and students. **3.1.4:** Engage technology

Goals	Objectives	Strategies
		leadership, community, and CITS into DIP planning and integrate technology plan into District Improvement Plan. **3.1.5:** Integrate technology into the District Playbook so that all stakeholders are informed of digital resources and processes available within LCISD to empower students, staff, parents and community.
	Objective 3.2: Provide the adequate resources to support technology in the most efficient and effective manner to improve system wide efficiencies.	**3.2.1:** Provide adequate internal technology staffing to meet infrastructure requirements, technical support and service needs. **3.2.2:** Take advantage of funding initiatives such as e-rate and grants to support technology activities. **3.2.3:** Increase and improve the use of technology for electronic student badges.
	Objective 3.3: Utilize technology in school facilities and transportation to ensure that an optimal environment is provided for teaching and learning. Review, update, and monitor schedules and procedures governing construction, remodeling, and maintenance of school facilities and transportation to ensure that an optimal environment is provided for teaching and learning.	**3.3.1:** Provide Mission Critical Internet Services for administrative functions. **3.3.2:** Increase and improve the use of technology for management of building energy. **3.3.3:** Increase and improve the use of technology for management of transportation including Bus Cameras, GPS Tracking and Badges to track students. **3.3.4:** Increase and improve the use of technology for management of building access for employees. **3.3.5:** Use technology to increase security through optimizing, adding to and maintaining a state of the art Security Surveillance System.
Goal 4: *To provide multiple communication forums, both within and outside the school district that result in a greater understanding of the needs of all stakeholders, thereby increasing student successes and improving*	**Objective 4.1:** To provide multiple communication forums, both within and outside the school district that result in a greater understanding of the needs of all stakeholders, thereby increasing student successes and improving LCISD's image among parents, taxpayers, and other significant groups.	**4.1.1:** Provide a Digital Citizenship Program that provides training for parents and community members on the academic, economic and social value and use of Internet Access. **4.1.2:** Provide a Connected Community Program that enables

Goals	Objectives	Strategies
LCISD's image among parents, taxpayers, and other significant groups.		all parents and students access to appropriate devices; high quality, secured Internet; and training for parents in the most cost effective and efficient manner. **4.1.3:** Increase LCISD communications to the community through the use of broadcast and radio technology with partnerships with cable and radio providers.
	Objective 4.2: Utilize technology to establish reciprocal channels of communication between campuses and central administration and to increase communication with community, among schools, and between schools.	**4.2.1:** Provide a structured plan to streamline the use of social media with best practices, expectations and job descriptions for social media personnel. **4.2.2:** Utilize system to increase communications between campuses and administration in an effective manner with online meetings and collaborative tools.
Goal 5: *To address issues that enhance school climate thereby creating strong, safe, drug-free disciplined schools.*	**Objective 5.1:** Utilize technology systems to empower students to develop positive internal and external assets. Empower students to develop positive internal and external assets so that they are strong and successful learners and are safe drug-free.	**5.1.1:** Provide training for LCISD Digital Citizens that teaches capabilities of the available Internet with Responsible and Expected Use (BYOD and Connected Community Programs) that supports safe social behaviors. **5.1.2:** Increase safe schools by empowering students with technology with Text Tip Line and Anonymous Message Photo Video to report unsafe campus behavior. **5.1.3:** Use technology to increase security with electronic student ID badges with BYOD badge system component in all campuses.
	Objective 5.2: Utilize technology systems to empower all LCISD staff members to work together to create a safe and drug free school environment. Empower all LCISD staff members to work together to create a safe and drug free school environment.	**5.2.1:** Empower all staff members with technology including: auto communications (calling, texting and emailing) systems, mobile apps like Remind 101 to get information home, and teacher mobile app to report information.
	Objective 5.3: Utilize technology systems to empower parents and community agencies as well as community members. Empower parents and community agencies as well as community members to take actions to ensure that children in LCISD are safe and	**5.3.1:** Provide a Digital Citizenship program that provides training for parents and community on the social value of Internet access.

Goals	Objectives	Strategies
	drug-free.	
	Objective 5.4: Utilize technology systems to evaluate effectiveness of student, staff, parent, and community initiatives. Evaluate effectiveness of student, staff, parent, and community initiatives in establishing strong, drug-free, disciplined schools.	**5.4.1:** Implement an Online Parent Safety Survey program.
Goal 6: *To create an effective integrated learning environment using technology as a tool to facilitate learning, delivery of instruction, and productivity thereby helping students and staff to become effective and efficient users.*	**Objective 6.1:** Provide mission critical, secure Internet Services for both Enterprise and Teaching and Learning Programs.	**6.1.1:** Provide an information and analytics platform that allows stakeholders to use data for Informed Instruction with easy access to data and resources. **6.1.2:** Provide identified standardized digital resources accessible by teachers and students at home and at school based on the individual needs. **6.1.3:** Have a continuous, consistent and measureable District Technology Usage Program that monitors access from campuses and grade levels that is quantifiable and measureable.
	Objective 6.2: Provide students, educators, and staff system-wide equitable access to technology that is current, secure, complex, and powerful enough to meet learning, teaching, and management needs (4.1).	**6.2.1:** Provide mission critical, secure Internet Services for both Enterprise and Teaching and Learning Programs. **6.2.2:** Identify service level requirements for services, both internal and external, and provide the infrastructure, system design and support to meet the service level agreements. **6.2.3:** Provide high capacity, highly available wireless access within facilities, outside facilities and on district property. **6.2.4:** Ensure that infrastructure in all campuses, new and existing, provides the same level of services. **6.2.5:** Integrate current databases and management systems to provide the information needed for efficient and effective departmental and management operations, specifically recruiting and human resources systems. **6.2.6:** LCISD will empower all students to have access to a

Goals	Objectives	Strategies
		capable device and equitable access to Internet at home and at school. **6.2.7:** Deliver services based on defined service level requirements for daily operations and for Disaster Recovery and Business Continuity Programs.
	Objective 6.3: Invest and employ strategies for effective and efficient technology use, curriculum integration, community access, support and financial accountability.	**6.3.1:** Provide adequate internal technology staffing to meet infrastructure requirements, technical support and service needs. **6.3.2:** Incorporate a technology playbook into the district.
	Objective 6.4: Increase campus and district technology communications, data-driven decision making, and quality of internal and external communications both during the day and outside the regular school day.	**6.4.1:** Provide a LCISD website that delivers mission critical availability and access, and that is accessible from both inside and outside of the District for daily operations and in emergency situations. **6.4.2:** Provide a Web Conferencing System and support that can be used district to campus, campus to campus, within campuses and with students inside and outside of district.

Source: LCISD Technology Services Department, February 2017.

An estimated three-year budget of $21.6 million was established to accomplish the technology plan's goals, objectives, and strategies. **Exhibit 10-4** shows the three-year estimated budget per item and sourcing type.

Exhibit 10-4
Lamar Consolidated Independent School District
Three-year Technology Plan Budget By Item and Sourcing Type
($000)

Budget Item	2014			2015			2016			Total By Year		
	Bond	E-Rate	Local	Bond	E-Rate	Local	Bond	E-Rate	Local	2014	2015	2016
Staff Development			349			349			349	349	349	349
Telecommunications & Internet Access	564	38	354	565	43	248	565	43	248	956	856	856
Materials & Supplies	2,309					824			824	2,309	824	824
Equipment	1,689		275	3,120		271	5,416		285	1,964	3,391	5,701
Maintenance			898			898			898	898	898	898
Miscellaneous Expenses			65			65			65	65	65	65
Total	**4,562**	**38**	**1,941**	**3,685**	**43**	**2,655**	**5,981**	**43**	**2,669**	**6,541**	**6,383**	**8,693**

Source: LCISD Technology Services Department, February 2017.

