FCMAT
FISCAL CRISIS & MANAGEMENT ASSISTANCE TEAM
CSIS California School Information Services

San Juan Unified School District

Technology Review

October 12, 2016

Joel D. Montero
Chief Executive Officer

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FISCAL CRISIS & MANAGEMENT
ASSISTANCE TEAM
CSIS California School Information Services

October 12, 2016

Kent Kern, Superintendent
San Juan Unified School District
3738 Walnut Avenue
Carmichael, CA 95608

Dear Superintendent Kern,

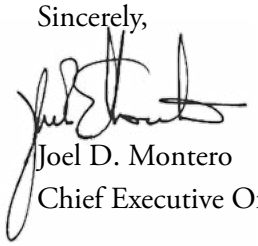
In October 2015, the San Juan Unified School District and the Fiscal Crisis and Management Assistance Team (FCMAT) entered into an agreement for a review of the district's technology services. Specifically, the agreement stated that FCMAT would perform the following:

1. Conduct a comprehensive analysis of the district's technology. Interview principals, department directors and classified staff to gather data on the software and hardware used. Review and analyze the district's technology master plan with an emphasis on integration with the Local Control Accountability Plan (LCAP).
2. Analyze the status of the following:
    a. Project management
    b. Infrastructure planning, deployment, and maintenance
    c. Network administration
    d. User account and password management
    e. Help desk system and ticketing process
    f. Website development and support, with an emphasis on content management and board policies, including social media policies
    g. Hardware installation and setup
    h. Software applications used at the district and school sites
    i. Technology in the classrooms
3. Review the job descriptions, skill level, and staffing of the technology department, including school site support.

4. Review the management of devices over their lifespan, including acquisition, disposal and inventory management.
5. Make staffing recommendations based on the support needed to meet the district's technology requirements.
6. Review the network design for safeguards against a catastrophic event or security breach of systems and data.
7. Perform a high-level review of network topology with emphasis on current and planned bandwidth and core networking equipment.
8. Review the processes or planning used to ensure that hardware and software are up to date.

This final report contains the study team's findings and recommendations. FCMAT appreciates the opportunity to serve the San Juan Unified School District, and extends thanks to all the staff for their assistance during fieldwork.

Sincerely,



Joel D. Montero
Chief Executive Officer

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About FCMAT

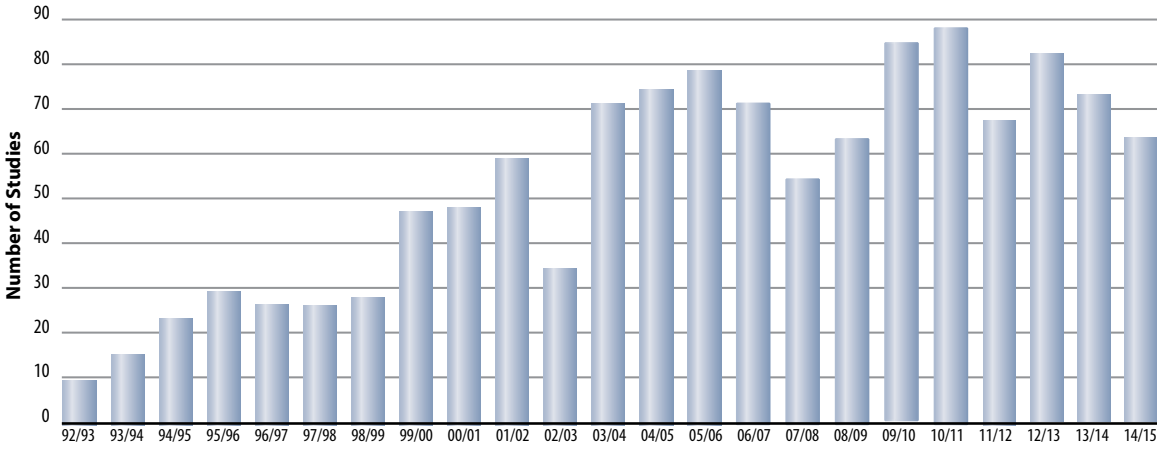
FCMAT's primary mission is to assist California's local K-14 educational agencies to identify, prevent, and resolve financial, human resources and data management challenges. FCMAT provides fiscal and data management assistance, professional development training, product development and other related school business and data services. FCMAT's fiscal and management assistance services are used not just to help avert fiscal crisis, but to promote sound financial practices, support the training and development of chief business officials and help to create efficient organizational operations. FCMAT's data management services are used to help local educational agencies (LEAs) meet state reporting responsibilities, improve data quality, and inform instructional program decisions.

FCMAT may be requested to provide fiscal crisis or management assistance by a school district, charter school, community college, county office of education, the state Superintendent of Public Instruction, or the Legislature.

When a request or assignment is received, FCMAT assembles a study team that works closely with the LEA to define the scope of work, conduct on-site fieldwork and provide a written report with findings and recommendations to help resolve issues, overcome challenges and plan for the future.

FCMAT has continued to make adjustments in the types of support provided based on the changing dynamics of K-14 LEAs and the implementation of major educational reforms.

Studies by Fiscal Year



FCMAT also develops and provides numerous publications, software tools, workshops and professional development opportunities to help LEAs operate more effectively and fulfill their fiscal oversight and data management responsibilities. The California School Information Services (CSIS) division of FCMAT assists the California Department of Education with the implementation of the California Longitudinal Pupil Achievement Data System (CALPADS) and also maintains DataGate, the FCMAT/CSIS software LEAs use for CSIS services. FCMAT was created by Assembly Bill (AB) 1200 in 1992 to assist LEAs to meet and sustain their financial obligations. AB 107 in 1997 charged FCMAT with responsibility for CSIS and its statewide data management work. AB 1115 in 1999 codified CSIS' mission.

AB 1200 is also a statewide plan for county offices of education and school districts to work together locally to improve fiscal procedures and accountability standards. AB 2756 (2004) provides specific responsibilities to FCMAT with regard to districts that have received emergency state loans.

In January 2006, Senate Bill 430 (charter schools) and AB 1366 (community colleges) became law and expanded FCMAT's services to those types of LEAs.

Since 1992, FCMAT has been engaged to perform more than 1,000 reviews for LEAs, including school districts, county offices of education, charter schools and community colleges. The Kern County Superintendent of Schools is the administrative agent for FCMAT. The team is led by Joel D. Montero, Chief Executive Officer, with funding derived through appropriations in the state budget and a modest fee schedule for charges to requesting agencies.