LCISD has accomplished or is working towards accomplishing the goals and objectives of the 2014-2017 technology plan except for the observations discussed in this chapter.

LCISD Technology Services Department's operational budget for school year 2016-2017 is $6,278,680. There are 30,829 students in the district; therefore, the Technology Services Department budget for 2016-2017 is $203 per student. **Exhibit 10-5** shows the LCISD Technology Services Department budget by technology department location codes.

Exhibit 10-5
Lamar Consolidated Independent School District
Technology Services Department
2016-2017 Budget By Technology Department Location Code

Location Code	Department Name	2016-2017 Budget
750	Information Services	$ 575,791
870	Webmaster	84,592
887	Technology Support	1,731,099
888	Technology	895,031
889	Development Center	1,582,068
935	Information Services – Student	529,213
953	Technical Services	880,886
Total	**Technology Services Department**	**$ 6,278,680**

Source: LCISD FY 2017 Adopted Budget, February 2017.

Exhibit 10-6 shows the Technology Services Department's 2016-2017 operational budget by major budget categories.

Exhibit 10-6
Lamar Consolidated Independent School District
Technology Services Department
2016-2017 Operational Budget By Major Budget Categories

Budget Category	Amount
Salaries Professional / Clerical	$ 2,378,594
Employee Benefits	238,601
Workers & Unemployment Compensation	5,486
Extra Duty Pay	146,321
Contracted Services	539,900
Travel & Subsistence	110,000
Dues & Fees	3,650
Furniture & Equipment	9,500
Reading Materials	202,634
Supplies & Materials	212,400
Technology Supplies	331,200
Utilities – Telephone / Fax	19,164
Contract Maintenance & Repair	1,610,195
Rental & Other Expenses	10,150
Miscellaneous Expenses & Costs	460,885
Total Operational Budget	**$ 6,278,680**
Total Students	**30,829**
Budget Amount Per Student	**$ 203**

Source: LCISD FY 2017 Adopted Budget, February 2017.

To control costs and streamline support, LCISD has standardized using Dell computing devices to support administrative and instructional technology. **Exhibit 10-7** provides a breakdown of the different Dell computing devices deployed in the district.

Exhibit 10-7
Lamar Consolidated Independent School District
Administrative and Instructional Computing Device Breakdown
2016-2017

Computing Device	Administrative	Instructional	Inventory	Total
Dell Desktops	557	7,958	17	8,532
Dell Laptops	670	11,540	53	12,263
Total Computing Devices	**1,227**	**19,498**	**70**	**20,795**

Source: LCISD Technology Services Department, February 2017.

Also, LCISD has several types of smart devices deployed throughout the district. **Exhibit 10-8** provides a breakdown of the various smart devices in the district.

Exhibit 10-8
Lamar Consolidated Independent School District
Smart Device Breakdown
2016-2017

Smart Device	Number of Units
IPads	16,087
IPods	1,115
IPhones	247
Miscellaneous Smart Devices	26
Total Smart Devices	**17,475**

Source: LCISD Technology Services Department, February 2017.

In addition, LCISD has 2,508 interactive smart boards and panels, 2,002 projectors, and 1,177 printers deployed throughout the district.

Based on the administrative and instructional computing devices and eligible student use smart devices, LCISD has met the 1:1 teacher and student to computer ratio as recommended by the Texas State Board of Education (SBOE) 2006-2020 Long-Range Plan for Technology (LRPT). Also, LCISD is a strong supporter of the "Bring your Own Device (BYOD)" concept that embraces the district's 1-to-need student to computer philosophy. The 1-to-need student to computer philosophy is based on the belief that students who take advantage of BYOD do not need a computer provided by the district. Therefore, the district only provides computers for students who do not participate in BYOD. This philosophy enhances the achievement of a 1:1 student to computer ratio in the district.

Exhibit 10-9 shows a comparison of the LCISD Technology Services Department staffing levels with peer districts based on number of students and devices supported. The comparison shows that the Technology Services Department supports less students per information technology staffer than Spring ISD but more per staffer than Clear Creek ISD. The analysis also shows that LCISD supports significantly more computers per information technology staffer than both of the peer districts.

Exhibit 10-9
Lamar Consolidated Independent School District
Peer School Districts Technology Staffing Level Comparison
2016-2017

School District	Number of Students	Number of Devices	Information Technology Staff	Students Supported Per Staffer	Computers Supported Per Staffer
Clear Creek Independent School District	41,896	62,575	101	415	620
Spring Independent School District	36,698	25,571	38	966	673
Lamar Consolidated Independent School District	**30,829**	**38,270**	**41**	**756**	**933**

Source: McConnell & Jones LLP's Review Team Research, February 2017.

LCISD has 34,285 student accessible computing devices for a student-to-computer ratio of 0.90:1. **Exhibit 10-10** shows how LCISD's student-to-computer ratio compares to the peer districts and the Council of Great City Schools median. LCISD's student-to-computer ratio is much better than one of the peer school districts but slightly lags behind the other peer district and the Council of the Great City Schools median.

Exhibit 10-10
Lamar Consolidated Independent School District
Peer Districts Student-to-Computer Ratio Comparison

School District	Total Students	Student Accessible Computers	Student-to-Computer Ratio
Clear Creek Independent School District	41,896	58,961	0.71:1
Spring Independent School District	36,698	17,695	2.07:1
Lamar Consolidated Independent School District	**30,829**	**34,285**	**0.90:1**
Council of the Great City Schools Median			**0.62:1**

Source: McConnell & Jones LLP's Review Team Research, February 2017.

LCISD uses many software applications to support administrative and instructional functions. **Exhibit 10-11** provides a comprehensive list of the applications and their purpose.

Exhibit 10-11
Lamar Consolidated Independent School District
Software Applications
2016-2017

Application	Purpose
A+ Suite	Document Camera
ActivInspire	Promethean Board
Adobe Suite	Content Creation
America's Army Education	Army Combat Game for ROTC
Arduino	Create Interactive Projects
Audacity	Audio Editing
Autodesk Suite	AutoCad for Engineering
AviSynth 2.5	Video Post-Production
Big Brainz	Multiplication Facts Game for Elementary Students
Blue Jeans	Videoconferencing Software
Boardmaker Plus!	Create Print-based Materials
Bomgar Jump Client	Remote Computer Support
Bridge Designer 2016	Bridge Design Educational
Burlington English	Blended Learning Solution
Certiport Exam Service	Secure Certification Tests for CTE Students
Chief Architect Premier X5	Home Design
Cisco WebEx Meetings	Remote Meeting
Dell Enterprise Manager Client	Enterprise Management Software for Dell Systems
Destiny	Library Management System
Digilent Software	Robotics and Engineering Courses
Discover Video Streamsie	Live Video Production
Edmodo	File Sharing and Collaboration
eduphoria! School Objects: Paper Scanner	Scoring and Analyzing Student Assessments
ExamView Assessment Suite	Test Generation and Question Bank
Finale	Music Scoring
FlowArm PLTW	PLTW Design
Format Factory	Media Conversion
Fujitsu ScandAll PRO	Scanner Utility
Garritan ARIA Player	Music Scoring Editor
Google Chrome	District Default Browser
Google Earth	Earth Mapping
GoToAssist Customer	Remote Meeting
Gravity Simulator 2.0.	Orbit calculation and simulator used in Aerospace engineering courses
Hudl Remote Version 2.2	Coaching Video Analysis
I-Boss	Content Management
iCap	Image Processing Software for Digital Telescopes
Image Mate	Document Camera
Imagine Learning	Language and Literacy
Infinite	Custom Math Worksheet Creator and Question Bank

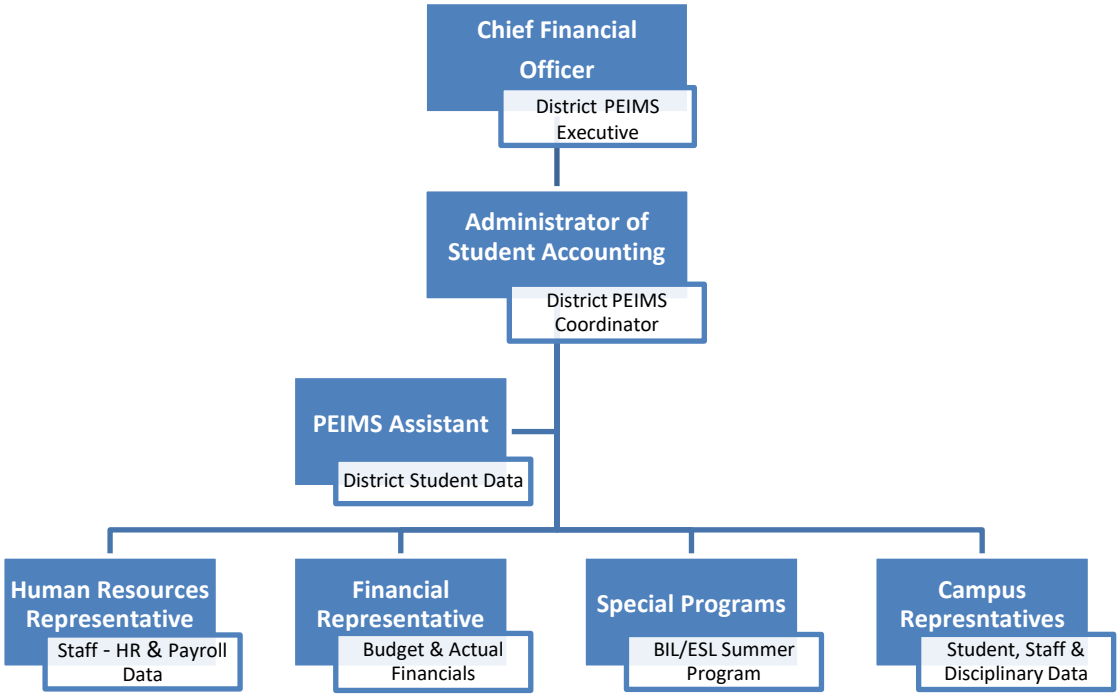
Application	Purpose
Java	Support Java Platform
JCreator LE 4.50	Java Development Used By CTE Computer Science Courses
KACE	Helpdesk and Asset Management System
KRONOS	Time and Attendance System
Krystal Reports	Ad-hoc Report Creation
Lakeshore Learning Materials	Interactive Student Centered Games
Learning Ally	Dyslexia Intervention
LEGO	Programs for LEGO Platforms
Logger Lite	Software for Vernier Probes and Sensors
MakerBot Print	3D Printer
Manatee Accounting Software	Activity Fund Accounting
MathType 6	Interactive Equation Editor for Windows
Mavis Beacon Deluxe - 25th Anniv. Ed.	Typing Tutor
McAfee Virus Scan Enterprise	Enterprise Virus Scanning
MDSolids	Mechanics of Materials Teaching
MHS Scoring Software	Special Education Tools for Early Intervention and Symptom Management
Micro Focus	Storage Management
Microsoft Applications – Windows 7,8, 10 – Office 365 Suite – Active Directory – SQL Server – .Net – Skype – Visio – Visual Suite	Applications Used for a Variety of Activities
Milestone XProtect Smart Client	Security Camera Footage Viewer
Minecraft	3D World Construction and Interactive Gaming
Mirroring360	Utility for Controlling PC Desktop From An IPad
Mozilla Firefox	District Alternate Browser
Munis	Financial Management System
NetVault	System Backup
Nuance PaperPort	Speech to Text Software for SPED Interventions
Palo Alto	Password Management
Pearson LockDown Browser	Secure Browser for Certain State Assessments
Primero	Food Services Point-of-Sale
Python	CTE Computer Science Courses
Raptor Vsoft	Campus Entry Security
RehearScore	Rehearsals with Virtual Accompanist
REI VMS 1.0.0.1	School Bus Security Video Viewer
ROBOTC 4.X	Curriculum Utilities for CTE Robotics Courses
Rosetta Stone	Language Acquisition
School Dude	Maintenance Work Order and Work Flow System
SharePoint	Document Management and Collaboration System
SketchUp	3D Creation and Editing
Skoolbo Common Core	Reading and Math Program
Skyward	Student Information Management System

Application	Purpose
SMART Education Software	SMART Interactive White Board
Solarwinds	Network infrastructure Monitoring
STAAR Online Testing Program	Online STAAR Assessment
StudioWorks 6.5	Yearbook Creation and Publishing
Tardy Calculator	Tardy Intervention for Secondary Campuses
TestNav	Secure State Testing Platform
The Joy of Tournaments	Comprehensive Software for Managing Speech Tournaments Including Debate, Individual Events, Congress, Rooms, Judges, Fees, Results, Sweepstakes, and Tabulation
TIP Web IM	Textbook Inventory Management
TI-SmartView	PC Software for Teaching Calculator Functions
Unity Web Player	Universal Content Player for 3D Interactive Content
Venus 1500	Stadium Display
Versatrans Routing & Planning	Bus Route Management
VEXos Utility	Utilities for VEX Robotics System Used By CTE Courses
Vision	Remote Viewing and Control of Student Computers
Virtual Business	Simulations For Business and Marketing Classes
VLC media player	Universal Video Player
VMware	District Server Virtualization and Management
Wacom Tablet	Utilities for Wacom Drawing Tablets
Waterford Assessments of Core Skills	Early literacy Intervention
Winocular	Job Posting and Application Management

Source: LCISD Technology Services Department, February 2017.

The Texas Education Agency (TEA) Public Education Information Management System (PEIMS) is a critical system required to be used in the district. PEIMS encompasses all data requested and received by TEA about public education, including student demographic and academic performance, personnel, financial, and organizational information. The administrator of student accounting coordinates PEIMS in LCISD and reports to the chief financial officer. Department and campus representatives provide pertinent PEIMS student, staff, financial, and campus data as appropriate. **Exhibit 10-12** shows LCISD's PEIMS organizational structure.

Exhibit 10-12
Lamar Consolidated Independent School District
PEIMS Organizational Structure
2016-2017



Source: LCISD Financial Department, February 2017.

BEST PRACTICES

Best practices are methods, techniques, or tools that have consistently shown positive results, and can be replicated by other organizations as a standard way of executing work-related activities and processes to create and sustain high performing organizations. When comparing best practices, similarity of entities or organizations is not as critical as it is with benchmarking. In fact, many best practices transcend organizational characteristics.

McConnell & Jones LLP identified 10 best practices against which to evaluate the organization and management of the LCISD Technology Services function. **Exhibit 10-13** below provides a summary of these best practices. Best practices that LCISD Technology Services Department did not meet resulted in an observation which is discussed later in the chapter. However, all observations included in this chapter are not necessarily related to a specific best practice.