Introduction

Background

The San Juan Unified School District is located in Sacramento County and serves the communities of Citrus Heights, Carmichael, Orangevale, Fair Oaks, Arden-Arcade and parts of Rancho Cordova and Sacramento. The district has a growing and ethnically diverse student population of more than 39,000 at more than 70 sites including one alternative school, one continuation school, 41 elementary schools, nine high schools, and eight middle schools. In addition, the district oversees the operation of 10 charter schools.

Study Team

The study team was composed of the following members:

Scott Sexsmith
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*As members of this study team, these consultants were not representing their respective employers but were working solely as independent contractors for FCMAT. Each team member reviewed the draft report to confirm its accuracy and to achieve consensus on the final recommendations.

Study and Report Guidelines

In October 2015 the San Juan Unified School District requested that FCMAT review its technology support services. FCMAT visited the district on December 8-11, 2015 to conduct interviews, collect data and review documents. This report is the result of those activities and is divided into the following sections:

- Executive Summary
- Technology Staffing Overview
- Technology Planning, Leadership and Vision

- Technology in the Classroom
- Professional Development
- Services
- Network Infrastructure and Data Center
- Disaster Recovery
- Security
- Technology Support Staffing and Organization
- Appendices

In writing its reports, FCMAT uses the Associated Press Stylebook, a comprehensive guide to usage and accepted style that emphasizes conciseness and clarity. In addition, this guide emphasizes plain language, discourages the use of jargon and capitalizes relatively few terms.

Executive Summary

K-12 education continues to change rapidly, including more integration of technology with the curriculum and learning. Districts are spending large amounts of human and financial resources to help improve student learning using technology. Technology use needs to be guided carefully using best practices and researched-based methods. In addition to a carefully developed technology plan, efforts to use technology effectively in the classroom must be led by a qualified certificated employee, often referred to as a director of educational technology.

Working with an astute technology professional such as a chief technology officer (CTO), a district can create plans to select products, train staff, implement software and hardware, and review effectiveness. The CTO can ensure that the technical resources are in place to support technologies and training plans through careful use of financial and human resources.

The state recently approved major changes to the K-12 curriculum with the addition of the Common Core State Standards (CCSS) and online Smarter Balanced Assessments, both of which will require considerable integration of technology into the curricula and classrooms.

Technology Support Staffing Overview

The district's technology support is provided by 57.4 full-time equivalent (FTE) positions in the Technology Services Department. All positions are full time except the intermediate clerk typist, which is 0.4 FTE. Nine positions were vacant at the time of FCMAT's fieldwork. The department is led by the senior director of technology services, who reports to the superintendent. The program manager application support and systems integration, the program manager student information systems, and a program manager network/telecom also provide leadership for the department.

Technology Planning, Leadership and Vision

The district's technology plan expired on June 30, 2015. The technology plan should act as a road map for implementing technology and should link technology efforts with the strategies outlined by the district in its strategic plan. The technology plan should have both short-term and long-term goals, and the whole plan should be evaluated continually to determine the status of each goal.

The technology department is lacking in leadership of technology initiatives and in clear project management techniques. The lack of these critical skills have led to poor communications, delays in implementing projects, and undefined scopes for projects.

Technology in the Classroom

The district recently ordered and distributed approximately 13,000 Chromebooks. However, a majority of teachers interviewed said that there was no training or clear vision for how they were to use the devices other than for required testing. User training is of the utmost importance when implementing new technology. Adding more computers to the classroom is unlikely to ensure success without professional development that focuses on integrating digital media and content into the curriculum. Apart from the district's purchase of Chromebooks, principals are responsible for overseeing their respective schools' student technology resources, yet the district lacks a districtwide plan or commitment to a standard of core classroom technologies.

To address this lack of standardization, coordinated planning, and delivery of educational technology services, the district should create a new position of director of educational technology, or equivalent position.

Services

The Technology Services Department has become fragmented in its organization because of a reorganization approximately seven years ago and a lack of ongoing and corrective measures. Multiple groups within the department provide services such as computer configuration and installation preparation rather than a single unified group doing so.

The district does not regularly perform a comprehensive inventory of its technology assets as required by Education Code 35168, and it has not yet adopted any policy regarding the use of social media, though both the district and several schools now have Twitter and Facebook accounts.

Network Infrastructure and Data Center

The district has no logical network diagrams of its technology infrastructure; this deficiency can lead to confusion when staff or vendors are troubleshooting or configuring components. There is widespread use of uninterruptable power supplies (UPS) to protect valuable equipment; however, the UPS devices are not monitored for problems or failures, and they are maintained by the Maintenance and Operations Department instead of the Technology Services Department. In addition, the backup generators the district depends on to provide power in an emergency are not correctly monitored or tested.

Disaster Recovery

The district uses a number of different backup solutions to back up data and critical server operating systems; this has hampered planning and carrying out a clear data recovery process to restore systems quickly.

The district lacks a comprehensive disaster recovery plan to protect all data and critical systems, and it does not perform manual data recovery and restoration tests to ensure critical systems and data can be retrieved quickly to protect operational continuity.

Security

There is no central group in the Technology Services Department to provide security oversight; instead, these responsibilities are scattered throughout the department. The district uses a Cisco 5580 adaptive security appliance (ASA) as a firewall; however, the manufacturer's end of sale date for this equipment was July 31, 2012, and support will end in 2017. In addition, this type of older firewall cannot provide the protection needed against many of the sophisticated cyber-attacks that are prevalent today.

Technology Support Staffing and Organization

To correct the Technology Services Department's fragmented and disorganized structure, a significant reorganization of the department is needed. Major components of the reorganization should include the following:

- Replacing the senior director of technology position with a chief technology officer position, or equivalent, that includes the skills needed to better lead the organization.

- Adding a director of educational technology, or equivalent, to provide dedicated support focused on training for and proper use of technology in the classroom.
- To improve communication and services, consolidate the three major groups in the department (applications support and systems integrations, student information systems, and network/telecommunications) into two restructured groups: application support and technical services.
- Reclassifying many positions so that they better match the duties and responsibilities being performed.
- Adding many positions to directly support technology use in the classrooms.

Findings and Recommendations

Technology Staffing Overview

Technology support is provided by 57.4 full-time equivalent (FTE) positions in the Technology Services Department. All positions are full time except the intermediate clerk typist, which is a 0.4 FTE. Nine positions were vacant at the time of FCMAT's fieldwork.