Exhibit 10-13
Summary of Best Practices – Technology Management

Best Practice Number	Description of Best Practice	Met	Not Met	Explanation
1.	Central repository for storage of pertinent student and district data that's accessible for analytical and reporting purposes.	**X**		LCISD has implemented the Skyward system to store student data that can be accessed for analytical and reporting purposes.
2.	Three or Five-year long-range technology plan.	**X**		LCISD Technology Services Department has a 2014-2017 technology plan.
3.	Implement a robust network infrastructure to support the operational needs of the district and integration of technology in the classroom.	**X**		The LCISD Technology Services Department has installed a wireless wide-area network to facilitate Internet/Intranet connectivity at all the schools.
4.	Develop a professional development program to train the instructional staff in the use and integration of technology concepts and tools in classroom.	**X**		LCISD uses I-Café, a web-based dashboard of various training videos to provide technology training to the district's administrative and instructional staff.
5.	Website design that uses space, color, content layout appropriately to be a good communications and marketing tool.		**X**	LCISD needs to use standards and style guides for uniformity and consistency in the district and campuses websites. **See Observation 10-4.**
6.	Disaster Recovery Plan with key components.		**X**	LCISD Technology Services Department does not have a Disaster Recovery/Business Continuity Plan. **See Observation 10-5.**

Best Practice Number	Description of Best Practice	Met	Not Met	Explanation
7.	Location of data center backup facility should be 10 to 50 miles from main data center.	X		LCISD backup data center location (Development Center) is more than 10 miles from the main data center (Fulshear).
8.	Allocation of training budget for technology organizations is on a per-learner basis.	X		The LCISD Technology Services Department has a training budget that adequately provides staff training.
9.	Service-level agreements for internal and external service providers.	X		The LCISD Technology Services Department has service-level agreements with all external providers.
10.	Possess policies and procedures to govern technology functions and activities.		X	The LCISD Technology Services Department has no documented policies and procedures to govern operations and daily activities. **See Observation 10-7.**

Source: McConnell & Jones LLP's Review Team.

ACCOMPLISHMENTS

ACCOMPLISHMENT 10-A

LCISD has an active board technology committee that meets regularly to review and approve the district's technology initiatives.

LCISD's board technology committee meets regularly to review and approve technology initiatives. This committee's involvement elevates the visibility and importance of technology projects ongoing in the district. Also, monthly the CTIO presents a report to the full board to keep them abreast of the progress and completion status of the major technology initiatives ongoing in each technology department. The report also highlights key measurement statistics for helpdesk and special projects.

ACCOMPLISHMENT 10-B

LCISD has effectively used E-Rate and bond funds to install a robust fiber optic network infrastructure and wireless connectivity to all district campuses and facilities.

LCISD's network infrastructure consists of dark fiber installed in a star configuration. The configuration terminates with 1Gigibit uplink and 10Gigibit downlink at elementary campuses; and 10Gigibit uplink and 10Gigibit downlink at secondary campuses. Wireless access points have been installed in all classrooms. The network has experienced very few problems with a 99% up-time performance. LCISD used $3,932,500 of 2014 bond funds to install this robust network infrastructure.

LCISD spent $1.7 million to upgrade its infrastructure to provide wireless connectivity to all district campuses and facilities. LCISD is a 60 percent disadvantaged district, which qualified it for a $1 million E-Rate fund reimbursement the district used to fund the infrastructure upgrade.

ACCOMPLISHMENT 10-C

LCISD effectively uses bond funding to support its computing hardware refresh strategy.

LCISD established a hardware refresh strategy centered on the approval and issuance of school bonds. The components of the refresh strategy are:

- Computers (5 years)
- Servers/storage devices (5-8 years)
- Networking equipment (7-10 years)
- Wireless components (5-7 years)
- Uninterrupted Power Supply (UPS) (3-5 years)

LCISD has virtualized its data servers reducing the number installed from 14 to 9. Virtualization improved server efficiency and reduced the amount of hardware to be refreshed.

In the 2014 bond, $10,206,020 was earmarked to fund the district's computing hardware refresh strategy for 2015 through 2017. **Exhibit 10-14** shows the computing hardware refresh funded by the 2014 bond.

Exhibit 10-14
Lamar Consolidated Independent School District
2014 Bond Computing Hardware Refresh Funding

Refresh Hardware Component	Funded Amount
Desktop Computers	$ 4,620,000
IPads	3,176,250
Laptop Computers	1,155,000
Projectors	1,254,770
Total 2014 Bond Hardware Refresh Funding	**$ 10,206,020**

Source: LCISD Technology Services Department, February 2017.

In the proposed 2017 bond, $30,133,428 is requested for continued funding of the computing hardware refresh strategy for 2018 through 2020. **Exhibit 10-15** shows the proposed amounts for each component to be refreshed through the proposed 2017 bond.

Exhibit 10-15
Lamar Consolidated Independent School District
Proposed 2017 Bond Computing Hardware Refresh Component Funding

Refresh Hardware Component	Proposed Amount
Desktops	$ 4,347,000
Document Cameras	737,100
Eduphoria Scanners	121,200
Interactive White Boards	9,043,200
IPads	3,994,200
Laptop Cart Retrofit	450,000
Printers	1,440,000
Staff Laptops	2,464,128
Students Laptops	7,536,600
Total Proposed 2017 Bond Hardware Refresh Funding	**$ 30,133,428**

Source: LCISD Technology Services Department, February 2017.

DETAILED OBSERVATIONS

Staffing Requirements

OBSERVATION 10-1

LCISD does not use an industry recommended staffing formula as part of its methodology to assess and determine the number of PC technicians required to provide adequate and equitable support to the schools.

Technical support is provided to the schools by PC technicians who are assigned by elementary school clusters and secondary school tracks. There are also PC technicians assigned to administration and special project areas. PC technician assignments are based on number of devices, proximity, and the number of schools that make up a cluster or track. All schools are not the same size and do not have the same type and amount of equipment. Consequently, many PC technicians must support more users and equipment than they can provide timely and satisfactory technical support.

KACE is the web-based system used throughout the LCISD Technology Services Department for submission and management of technology service requests. The system is also used as a collaboration tool to prioritize and manage the technology support workload and communication of service request status to the requester. The system has dashboards, queries, and reports to provide real-time visibility into support performance.

A study by the Massachusetts Institute of Technology in partnership with International Business Machines and Digital Equipment Corporation called "Project Athena" established some guidelines to help determine the staffing requirements to support a school district's technology environment. The resource variable and staffing ratio guidelines are shown in **Exhibit 10-16**. The approach taken by the study was to determine the human resource skills necessary to support the total environment and then translate this into real numbers based on full-time employees.

Exhibit 10-16
Massachusetts Institute of Technology "Project Athena" Study
Resource Variable and Staffing Ratio Guidelines

Resource Variable	Staffing Ratio
W = Number of workstations (Resources required to install, maintain, track and update)	W/500
U = Number of users (Account administration, user training, documentation, and configuration services)	U/1000
C = Number of clusters (physical co-located workgroups sharing servers, printers and other peripheral equipment	C/15
A = Number of supported applications (Applications provided and supported centrally required to install, update, support, track and document software licenses)	A/50
V = Number of distinct vendor operating systems and platforms (Operating systems for different platforms that require frequent revisions and updates to and ensure interoperability with other systems and applications)	V/1
L = Number of licenses (Defined as the right to use the application software for multiple users on multiple platforms)	L/25

Source: Chaminade College Preparatory Information Systems (Arfman & Roden Report, 1992), September 2011.

The resource variable and staffing ratio guidelines can be used to determine the staffing level for an individual department or total staffing (TS) for an Information Technology organization (TS = W/500 + U/1000 + C/15 + A50 + V + L/25).

RECOMMENDATION 10-1.1

Adopt a staffing formula to be included in the methodology to assess and determine the appropriate number of PC technicians required to provide adequate support to the schools.