Leaders in the department are the senior director of technology services, the program manager application support and systems integration, the program manager student information systems, and the program manager network/telecom.

The senior director of technology services is the head of the department and reports to the superintendent. Staffing is discussed throughout this report and in detail in the Technology Support Staffing and Organization section.

Technology Planning, Leadership and Vision

Technology Plan

The district's technology plan expired on June 30, 2015. The original technology plan had several state-required benchmarks to qualify for E-Rate funding. The director of professional learning and curriculum innovation had no knowledge regarding evaluations to determine whether the benchmarks were met. The senior director of technology services also explained that the new focus was the strategic plan. However, the district's strategic plan contains no mention of technology.

A technology plan should act as a road map for successfully implementing technology and should link technology services and the strategies outlined in the district's strategic plan. It should include both short- and long-term goals, and the entire plan should be evaluated continually to determine the status of each goal. The district is missing an opportunity to evaluate the past five years of goal setting, which would help it make data-driven decisions about future technology and professional growth.

The principals FCMAT interviewed gave a range of responses when asked about their interaction with the Technology Services Department. Some stated that they only used it for help tickets, while others said that they used the teachers on special assignment (TOSAs) for professional development. To unify the district and its vision for educational technology, the senior director of technology services needs to meet with each principal at least once a year to discuss their school's current technology inventory, hardware replacement timeline, and professional development. Although the technology plan mentions monitoring and evaluating benchmarks with surveys, administrators said that they did not know of any districtwide survey. The department needs to create a districtwide survey or use a third-party survey service to do so, and administer the survey annually. The data from this type of survey can help the department identify products and services to meet teachers' professional development needs. The information from the surveys can also be evaluated in meetings of the senior director of technology services and each principal, and used to make technology purchasing decisions.

Because the technology plan was created more than five years ago, the Technology Services Department needs to begin creating a new plan by revisiting the essential elements of a plan, starting with the stakeholders. The technology plan refers to the district's strategic plan and identifies a wide variety of stakeholders - such as parents, students, classified and certificated staff, and leaders - as major contributors to the plan. These stakeholders contributed to the district's strategic plan; however, the technology plan was created with contributors only from the Technology Services Department, Assessment, Evaluation, and Planning (AEP) Department, and Adult Education Department.

The International Society of Technology in Education (ISTE) has identified 14 critical elements needed for technology planning (http://www.iste.org/standards/essential-conditions). The district would benefit from using these as a guide for developing its technology vision and creating a new technology plan. The ISTE also has a Lead & Transform diagnostic tool (http://www.iste.org/lead/lead-transform/diagnostic-tool) that will generate a report that can help guide technology planning.

Recommendations

The district should:

1. Update or replace the outdated technology plan with a new three-year vision and plan that expresses the district's commitment to using technology in the classroom to improve learning, and that includes a process for continually updating goals and strategies. Use tools such as the ISTE's Lead & Transform diagnostic tool to generate a report that will help guide technology planning.
2. Communicate with principals at least annually to discuss their technology replacement plans and professional goals for the year.
3. Create and administer a districtwide technology survey annually, or use a third-party service to do so. Ensure that the survey includes students, teachers and parents, and that the data is used to determine progress toward benchmarks in the technology plan as well as future professional development and training for teachers.

Leadership and Project Management

Throughout FCMAT's interviews, employees consistently cited a lack of vision, support, trust and communication, as well as an abandonment of past technology, when describing management practices in the Technology Services Department. Although some of these comments can be attributed to frustration with technology support taking months to resolve issues, others are justified.

Decision-making in the Technology Services Department has been fragmented or in some cases nonexistent. Decisions that should have been made at the executive level are being made at a team leader level or by midlevel technicians. Other decisions were made at the top with little input from department managers or technical specialists and thus with little consideration of the technical and support issues they would face. This lack of communication and project management has led to many frustrations within and outside of the department.

Some technology-related projects are carried out using good project management techniques while others have little or no project management. Almost any technology project undertaken

in a district of this size will need project management because of the amount of resources used and the number of sites involved. Simply allowing a project to evolve as things progress without active management is not a viable option.

Districts with successful technology projects use a formal project management platform or template so both large and small technology projects can be monitored to ensure success. For mid- to large-scale projects, a proof of concept step is included to help ensure that no technical issues will impede the project's success. This allows technical problems to be identified in advance of the project being fully implemented. When software or hardware is to be implemented across the entire district, an oversight committee is formed to vet the project's viability and its benefit to the district.

The district's Schoology learning management system is an example of a poorly implemented project: after almost two years of implementation and training, the best estimate from those involved in the project is that less than 20% of the teaching staff are using Schoology for its intended purpose. Few districts can afford such a low adoption rate for large districtwide projects such as this. When it invests significant human and financial resources in such a widescale implementation, a district should be prepared to explain fully the benefits of such a systems and that staff should use the resources provided to them.

The district also lacks a process for managing changes after a project has begun. Scope creep is a common problem in technology projects and can lead to cost overruns and missed deadlines. It is important that projects be completed in stages, with one stage being completed before another stage is added. Those involved need to sign off on completed stages and know the cost of future stages.

Recommendations

The district should:

1. Develop a formal project management template to be used for all technology-related projects.
2. Review the decision-making process in the Technology Services Department and change it as needed to ensure that critical decisions are made at the appropriate level.
3. Create a software oversight committee to vet districtwide technology before it is purchased and implemented.

Technology in the Classroom

During the 2014-15 school year there was a collaborative effort between the Technology Services and the Assessment, Evaluation, and Planning (AEP) departments to help ensure that enough devices were available for the Smarter Balanced Assessment Consortium (SBAC) testing and district assessments. This resulted in the governing board approving the purchase of Chromebook carts. Each school received 35 to 70 devices, depending on the school's size and its students' grade levels. An additional goal was to encourage teachers to use the technology not just for testing but also for instruction and to develop digital literacy to meet the Common Core State Standards (CCSS).

A total of approximately 13,000 Chromebooks were distributed and installed in 2014-15, with a goal of using the devices for digital literacy skills. However, all of the teachers FCMAT interviewed said that there was no training or clear vision for how they were to use the devices other than for Smarter Balanced testing. In situations like this, professional development for all involved is of the utmost importance. Adding more computers to classrooms is unlikely to ensure success without professional development that focuses on integrating digital media and content into the curriculum.