Although LCISD has developed a methodology to capture statistical data related to support activities by school and PC technician, it does use an industry recommend staffing formula to determine the appropriate number of PC technicians required. The LCISD Technology Services Department should use the appropriate resource variables and staffing ratios shown in **Exhibit 10-16** in its staffing methodology. This staffing methodology could also be used to equitably assign PC technicians to the clusters and tracks while also taking school proximity into consideration.

For example, using the above guidelines for the number of devices supported, the current number of 9 is vastly understaffed (20,795 (Computing devices) / 500 = 42). Based on this calculation the current number of PC technicians is less than a quarter of the number required to provide adequate support.

Another example is the 2016-2017 staffing benchmarks established by the Texas Association of School boards (TASB) of one technician per 750 devices (20,795 / 750 = 28). This benchmark shows that the current number of PC technicians is less than a third of the number required to provide adequate support.

The above examples validate what was conveyed in the PC technician's focus group interview session that they are understaffed and overworked for the number of devices and schools they have to support.

The CTIO should direct the director of Tech Integration to use the adopted staffing formula as part of the methodology to assess and determine the appropriate number of PC technicians needed to adequately perform the duties for their areas of responsibility. The staffing methodology results can be used for staffing justification during the budgeting cycle.

FISCAL IMPACT

This recommendation can be implemented with existing resources.

ANTICIPATING TOMORROW

As the district continues to grow, it should establish a flexible staffing methodology that can be used to determine the number of PC technicians needed to provide adequate support due to increases in students and/or computing devices. As more technology is being deployed and depended upon for educational delivery in the classroom, it becomes extremely critical for timely support. Any delay in providing support could have a negative impact on student learning. A key factor in providing timely support is having adequately trained staff. Adopting either of the benchmarks discussed in this chapter to provide adequate support would require a significant increase in the PC technicians. Also, a fast growing school district best practice is to automate support processes wherever possible to address staffing issues. This includes data entry and data transfer processes throughout the district. This is an area the district needs to focus on to address the current staffing shortfall and keep abreast of as the district grows.

RECOMMENDATION 10-1.2

Develop a staffing plan to address any staffing shortfalls as a result of the assessments using the enhanced staffing methodology.

The CTIO should collaborate with the Human Resources Department to develop the staffing plan. The plan should include position title, level and skills required, hiring timeline, and projected costs.

FISCAL IMPACT

The fiscal impact of this recommendation cannot be determined until the staffing assessment is completed and the staffing plan is developed.

ANTICIPATING TOMORROW

As the district grows, a staffing plan should be developed and closely managed to prevent the district from experiencing a critical shortage of talented technology personnel required to keep pace with the implementation and support of technology resources needed for the increased number of staff and students. The lack of technology support could significantly impact administrative support and education delivery required due to district growth.

RECOMMENDATION 10-1.3

Revise key performance indicators with targets to measure the effectiveness of the technology support provided to the schools.

A task force of representatives from the campuses and the Technology Services Department should collaborate to establish the key performance indicators and targets. Some samples of key performance indicators that should be considered include the following:

- service request acknowledgement time;
- service request resolution time;
- hardware request completion time;
- help desk first contact resolution;
- help desk abandonment rate; and
- help desk speed to answer.

The KACE system should be used to capture and track the performance data. The results for the performance indicators should be reported on monthly.

FISCAL IMPACT

This recommendation can be implemented with existing resources.

ANTICIPATING TOMORROW

As the district grows, performance indicators should be established and measured to ensure the focus and quality of technical support is adequate to meet the growing needs of the district. Not having performance indicators could result in technology personnel working on issues that are not of significance to maintaining administrative and instructional technology resources that are required to support district growth.

OBSERVATION 10-2

LCISD lacks overall functional knowledge of the Munis business system resulting in its full capabilities and benefits not being realized.

Munis is an enterprise resource planning (ERP) solution consisting of web-based applications and a single database integrate all financial, human resources and procurement information throughout the district, centralizing data and processes. With role-based dashboards, automated workflow, wizards and integration with Microsoft productivity tools, Munis helps users work more efficiently. Munis has the tools and business intelligence needed to be more responsive to the district's constituency. Users only have to enter data once and it's available in all ERP applications, reducing redundancy, increasing efficiency, and improving data quality and integrity.

However, LCISD has no one on staff that fully understands the overall functionality of the installed Munis business system modules. This situation results in many of the capabilities and benefits of having an integrated system not being realized. A consistent theme throughout the interviews of financial, human resources, purchasing, and

operations personnel was that Munis is not being fully utilized in the district. This situation is a direct result of a lack of understanding of the full functionality of each module and how the modules integrate with each other. Also, this lack of understanding requires many satellite applications to be used to provide functionality that could otherwise be provided within Munis. The lack of internal knowledge also presents a training concern. Currently, the vendor provides selected Munis training or attendance at user group sessions, which are limited to a few staffers.

RECOMMENDATION 10-2

Establish a business system analyst role to provide functional knowledge and training for all Munis business system modules.

The CTIO should work with the leadership in the finance, human resources, and operations departments to develop the criteria and responsibility of a business system analyst.

As an example, a business system analyst reviews, analyzes, and evaluates business systems and user needs. The position also documents requirements, defines scopes and objectives, and formulates systems to parallel overall business strategies. They rely on experience and judgment to plan and accomplish goals. Typically the job requires a bachelor's degree and 4-6 years of experience in the field or in a related area.

Based on the developed criteria, the CTIO should hire a business systems analyst to provide Munis knowledge for all business areas. The initial focus of the business systems analyst should be the development of training resources for the Munis system using the following steps:

- Conduct an assessment of the current business processes and compare against Munis business system capabilities.
- Assess existing user knowledge of Munis functionality in their area of responsibility.
- Develop training materials to address capability variances and user training needs.
- Plan and conduct training classes to transfer knowledge to users.
- Conduct regular refresher training classes to reinforce system understanding.

FISCAL IMPACT

Based on research for the Houston area, the average salary for a full-time business systems analyst with 4-6 years' experience is $73,000. With benefits of 18 percent, the annual fiscal impact for the business systems analyst will be $86,140 ($73,000 + ($73,000 x .18 = $13,140) = $86,140). The five year fiscal impact will be $430,700 ($86,140 x 5 = $430,700).

ANTICIPATING TOMORROW

As the district grows, it will become more critical that the full functionality of the Munis system be used to handle and offset the manual work required to support the increased number of transactions. The district has invested in all the Munis system modules that could provide the required functionality, but there is no one currently on staff that has the knowledge to ensure district staff are fully using the system's capabilities. Therefore, a full-time business systems analyst should be hired to provide adequate knowledge to train and assist appropriate personnel in the use of the Munis system. Not fully using the Munis system could require the district to hire additional staff to handle the increased number of transactions resulting from growth.

Planning

OBSERVATION 10-3

LCISD does not have an active districtwide technology committee to review and approve technology initiatives.

In 2013, LCISD established a districtwide Technology Planning Committee (TPC) to provide guidance for the development of a district technology plan that would impact all stakeholders from 2014-2017. However, after the development of the technology plan, the TPC was disbanded and no districtwide technology committee has been established to replace it. Therefore, no districtwide group is in place to ensure the goals and strategies of the technology plan are being implemented as outlined. Also, no annual review of the plan is conducted to make adjustments according to changes in the DIP and CIPs, as well as technology advancements. Also, there is no forum for review and approval of district technology initiatives before being presented to the board technology committee for approval.

The 2013 TPC consisted of representation from the administration, technology department, instructional staff, students, parents, and community. The TPC held several group meetings and subcommittee sessions to develop goals and strategies based on the district's Improvement plan (DIP), Campus Improvement Plans (CIP), as well as local, state and national assessments, needs and technology guidelines. The outcome of the TPC work was the LCISD 2014-1017 Technology Plan.