With the exception of the district's purchase of Chromebooks, principals are responsible for overseeing their respective schools' instructional technology resources, yet here is no districtwide commitment to a standard of core classroom technologies. Principals interviewed gave a variety of different responses when asked about the quantity and types of technology being used at their schools.

The wide variety of devices in use has disrupted services and teaching. Although some teachers still use aging electronic whiteboards (Promethean Board), others are using current Apple TVs, flat screen televisions, and iPads. One principal reported that the district was not supporting Apple TVs, but another indicated that it was. One teacher stated that she was the last teacher at her school using the Promethean boards because they weren't supported, but a technology services technician indicated that they can support them.

These discrepancies create disparities in access to a resource that the district's only existing technology plan states is integral to the curriculum. A lack of districtwide standards has resulted in a high number of different devices. This hampers support functions because only some of the technicians feel comfortable troubleshooting specific hardware. If left uncorrected, this type of reliance on a single technician for a specific type of device, combined with the lack of hardware standards, will continue to hinder and delay the support desk's ability to resolve hardware and software problems. The district's continuing investment in educational technology requires empirical, research-based evidence that these investments are improving students' education and transforming the classroom for the teacher. An understanding of how and why schools are using technology can be achieved using a research-based standardized survey that examines multiple facets of teachers' and students' technology use. It is a best practice to conduct such a survey annually to obtain statistical data for analysis. This type of specific, reliable data, can help the district make sound decisions regarding professional development and technology infrastructure, as well as gauge students' and teachers' attitudes about technology use in the classroom. The insights gained can be used to improve strategies annually. A third party that specializes in this type of research, such as BrightBytes or other similar services, can be used to help conduct the survey and analyze the data.

Recommendations

The district should:

1. Develop a plan that provides all students with equitable access to technology to meet the CCSS that explicitly require the use of technology and digital resources.
2. Collaboratively develop a vision and a detailed plan for how students will use technology and digital resources. Ensure that the detailed plan includes professional development for teachers, infrastructure requirements, professional development for technology staff, ongoing support, and a way to measure the plan's goals using a survey.
3. Standardize devices and a replacement plan for those devices.

Professional Development

Many teachers do not clearly understand how to use the Chromebooks effectively other than for SBAC testing. Although some are aware of Google Apps for Education, many have only learned about it from their peers or students; they have not been taught how to effectively use Google Apps with the Common Core State Standards (CCSS). The district-operated Digital Edge Learning Center has an out-of-date online training catalog that lists some technology classes scheduled between December 2012 and February 2013; the dates and times for remainder of the classes in the catalog are listed as "to be determined." Teachers were aware of technology trainings on the district's Schoology online learning management software and explained that the trainings focused on how to use the product but not how to incorporate it into teaching. In 2014-15, 90% of the trainings provided by the district's two teachers on special assignment (TOSAs) were on how to use Schoology.

Access to a given technology will not of itself help teachers establish desired learning outcomes or use the technology optimally to help improve teaching and learning. Teachers need to learn how to integrate technology with teaching. Understanding models such as Dr. Ruben Puentedura's Substitution Augmentation Modification Redefinition (SAMR) model or the Technological Pedagogical Content Knowledge (TPACK) framework can help teachers learn this.

Two TOSAs are not sufficient to meet the needs of the entire district for technology-related professional development: it is nearly impossible for two TOSAs to train staff at all 70 sites in one year. The district currently has no program to ensure educational technology representation at each school. One way many large districts ensure this type of representation at each school is by providing a stipend or adjunct duty hours to one teacher at each site and giving them the responsibilities specified in the International Society for Technology in Education's (ISTE's) coaching model for technology-related professional development. These teachers become educational technology liaisons, acting as the contact for instructional technology issues and participating in planning and facilitating professional development and effective use of technology at their respective schools. They have the advantage of being close by and readily available to any teachers who may be struggling with technology and can meet with them after school or during their preparation period to work on lessons. These teachers also act as a technology liaison and are a voice for their school when they engage with the Technology Services Department and report on their school's current technology. The impact of this additional role can improve communication and awareness between the Technology Services Department and the schools by focusing on teaching as much as technology.

In addition, support could be multiplied by doubling the size of the TOSA team to four. The two additional team members would include one individual with expertise in elementary schools and one with expertise in secondary schools. This follows the TPACK model of having a content expert training teachers in both technology and pedagogy. The elementary school TOSA could be consulted on and assigned to all trainings for elementary school staff; the secondary school TOSA could help with training for teachers of grades 7-12.

The lack of a unified districtwide vision for instructional technologies creates an environment in which only some students have access to digital learning resources. Teachers who are given the training to use these resources and apply them to the CCSS are either taught by one of the two TOSAs, or are learning on their own through websites or conferences. Although there are notable successes in this area, they are limited to a few teachers and school sites; there remains no districtwide goal or direction. The lack of a districtwide technology plan that provides clear,

realistic goals and comprehensive strategies for educational technology has left teachers feeling isolated and unsure of how to implement technology in their lessons.

If the district chooses to increase the number of TOSAs as suggested to train teachers, a best practice would be to place them in a new educational technology group within the Technology Services Department. In addition to this, the district would benefit from having a credentialed administrative position that can focus on instructional technology training and professional development for teachers. This person could report to the chief technology officer position proposed later in this report but should attend meetings of the educational services director and coordinators at which decisions are made about how teachers are implementing CCSS. The Technology Services Department would benefit from this position because it would serve as a liaison that links the department with, and gives it a voice in, the district's vision and processes for curriculum and instruction.

Recommendations

The district should:

1. Create the role of educational technology liaison at each school to link the school with the Technology Services Department. This role should help teachers fully integrate the use of technology devices into the curriculum, and should meet monthly with the proposed educational technology group to ensure that the district's vision is being implemented.

2. Create two additional TOSA positions to help provide training and professional development in educational technology: one for elementary school teachers and the other for secondary school teachers.

3. As recommended in the Technology Support Staffing and Organization section of this report, create a director of educational technology position, or equivalent, that reports to the chief technology officer. The primary purpose of this position should be to ensure that professional development is provided for teachers in the area of educational technology. This position should also work closely with the district's Division of Teaching and Learning to uphold the district's curricular vision whenever instructional technology is implemented and used.

Services

Computing Devices and Peripherals

The district has three main categories of computers: administrative, student, and teacher. Its approved standard devices include Windows PCs, Apple devices, and Chromebooks. Computer purchasing is limited to a set of standard devices in the 'Supported Technology Hardware' document on the district's intranet. If a nonstandard device is ordered, the requester is informed prior to purchase that it will not be supported.

The number of computers and number of computers per student and per teacher vary from school to school, but a majority of classrooms use Apple systems and a majority of administrators use Windows PCs. Each school received one or two carts of Chromebook computers in 2014-15, with approximately 35 devices per cart, for SBAC testing; Apple iPads were introduced approximately five years ago. The Chromebooks and iPads have become the main student computing devices: the district now has approximately 12,667 Chromebooks and approximately 6,500 iPads.

New teachers receive a new laptop when they are hired, and it stays with them if they are transferred within the district. The district supports a computer replacement plan that promises a new computer to every teacher every five years. The initial intent of the plan was to allow students to use teachers' old computers when they were replaced, but this practice is not consistently followed. All other classroom technology equipment, such as document cameras, iPads, printers, Apple TVs and projectors or large monitors, are funded by the school sites.

Computer Replacement Program

Most new computers are purchased under the computer replacement program, which is run mainly by two microcomputer specialist II staff members in the network/telecom group. These two employees are responsible for ordering and scheduling installation of the new equipment for teachers and staff and have significant experience in running the program.

Approximately one year ago, at the direction of the senior director of technology services, a new form and procedures were added to the computer replacement program. All teachers were required to fill out a form and have their principal sign it before any equipment would be ordered. This new form and procedure came about because of one miscommunication between a teacher and the computer replacement program staff out of hundreds of orders a year. The requirement for this new form, and an accompanying prohibition against ordering equipment as soon as a need is known, have contributed to a significant slowdown in obtaining equipment for teachers and staff. In addition, replacement program staff have been prohibited from emailing or contacting teachers and staff directly regarding what type of equipment they need; this has hindered the overall process.

Recommendation

The district should:

1. Allow the replacement program to function as it was before the new form and protocols were put in place. Allow advance ordering of equipment and verbal communication between staff and replacement program personnel.

Hardware Installation and Setup

The installation and setup of new and existing hardware is split among several groups in the Technology Services Department. The network/telecom group orders and installs new hardware for the computer replacement program. The configuration of computer system images, which is crucial to new installations, is split between two other groups in the department.

In interviews with staff outside the Technology Services Department, FCMAT heard repeatedly about the long time it took for equipment to be installed. Many of the devices ordered for the new teachers who started in the district at the beginning of the 2015-16 school year were just beginning to be installed as of December 2015.

During a school site visit FCMAT noticed a principal's Apple desktop that had a label with "Crashed" written on it. When FCMAT asked how long the desktop had been down, the reply was over a month. In another interview FCMAT was told of more than 200 iPads that had been in the warehouse since October 2015 and had yet to be deployed. The reason technology staff gave for this was a mobile device management problem. Many times FCMAT was told of month- or months-long delays in getting equipment installed.

Mobile Device Management

The district is using two mobile device management tools to manage the Apple devices: Casper Suite from JAMF, and AirWatch from VMware. The decision was made approximately two years ago to begin dropping support and use of the JAMF product and instead move to using AirWatch. The reason given for the move was that the district was trying to obtain a small support feature for some teachers; however, ultimately this feature did not work. Little consideration was given as to the technical difficulties that would be encountered when trying to remove Apple devices from the JAMF product and enroll them in AirWatch.

One example given in an interview was that it took 15 hours to move 20 iPads on one cart from JAMF to AirWatch. The fact that there are more than 9,000 devices to be moved and little to no functional advantage to doing so indicates that the mobile device management project was not vetted from a technical perspective to ensure a timely completion and success.

Test Accounts

Technology staff members do not have a test account to test desktop software installations such as QSS. This prevents these staff from testing the installation and users' access to the system, resulting in potential delays or repeated visits to the user's location to resolve the initial problem. Many districts provide their technicians with these accounts, which typically have extremely limited read-only access to data in the application.

Network Drives

Few teachers are aware of or know how to access their network drive for storage or backup of their files. This can cause a significant lack of access to files when a computer is down or is being replaced, and it leaves the technology liaison or microcomputer specialist with the responsibility of determining which files are needed and attempting to back them up.

System Imaging

The application support and systems integration group produces Windows computer images, and the network/telecom group produces Apple computer images. Using two different groups to create computer images reduces efficiencies and delays delivery of new systems. It would be more

efficient to ensure that all staff involved in creating images work closely with the staff responsible for computer installations. This is a key component of installation and configuration that can halt work if it suffers delays or inefficiencies.

The district manages Windows operating system imaging using Microsoft's System Center Configuration Manager (SCCM); however, technology staff reported that the imaging process cannot traverse subnets of the local area network, so staff must either bring the device to the shop or bring a flash drive to the site to load the software onto the system. The district has licenses for Microsoft's Windows Deployment Service for Windows imaging through its membership in the California Educational Technology Professionals Association (CETPA) and California Microsoft Strategic Alliance (CAMSA) agreement but is not currently using this service. Apple imaging is accomplished using DeployStudio and seems to be working well.

System imaging is vital to standardizing systems and maintenance procedures. Computers need to be imaged at time of purchase and again periodically to incorporate system updates or to resolve critical system failures. An organization of the district's size must be able to remotely image computers and maintain a set of images to meet administrative, teaching and student needs.

Recommendations

The district should:

1. Reevaluate the use of either AirWatch or JAMF mobile device management software for Apple devices. Select a single system based on overall cost and performance.
2. Set up a limited-access read-only test account in QSS and other key software products that are frequently installed so that technology staff can test installations.
3. Provide training for teachers on how to access and use network drives to store and back up files.
4. Create a single imaging/setup group within the network/telecom group to perform all computer imaging.
5. Compare and evaluate the use of Microsoft's SCCM and Microsoft's Windows Deployment Service for Windows imaging. Determine which system would be of greatest benefit to the district given cost and performance factors.

Help Desks

Support

The Technology Services Department's helpdesk/support desk system is composed of three separate helpdesks. One is located in the application support and systems integration group and is called the support desk; this helpdesk has the traditional call-in or walk-in helpdesk staff to help with a variety of problems, except those related to the student information system (SIS) or QSS. It is staffed with a microcomputer specialist I and four technology liaison II positions, two of which have been vacant for more than a year. This support desk is open from 7 a. m. to 5 p.m.