RECOMMENDATION 10-3

Reestablish the districtwide technology committee to review and approve technology initiatives.

The CTIO should work with the district's leadership to develop the mission, objectives and guidelines for the districtwide technology committee. Based on this work, the CTIO should establish a districtwide technology committee with representation from the administration, instructional staff, students, parents, and community as was done in 2013.

The districtwide technology committee should hold regular scheduled meetings to identify, review, and approve technology initiatives. The CTIO should schedule an annual meeting of the districtwide technology committee to review and revise the technology plan to incorporate any changes in the DIP and CIPs. The districtwide committee should meet on a regular basis to review and approve any new technology initiatives, address any technology budget, policy or operational issues, and review progress status of the goals and objectives outlined in the technology plan.

FISCAL IMPACT

This recommendation can be implemented with existing resources.

ANTICIPATING TOMORROW

As the district grows, the districtwide technology committee should be reestablished to review and approve technology initiatives that provide the greatest benefit to the district. This is critical due to limitations in funds for acquiring technology resources and hiring technology personnel. The technology committee will play a key role in ensuring the district's limited technology resources are being used wisely to support the district's growth.

LCISD Websites

OBSERVATION 10-4

LCISD lacks formalized standards and style guides for maintaining the district and campus websites.

The Communications Department manages and updates LCISD's website content. Each department is responsible for maintaining their individual webpages. Each campus has a designated content manager who is responsible for

managing the website and updating the content. The LCISD Technology Services Department's webmaster is responsible for designing and updating the LCISD and all campus website layout templates. Request for website access, content or template changes are received through email or phone call. The Communications Department and Webmaster regularly review and handle these requests accordingly.

The LCISD website layout has a title section and menu tabs that are well-defined and displayed at the top of the homepage making navigation within the site fairly easy. For the most part, the campus' websites have the same title section and main tab layout as the district website and all have the LCISD information window area at the top that is used to display major districtwide information. But the campus' website content layouts are inconsistent. If one is not familiar with the district and campus websites, navigating between the two is not intuitive.

Several of the department webpages are not consistent with the layout of the district's website. This inconsistency makes it difficult to locate information easily when moving from the district's homepage to a department's webpage and/or from one department's webpage to another. The departments' webpages and campus website layout inconsistencies drive the need to develop standards and style guides for the district and campus websites.

RECOMMENDATION 10-4.1

Develop LCISD standards and style guides for designing and maintaining the district and campus websites.

The executive director of Community Relations, Technology Services Department webmaster, and campuses website content managers should work together to develop the website standards and style guides.

In developing the standards and style guides, key stakeholders from the following functions should be actively engaged:

- district administration;
- principals;
- teachers;
- students;
- parents; and
- community.

Regular meetings should be held to ensure that all stakeholder input is being given and needs are being addressed as development proceeds.

District and campus websites should be effective communication and marketing tools. A visitor gains a first impression about the school district when they initially view and read their website. The site should be up-to-date with quality, error-free content that is interesting to read and easy to find. **Exhibit 10-17** provides some best practice tips to be followed in designing and updating the content of school district websites.

Exhibit 10-17
Best Practice Tips for Designing and Updating School District Websites

Tip	Rationale
Make/Keep it Up-to-Date	• A quality website offers current, timely information about the organization. Visits are made to the website for a reason—to find out something about the district or school. Some may simply want the school's phone number or address, while others need more information about the upcoming events. If the site is filled with outdated information, visitors wonder when it was last updated. • Be sure that the website includes only current information. If possible, set time-sensitive posts to expire off the site automatically. Place the district or school's phone number, address, and staff email addresses in a prominent location so the school community can find what they need quickly.

Tip	Rationale
Brag on the district or Schools	• If the district or school is like most others, the students and teachers are actively involved in creative, diverse activities that build a successful learning community, about which you love to brag. Word of mouth only gets so far, so brag online too! School choice makes competition within a town—and even district—fierce. So devote a Web page to featuring school successes and to bragging on the students and staff. When prospective families see what great, devoted teachers are in the school, it just might outshine the school down the street.
Look for Errors	• The district and schools are in the business of educating the future leaders of the country and there's nothing worse than typos on a district or school website. Take the time to proofread something that's going worldwide on the Web, it begs the question, "Is that how much you care about my child?" Have another set of eyes look at the website before it goes live, making sure the website is professional and error-free.

Source: School Webmasters Blog "Don't Just Have a Website", November 2013.

In developing the standards and style guides, there are pitfalls to avoid in making the websites effective communication and marketing tools that are easy to manage and maintain. **Exhibit 10-18** shows ten things to avoid when designing a quality district or school website.

Exhibit 10-18
Ten Things to Avoid in Designing School Websites

Avoid	Reason
1. Counters	• They do not add credibility to the district, school or website and look amateurish. For analytical purposes, view site statistics through the server logs (or any statistics analysis not publically displayed). The site visitors don't really care how many "hits" your site gets.
2. Excessive Animation or Flashing Text	• If the animation does not serve a purpose and add to the message, lose it. In the 90's they were fun, but have now become annoying and detract from the professionalism of the site and the message in the content. The site is there to provide useful and current information.
3. Broken Links	• There are tools that can be used to check the entire site for any broken links. Get in the habit of running those frequently to keep the links useful. Broken links make site visitors feel that the site is stale and the District or school don't care enough to keep it fresh. Parents also get upset when the form or page they are looking for is no longer there. Off-site links are not under your control, but when they become broken, fix or delete them.
4. Under Construction	• All sites should be constantly under construction if they are to stay current and useful. However, don't place any "Under Construction" signs on the site. If it is not ready to display, don't make the page live until it is.
5. Slow Page Load Speeds	• Fast wins! The established standard is text that is visible in five seconds or less. It is acceptable for graphics to take a few seconds longer if they are worth waiting for, but always optimize them for the Web. However, while speed is important, don't completely sacrifice quality for two seconds of load time. Pixilated photos detract from visual appeal and professionalism. A site exists to provide information to the customers–parents, students, staff, potential new hires, and the community—so

Avoid	Reason
	always keep their needs at the forefront of all design decisions. They went to the site to save time, don't test their patience or they will leave.
6. Splash Screens or Doorway Pages	• Site visitors want to get to the information they are looking for and not to see the mascot growl or roar or the logo morph into something clever. It's fun for the designer, but a waste of time for your target audience.
7. Inconsistent Navigation	• The site visitors should feel confident that while transitioning from page-to-page the navigation structure will remain consistent. The navigation should be kept straight-forward and simple. Do not confuse the visitor with redundant navigation scattered around the page, with different buttons or links pointing to the same page.
8. Inconsistent Theme and Style	• A professional site design will maintain a theme throughout. This tells visitors that there is care enough to build a cohesive, well thought out website. It also assures visitors that they haven't wandered off the site. Don't change styles from one department to the next just because they want to do their own thing. The site needs to display an organized front, not a fragmented, departmentalized image. A district or school site shouldn't be a reflection of individual personality, but a team of professionals dedicated to a united cause.
9. Stingy White Space	• Readability requires the good use of white space. Use adequate margins and line-height and avoid wide blocks of text that are difficult to read. On a monitor, it is too difficult and they simply won't do it if the text runs from one side of their screen to the other.
10. Obnoxious Background Colors	• The district and school colors may be neon orange and teal, but don't use them for background colors on the website or as a text color. While there may be an attempt to "brand" the website with the District or school colors, obnoxious colors make it difficult to read content and distracts the user. Save those colors for graphic images, the school mascot, or maybe a heading or two. Don't overdo it.

Source: School Webmasters Blog "10 Things to Avoid on Your School Website", February 2013.