Another helpdesk is the SIS helpdesk. This helpdesk has six technology liaison II staff and does much more than the traditional helpdesk support. These SIS positions answer calls about the SIS, work on California Longitudinal Pupil Achievement Data System (CALPADS) anomalies, resolve grade book issues, load student photos, work on attendance reports, prepare the SIS for summer school classes, handle transcript requests on the old QSS Pertaine SIS system, and support California Special Education Management Information System (CASEMIS) issues. This group also handles a number of rollover processes for each new school year. The SIS helpdesk is open from 6 a.m. to 6 p. m. and later on some occasions (e.g., open house, open enrollment). Although this helpdesk generally handles more complex support issues than the first helpdesk group above, it cannot reset a user's Microsoft Active Directory login password, which forces users to contact the support desk in the application support and systems integration group resulting in unnecessary additional time to resolve this issue.

The district also has a QSS helpdesk, which is also in the application support and systems integration group. This is staffed by two senior programmer-analyst positions, which also provide most of the support for QSS programming as well as finance and payroll. One problem with this helpdesk's configuration is that anyone from the finance department can call at any time and expect to get immediate help with a QSS issue. Although users desire this level of support, and should be supported within a reasonable amount of time, it is not cost effective to have highly paid programmer-analyst positions providing it as a first level of support.

All district staff can go online or call in to open a helpdesk ticket with any helpdesk using the district's HEAT ticketing system. Once a ticket is opened, a status email is sent notifying the staff member of the disposition of their help request. To close a ticket, a technician must return to the central office and do so using the helpdesk software.

Recommendations

The district should:

1. Give SIS helpdesk staff the ability to reset passwords in Microsoft Active Directory.
2. Stop allowing staff to call programmers directly for immediate help with QSS issues; instead, assign an existing position in the support desk to receive these calls and relay messages to the programming staff.

Helpdesk Software

The district uses the HEAT helpdesk system from FrontRange Solutions. This software has not been updated in years, which has led to problems. For example, it does not provide information on how many helpdesk tickets are open, does not provide any analytics on calls received, and does not communicate ticket status to mobile devices for technicians in the field. The only way FCMAT was able to obtain an open ticket report was by having an SQL programmer run an SQL query on the database. This query showed that approximately 388 tickets were in open/hold/waiting/in-progress status. Although this is not an unusually large number for such a large district, the difficulty of obtaining this information is unusual. An updated helpdesk software package is needed for reports and analysis of calls.

The HEAT system does not have a knowledgebase where staff can look up solutions to issues. A self-help lookup feature would greatly help all staff resolve small, easy-to-fix issues without calling helpdesk staff.

While visiting a school, FCMAT observed a clipboard sign-up list in the main office on which staff recorded technology problems. When FCMAT inquired about this, the answer given was that the clipboard was a stopgap measure so that both the technology liaison and microcomputer specialist would know what needed fixing. Having access to this information via mobile devices to communicate new tickets to these staff in real time would eliminate the need for such stopgap measures and give these staff complete information that allows them to resolve all issues at a school site in one visit. Without such access these staff often have to return to the same school the same day to fix another problem.

The district purchased a new helpdesk software system, SA Manage, in July 2015. There was little input from staff on the selection, and the new system had not been implemented at the time of FCMAT's fieldwork. Although SA Manage appears to be a worthwhile software package, the new version of HEAT is also viable and worth evaluating before a final decision is made.

Recommendations

The district should:

1. Include all parties, including users and technology staff who use the helpdesk software in a demonstration of the both the SA Manage and latest HEAT products. After feedback from all staff involved in the use of the ticketing system and a review by all technology management, select a system that is in the best interest of the Technology Services Department and the district.
2. Set up a knowledgebase in the helpdesk software to allow users to look up solutions to frequent problems.
3. Ensure that any helpdesk software implemented allows technology support staff to access support request information on mobile devices.

Technology Asset Management

The district has not conducted a physical inventory of technology assets in several years. All items ordered are entered into the QSS financial system when the purchase is initiated. The district receives all items at the district office warehouse, where items valued at more than $500 are tagged per Administrative Regulation (AR) 3440. However, the location and specifications of individual computer systems are not maintained in QSS.

The Technology Services Department has multiple inventory lists for each computer system type (Windows, Apple, and Chromebook). The department tracks technology assets using software reporting tools and/or physical logbooks; however, it was unable to produce a complete, current and accurate inventory of all technology assets.

Devices that have been entered into Microsoft's Active Directory are not removed from it even after they have been disposed of. Apple devices are maintained in a mobile device management system, but the district has changed from JAMF's product to AirWatch's product. An estimated 6,500 devices are managed with JAMF, and approximately 1,500 using AirWatch. The number of active PC devices reported ranges from 3,000 to 4,900.

As mentioned earlier, teachers are able to take their computer with them if they are transferred within the district. Many principals reported that they have never taken inventory of the computers at their school. Staff reported that devices deemed obsolete are collected and then disposed of after board approval.

An accurate inventory is critical for budget planning, for understanding the resources needed to administer the California Assessment of Student Progress and Performance (CAASPP), and for proper software licensing.

Education Code Section 35168 requires a district's governing board to establish and maintain an inventory of all equipment items with a current market value of more than $500. When state or federal funds have been used for a purchase, the district is required to include additional information in its inventory records, including the funding source, titleholder, and percent of federal participation (34 CFR 80.32 and 5 CCR 3946). In addition, at least once every two years, a physical inventory of equipment must be conducted and the results reconciled with the property records (34 CFR 80.32).

Recommendations

The district should:

1. Determine if any of its existing automated inventory systems can be configured to provide comprehensive and accurate asset reporting. If not, invest in an adequate automated inventory management system capable of creating an inventory of all hardware and software.

2. Conduct and maintain a complete inventory of all qualifying devices as required by Education Code Section 35168, 34 CFR 80.32 and 5 CCR 3946.

Websites and Social Media

The district maintains multiple websites and information portals. The official public site is hosted by Schoolwires and managed by the district's Communications Department. The district has also contracted with Schoology to serve as its learning management system.

These systems have different purposes, and teacher-related content on them can sometimes overlap. Teachers are issued websites on request and can choose to use Schoolwires, Schoology, or both, to create a website, but are not compelled to use either. The Technology Services Department has also set up a locally-managed web portal from Stoneware for students, staff and parents who wish to access various web-based systems. The success of this initiative is unknown, but its intent is to bring together all websites and resources using an integrated single sign-on for both students and staff. The senior director of technology services devoted most of the training for TOSAs to the implementation of Schoology; teachers interviewed were not aware of any training regarding the Schoolwires websites.

The district has also developed multiple in-house web-based systems to facilitate school operations. Some of these are accessible only internally, including the following:

- Absence tracking for staff - Monthly consolidated absence reporting.
- Employee records updating – For direct deposit, maintaining addresses, and other information.
- Open enrollment project - Student open enrollment projection and accounting.

The open enrollment project has been a work in progress for three years and seeks to optimize and balance the requests for open enrollment to any school in the district. The project has grown

considerably over time and does not seem to have a defined scope or any up-to-date documentation.

The district and several schools have Twitter and Facebook accounts. Many districts statewide use social media accounts to improve their community outreach. Teachers also use social media for academic communication with students. However, the district has not yet adopted any policy regarding the use of social media. The California School Boards Association's online policy service, Gamut, includes sample Board Policy 1114, District-Sponsored Social Media, which outlines policy and practice for managing social media use by staff and students.

Recommendations

The district should:

1. Offer Schoolwires website training periodically to teachers and staff who have web publishing duties.
2. Define the scope and final outcomes of the open enrollment project. Although the district will need to continue amending this to meet state mandates, it should define the functionality and project scope and conduct a cost-benefit analysis.
3. Document all custom-built website applications.
4. Adopt Board Policy 1114 and the corresponding administrative regulation regarding social media and student privacy.

Network Infrastructure and Data Center

Network Diagrams

The technology services staff were unable to produce detailed logical network diagrams. The lack of these diagrams can result in confusion when staff are troubleshooting network problems or can cause errors when configuring networking components.

Successful technology operations create detailed network diagrams, keep them updated, and store them on a shared drive that multiple staff members can access.

Recommendation

The district should:

1. Create detailed network diagrams to help staff monitor, troubleshoot and maintain the district's complex networks.

Uninterruptable Power Supplies

The district uses electronic uninterruptable power supplies (UPSs) to provide battery backup and protect critical network equipment and servers. Each school has a main distribution frame (MDF) location with a dedicated UPS device protecting the network equipment and servers.

If a UPS device is not serviced and electronically monitored, it can fail unexpectedly and a school can lose connectivity to the district. At San Juan High School FCMAT found a UPS that was completely disconnected and powered off, leaving the core router without protection.

None of the UPS devices at the schools are monitored. The district's Technology Services Department has not been given the responsibility of maintaining or monitoring the UPS equipment; these duties are assigned to the Maintenance and Operations Department. The UPS systems are critical to the district's network and telecommunications, and it is a best practice to make them the responsibility of the technology department.

Recommendations

The district should:

1. Make all UPSs at all schools the responsibility of the Technology Services Department.
2. Implement a monitoring system for all UPS devices and a recovery plan for when one fails.

Data Center

Backup Power

The district has a data center that houses all its central servers, and network and telecommunications equipment. The data center provides all network and telecommunication services for all schools and district offices. The district has a fiber-optic network that gives each school a dedicated 1-gigabyte (GB) connection. The district's Internet service provider (ISP) is the Sacramento County Office of Education, which provides a 10GB connection. All schools and offices depend

on the ISP connection for Internet access. The district also has a second data room that contains the district Avaya private branch exchange (PBX) telephone system.

The data center and the telephone data room are each connected to their own natural gas generator that provides power in case of an outage. The district uses Onan Quietsite II natural gas generators. The district does not manually test the natural gas generators to ensure that backup power will function during a power outage. Although the generators perform an automated test weekly, the logs of these tests are not checked regularly to see if the generators are functioning properly. The generator that protects the districtwide PBX system failed during the last power outage on November 13, 2015 and the district lost telephone connectivity for an extended time.

It is a best practice for technology departments to perform regularly scheduled manual tests of any backup power generators as part of its data center operating procedures to ensure that backup power will be available in case of an outage.

Recommendation

The district should:

1. Set up and implement a maintenance schedule that includes monthly inspections and manual testing to ensure that both generators operate at their designed power load.

Access Control and Monitoring

The data center has a card swipe access control system, but the Technology Services Department does not check the access control system logs or monitor who accesses the data center. The district lacks a closed-circuit video surveillance system to record who enters or leaves the data center.

It is standard practice to have a means of logging technology staff and outside service personnel as they enter and leave a data center. More information on proper data center physical security can be found at the SANS Institute website at https://www.sans.org/reading-room/whitepapers/awareness/data-center-physical-security-checklist-416.

The district has no central monitoring, alert, or performance tracking of the overall data network, nor are there high temperature alarms or other environmental monitoring of the data center.

A system of network monitoring that provides historical data on infrastructure and server components would allow the Technology Services Department to be more proactive in resolving network and server issues, give it the ability to better plan for hardware upgrades, and allow it to configure alerts based on certain criteria. This system would also increase staff efficiency by providing automated server, infrastructure and environmental monitoring.

The same is true of data center environmental monitoring, which would alert staff of problems based on certain environmental criteria, such as high temperature, thus preventing sustained high temperature and other environmental conditions that can lead to unplanned system shutdowns.

Recommendations

The district should:

1. Install a closed-circuit video surveillance system to monitor the data center. Regularly check the access control system logs and video surveillance videos to monitor who is accessing the data center.
2. Implement a reliable network monitoring system.
3. Install a system for environmental monitoring of the data center.

Telephone Systems

The district uses Avaya for its districtwide telephone system. Eight different generations of Avaya products make up the telephone system. Some of the PBX units are 22 years old, including the district office system. The manufacturer has identified these systems as past their end of life and they are no longer supported. Many districts have successfully replaced their older telephone systems with newer, more flexible voice over Internet protocol (VoIP) systems.

The district has one telecommunications system technician to manage and support its telephone system. No other staff member in the Technology Services Department is cross trained to provide backup in case the technician is not available. Because the telephone system is critical to safety and business continuity, identifying qualified backup support is vital.

Recommendations

The district should:

1. Select a qualified vendor with knowledge of Avaya products to support the telephone system in case the telecommunications system technician is unavailable.
2. Evaluate newer VoIP phone systems to replace the Avaya phone system.
3. Cross train staff so that multiple technicians have the ability and knowledge to support the telephone system.