Adhering to the above "tips" and "things to avoid" will ensure that the district and campuses websites will be effective communication and marketing tools for years to come.

FISCAL IMPACT

This recommendation can be implemented with existing resources.

ANTICIPATING TOMORROW

As the district grows, having a well-designed and easy to navigate website is an imperative to assist all district stakeholders in accessing critical information about the district. The website is a major means for administration, teachers, parents, and students to engage in the life of the district in an expedient and less intrusive manner. This capability to communicate to a broad audience in a concise and short amount of time is critical as the district grows.

RECOMMENDATION 10-4.2

Conduct regular meetings and training sessions with department and campus content managers.

The executive director of Community Relations and/or Technology Services Department webmaster should conduct regular meetings with departments and campus content managers to keep them abreast of any required website changes. These meetings should also be used as training sessions to ensure that the content managers are equipped to maintain their websites and/or webpages per the standards and style guides.

FISCAL IMPACT

This recommendation can be implemented with existing resources.

ANTICIPATING TOMORROW

As the district grows, the website becomes more critical in communicating information to a wide range of stakeholders. It is imperative that an established process be followed to ensure the website content is current and accurate. Inaccurate website information could be misleading and detrimental to the communication process.

Disaster Recovery Plan

OBSERVATION 10-5

LCISD does not have a comprehensive disaster recovery/business continuity plan to ensure continuity of operations in the aftermath of a catastrophic event.

Disaster recovery and business continuity planning are related interconnected concepts dealing with different aspects as defined below:

- disaster recovery addresses what processes and solutions are in place to resume operations; and
- business continuity asks are redundant systems, processes, and services available to continue operations while recovery takes place.

Successful disaster recovery begins and ends with advance planning. The primary objective of a disaster recovery/business continuity plan is to provide a set of actions to be taken to minimize chaos and ensure organizational stability and orderly recovery after a disaster. **Exhibit 10-19** shows the components of a comprehensive best practices disaster recovery plan.

Exhibit 10-19
Components of a Best Practices Disaster Recovery Plan

Components
1. EXECUTIVE SUMMARY
2. DISASTER RECOVERY PLANNING
2.1 Identification and Analysis if Disaster Risks/Threats
2.2 Classification of Risks Based on Relative Weight
2.2.1 External Risks
2.2.2 Facility Risks
2.2.3 Data Systems Risks
2.2.4 Departmental Risks
2.2.5 Desk-Level Risks
2.3 Building the Risk Assessment
2.4 Determining the Effects of Disaster
2.4.1 List of Disaster Affected Entities
2.4.2 Downtime Tolerance Limits
2.4.3 Cost of Downtime

Components
2.4.4 Interdependencies
2.5 Evaluation of Disaster Recovery Mechanisms
2.6 Disaster Recovery Committee
3. DISASTER RECOVERY PHASES
3.1 Activation Phase
3.1.1 Notification Procedures
3.1.2 Damage Assessment
3.1.3 Activation Planning
3.2 Execution Phase
3.2.1 Sequence of Recovery Activities
3.2.2 Recovery Procedures
3.3 Reconstitution Phase
4. THE DISASTER RECOVERY PLAN DOCUMENT
4.1 Document Contents
4.2 Document Information
– Purpose
– Scope
– Assumptions
– Exclusions
– System Description
– Roles and Responsibilities
– Contact Details
– Activation Procedures
– Execution Procedures
– Reconstitution Procedure
4.3 Document Maintenance
– Periodic Mock Drills
– Experience Capture
– Periodic Update

Source: Cisco Systems, Disaster Recovery Best Practices, 2008.

A comprehensive disaster recovery/business continuity plan takes into consideration all aspects of the technology environment such as the following:

- computer room operation/equipment;
- servers;
- network infrastructure/equipment;
- software applications;
- database content; and
- telephony operation/equipment.

A key component of the disaster recovery process is having a backup facility with the capacity to host the necessary technology infrastructure to maintain operations during and after a disaster. A popular strategy is to have an external site that can support business systems, applications, and customer data until the primary data center can return to normal operations. Due to its size, LCISD has been able to establish a backup facility within

the district that meets the best practices criteria. LCISD has established the Development Center data center that is more than 10 miles away as the backup facility for the district's main Fulshear data center.

RECOMMENDATION 10-5

Establish a disaster recovery team, and develop a disaster recovery/business continuity plan.

The CTIO should establish a disaster recovery team that is comprised of representation from principals, teachers, administrative staff, technical staff, maintenance, security, and external vendors with the mission of developing a comprehensive disaster recovery/business continuity plan. **Exhibit 10-20** shows actions to be taken in developing the plan.

Exhibit 10-20
Actions to Develop a Comprehensive Disaster Recovery/Business Continuity Plan

Action to be Taken	Rationale
Work as a team	• It is vital to take a big picture view of the district in developing the plan. If only one individual or group creates the plan, something could easily be overlooked.
Define the scope and mission	• The scope statement should explain why and how the disaster recovery team is going to develop the plan. • The mission statement should clearly define the document's main purpose.
Assess the risks	• The risk assessment should review all of the risks the district may face – even those that seem wildly outlandish. Use the team's best judgment to single out the most credible threats to the district's security; these are the crises the plan should ultimately address.
Define priorities and perform a business impact analysis	• Deciding what's most important to the district's day-to-day operations will help the team determine how to best leverage financial and staff resources to protect those interests.
Define recovery strategies and procedures	• This section of the plan should describe each disaster and recommend actions to take if it occurs. • The plan should outline the costs associated with recovery efforts and the procedures to follow if the plan must be executed.
Develop a communication plan	• This section of the plan should define each disaster's actual or potential threat to human safety or to property; the need to relocate operations; and acceptable time periods for response and recovery. • Define recovery teams, recovery infrastructure, and alternate sites. • Collect and have available in one place the phone numbers and other personal contact information of internal and external personnel who should be contacted if an emergency occurs.
Create an appendix	• A disaster recovery plan should be mostly nontechnical. There will be a need for solid technical documentation to recover the systems once the immediate trauma of a crisis has passed. • Include in the plan's appendix a comprehensive inventory of all Information Technology resources, data backup polices, vendor lists, service contract lists, diagrams and other technical specifications.

Action to be Taken	Rationale
Consider the disaster recovery plan a living document	• Failing to keep the plan up-to-date defeats the purpose of having one. • Store a physical copy of the document in a three-ring binder that's kept in the data center (or another secure location) so it's easy to access if the systems go down. • Keep a record of all changes, and be sure to date and sign off on each modification.
Test often	• There's no point in having a well-thought out plan if it can't be executed. Testing the plan regularly will ensure that problems are addressed before an actual disaster occurs.

Source: EdTech Magazine "How to Write an Effective Disaster Recovery Plan", August 2011.

Several key essential elements the disaster recovery/business continuity plan should include are:

- complete list of critical activities performed within the district;
- identity of which systems and staff are necessary to perform functions;
- list of key staff for each function and their responsibilities;
- inventory of all technology assets including hardware, software systems and data, documentation, and supplies that correctly identify the location with sufficient information to document loss for insurance recovery;
- defined actions to be taken when a pending disaster is projected; and
- actions to be taken to restore critical functions.

FISCAL IMPACT

This recommendation can be implemented with existing resources.

ANTICIPATING TOMORROW

As the district grows, more opportunities are present for a disaster to occur. As the dependency on technology is increased, it is critical that a documented and tested process be in place to restore the technology resources to a fully operational state as expeditiously as possible. The absence of a documented disaster recovery plan could lead to chaos and a longer period of time to return to an operational state, which could be catastrophic to the district.

OBSERVATION 10-6

LCISD network infrastructure lacks redundancy to provide the capability to re-route network traffic if there is an outage for an extended period at any location in the fiber optic network.

LCISD lacks a redundant network infrastructure to maintain connectivity if the main district or a campus network connection is down. A redundant network infrastructure serves as a backup mechanism for quickly swapping network operations onto an extra network infrastructure in the event of unplanned network outages.

The primary objective of having a redundant network infrastructure and a backup data center facility is to ensure the district could return to full operation as quickly as possible after a disaster or outage. With neither of these safety measures in place, the district risks not having access to its systems, standalone applications, Internet, email, and telephone service. It would be difficult for the district to operate without access to this critical technology.

Many districts install land-based, alternative networks to provide redundancy and backup for a wireless network. Taft ISD's backup network architecture is an underground, 24-pair, fiber optic ring interconnecting all campuses and the administration building. The ring provides redundancy so in the event of power failure, the entire network would not be down or it could be rerouted to restore connectivity to any affected location.

RECOMMENDATION 10-6

Develop and install a redundant network infrastructure to use in the event a disaster renders the district's data center inoperable.

The district should consider a similar setup to Taft ISD's backup network architecture as a starting point for the redundant network model. In addition, the district should consider alternate routes for telecommunications and Internet traffic coming into the district.

The CTIO should engage the established disaster recovery team to assess and approve redundancy and backup requirements. The network analyst should develop the redundant network architecture and present to disaster recovery team for approval and implementation.

FISCAL IMPACT

The fiscal impact cannot be determined until the district analyzes the unknown expenses associated with the selection of the redundant network architecture.

ANTICIPATING TOMORROW

As LCISD grows, it should invest in a redundant network infrastructure to maintain connectivity and support increased dependency on classroom technology. A fast growing school district best practice is to install a robust infrastructure built for future growth not today's enrollment. The infrastructure must be able to handle future technology initiatives with adequate uptime and redundancy to avoid negatively impacting the learning process. The district should ensure that appropriate funds are allocated to install an infrastructure that provides districtwide redundancy. Another fast growing district best practice is to develop strong partnerships with vendors who will help the district with planning for future growth; i.e. infrastructure, new technologies, and classroom design. Also, the use of "cloud" technologies should be considered to support a redundant and backup infrastructure. Cloud technology means that storing and accessing data and programs are done over the Internet instead of on local computing devices.

Policies and Procedures

OBSERVATION 10-7

The LCISD Technology Services Department lacks documented policies and procedures that govern technology functions and operational activities.

Documented policies and procedures provide clear direction and guidelines to technical staff on how to perform support activities. Without documented policies and procedures, technical support may be carried out in an inconsistent, ineffective, insufficient manner. This situation could lead to performance issues with the LCISD Technology Services Department's technology resources such as email, electronic file, and Internet access. Not having documented policies and procedures leaves the LCISD Technology Services Department unprepared for emergencies and other problems that challenge the technical staff. Based on interviews with the technical staff, the LCISD Technology Services Department has suffered some inefficiency in support because of lack of policies and procedures.

Also, documented policies and procedures provide the LCISD Technology Services Department protection from loss of knowledge in the case of staff turnover. At the same time, the documented policies and procedures can facilitate assimilation of new staff or new assigned staff responsibilities in the most effective way.

Sumter District Schools in Bushnell, Florida provides an example of a well-structured and comprehensive information technology policies and procedures manual. **Exhibit 10-21** shows the Table of Contents for suggested content.

Exhibit 10-21
Sumter District Schools
Information Technology Policies and Procedures Manual Table of Contents

d. Confidential Information
e. Server and Storage Classification

IX. SECURITY INCIDENT RESPONSE: NETWORK AND INSTRUCTIONAL TECHNOLOGY

a. Incident severity classification
b. Investigations
   1. Student
   2. Staff
c. Alerts and Advisories

Source: Sumter District Schools, Bushnell, Florida, July 2013.

RECOMMENDATION 10-7

Develop policies and procedures to govern and guide technology support activities.

The CTIO and technology management team should identify functions and activities that require a policy or procedure to be effective. A plan should be developed to document and publish the documented policies and procedures and incorporate standards, as appropriate. The CTIO and/or their designee should write the policies and procedures. The Technology Services Department management team should review and approve the written policies and procedures. They should be included in the standard operating procedures manual and posted on the district and campuses websites.

FISCAL IMPACT

This recommendation can be implemented with existing resources.

ANTICIPATING TOMORROW

As the district grows, documented policies and procedures should be developed to instruct and provide guidance on how to handle routine technical tasks. This tool should reduce the time a technology staffer take to research and resolve a routine technical situation. This ability is critical as technology staffers will be required to handle more issues in a timelier manner due to district growth.

Anticipating Tomorrow – Other Topics

Although the review team had no issue with the current manner in which technology equipment is funded, there is concern on the part of district administration and technology management about how technology equipment will be purchased in the future. In recent years, bond and E-rate funds have financed the district's technology purchases. The question looking forward is, "how will new computing devices be purchased and old computing devices be refreshed if there is no bond issue or E-rate money available?" As the district's demographics change over the next 10 years, the percentage of disadvantaged student could negatively impact the amount of E-Rate funding the district would be eligible to receive. Currently, the proposed 2017 bond has a provision to cover technology equipment purchases for the next several years; however, the district must consider what happens if there are no bond issuances in future years. According to the Fast Growth School Coalition, for some districts there is no option other than to issue bonds for high turnover technology purchases. This approach could present a challenge to LCISD as it grows. Therefore, the district should begin exploring alternative sources of computing hardware refresh funding to avoid resource deficiencies in the future.

FISCAL IMPACT SUMMARY

RECOMMENDATION		2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	TOTAL 5-YEAR (COSTS) OR SAVINGS	ONE TIME (COSTS) OR SAVINGS
CHAPTER 10: TECHNOLOGY MANAGEMENT								
10-1.1	Adopt a staffing formula to be included in the methodology to assess and determine the appropriate number of PC technicians required to provide adequate support to the schools.	$0	$0	$0	$0	$0	$0	$0
10-1.2	Develop a staffing plan to address any staffing shortfalls as a result of the assessments using the enhanced staffing methodology.	$0	$0	$0	$0	$0	$0	$0
10-1.3	Revise key performance indicators with targets to measure the effectiveness of the technology support provided to the schools.	$0	$0	$0	$0	$0	$0	$0
10-2	Establish a business system analyst role to provide functional knowledge and training for all Munis business system modules.	($86,140)	($86,140)	($86,140)	($86,140)	($86,140)	($430,700)	$0
10-3	Reestablish the districtwide technology committee to review and approve technology initiatives.	$0	$0	$0	$0	$0	$0	$0
10-4.1	Develop LCISD standards and style guides for designing and maintaining the district and campus websites.	$0	$0	$0	$0	$0	$0	$0

RECOMMENDATION		2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	TOTAL 5-YEAR (COSTS) OR SAVINGS	ONE TIME (COSTS) OR SAVINGS
CHAPTER 10: TECHNOLOGY MANAGEMENT								
10-4.2	Conduct regular meetings and training sessions with department and campus content managers.	$0	$0	$0	$0	$0	$0	$0
10-5	Establish a disaster recovery team, and develop a disaster recovery/business continuity plan.	$0	$0	$0	$0	$0	$0	$0
10-6	Develop and install a redundant network infrastructure to use in the event a disaster renders the district's data center inoperable.	$0	$0	$0	$0	$0	$0	$0
10-7	Develop policies and procedures to govern and guide technology support activities.	$0	$0	$0	$0	$0	$0	$0
TOTAL CHAPTER 10		**($86,140)**	**($86,140)**	**($86,140)**	**($86,140)**	**($86,140)**	**($430,700)**	**$0**