Disaster Recovery

General Backup and Recovery

Backup Methods

The district uses multiple different backup solutions to back up data and critical server operating systems. Although the district has recently invested in the Nimble storage backup product and uses VMWare to back up servers, it still uses an older EMC and Data Domain storage area network (SAN) devices as physical media on which to store data. The district also uses Commvault and Symantec software to back up data.

The district continues to have intermittent problems with Commvault backing up the Microsoft Exchange email server, so it relies on the older Symantec backup systems and Data Domain storage to back up all district email.

The district's dependence on several different storage and backup software and hardware systems has complicated planning and carrying out data recovery.

Data Recovery

The district does not have a comprehensive disaster recovery plan to protect all data and critical systems and does not perform manual data recovery and restore tests to ensure that critical systems and data can be retrieved in a timely manner to protect operational continuity in an emergency.

The district is setting up an off-site backup recovery site at San Juan High School; this is a work in progress and not all data and systems requirements have been completed. This site is within the district's geographic boundaries, which could pose a serious problem in case of a natural disaster such as earthquake, flood, or fire. The off-site location also relies on the same electrical power grid that serves the district office and the data center.

The following are some best practices for a disaster recovery site:

- Have a secondary data center in a safe location outside the geographic area of the potential disaster. How far away this is depends entirely on which natural disasters are likely to occur in the geographic region.
- Make sure that the disaster recovery site and the data center are on different power grids so that if one power grid fails in a disaster, the disaster recovery site is protected on the second power grid.
- Regularly test all disaster recovery components at a full load to ensure that everything is working properly; make a schedule for these regular tests.

Additional information on disaster recovery centers and best practices can be found at http://searchdisasterrecovery.techtarget.com/Data-center-disaster-recovery-plan-template-and-guide.

Recommendations

The district should:

1. Consolidate backup systems, remove older data recovery software and hardware, and develop a data recovery plan that ensures business continuity.

2. Identify an off-site disaster recovery location that is outside the district's geographic boundaries and that has no probability of being affected by a disaster that affects the organization's primary site. The district should evaluate cloud-based disaster recovery services that offer multiple locations with high-speed connections to achieve a dedicated, geographically redundant cloud-based disaster recovery option that provides data protection and 100% guaranteed uptime.
3. Schedule and conduct regular manual tests on all components of the disaster recovery center to ensure business continuity in case of a disaster.

QSS Backup and Recovery

The district is financially independent and uses the QSS integrated financial system for payroll, finance, accounts payable, and other critical accounting functions. QSS depends on Hewlett Packard HP3000 mainframe computers, which are no longer supported by HP.

The district backs up the QSS financial system on tapes and contracts with an outside professional service called Recall to store the tapes off site. The district does not have an off-site disaster recovery plan for QSS. An off-site recovery site would need to have printers and an HP3000 system with sufficient capacity to restore all financial data and process payroll and other critical systems in case of an emergency.

Recommendation

The district should:

1. Select an off-site disaster recovery service to help restore all critical QSS services in case of a disaster. Companies similar to Ideal Computer Services and the QSS user group provide off-site disaster recovery.

Security

Inventory of Devices on the Network

The district does not have an inventory of authorized and unauthorized devices that access the network. The Technology Services Department was unable to produce a complete, current and accurate inventory of all technology devices. Some devices are tracked in Active Directory but are not removed from it after being disposed of. The department does not have a process for removing these devices from the domain. Apple computers and iPads are managed in different mobile device management systems that do not provide a comprehensive list of which devices are accessing the network. Because the district lacks a centralized device management system that monitors and manages these devices, many systems are out of sync, without the latest patches, security updates and antivirus software.

Potential attackers are quick to take advantage of systems, especially mobile devices, that are not kept up to date with patches and security updates but that have access to an organization's network. Even devices that are not visible from the Internet can be used by attackers who have already gained internal access and are looking for internal jump points or vulnerable systems.

Additional information on effective cyber defense can be found at https://www.sans.org/critical-security-controls.

Recommendations

The district should:

1. Implement and maintain an inventory of all computers and mobile devices to actively manage (inventory, track and correct) all hardware devices on the network so that it can give access only to authorized devices and so that it can identify and deny network access to unauthorized and unmanaged devices.
2. Implement an inventory of all systems connected to the network. Ensure that the inventory includes every system that has an Internet protocol (IP) address on the network, including but not limited to desktops, laptops, servers, mobile devices network equipment (e.g., routers, switches, firewalls), printers, storage area networks, and VoIP telephones.
3. Create a procedure for removing devices from Microsoft Active Directory when they are dispositioned or removed from the district network.

System Updates and Antivirus

The district has numerous machines running outdated operating systems, and many systems without antivirus protection. The Technology Services Department does not have an automated inventory system to identify what software is outdated and which systems need patches installed.

The Technology Services Department uses Microsoft Endpoint antivirus to protect computers from viruses and malware. According to the department, there are more than 16,400 Windows computers in Active Directory; however, only 2,911 Windows computers are protected by Endpoint. None of the district's Apple computers have antivirus software or protection from malware. Approximately 1,300 devices still run the Microsoft Windows XP operating system, which is vulnerable to attacks and is no longer supported by Microsoft.

Attackers continuously scan target organizations looking for vulnerable versions of software that can be exploited remotely. These unmanaged devices are more likely to be running software that is not needed for business or educational purposes and that has security flaws. These systems could be running malware introduced by an attacker after a system is compromised.

Recommendations

The district should:

1. Implement a comprehensive device management and patching system that monitors software updates. The system should be automated and should apply software patches regularly.
2. Update Endpoint to ensure that it manages all computers and devices and protects them from viruses and malware. The antivirus protection should be automated and should update systems as needed to keep them protected.
3. Develop and implement a plan to replace all Windows XP operating systems as soon as possible.

Custom Web-based Programming

The district creates many different custom web-based applications using Linux Apache, MySQL and PHP (LAMP). PHP stands for Hypertext Preprocessor and is a server-side scripting language designed for web development but also used as a general-purpose programming language. Because PHP can have numerous security flaws if not programmed correctly, it is common to see PHP applications that lack security. When programming PHP, programmers need to be aware of all of its security hazards. Several of the district's custom web-based applications contain sensitive information exported from the QSS financial system and can be accessed through the Internet.

The district has no procedures for determining whether an application or its code is secure or if sensitive information may be leaked, nor has it tested any of its custom applications for security.

Information on security related to PHP programing can be found at https://www.owasp.org/index.php/PHP_Security_Cheat_Sheet.

Information on security tools to analyze web-based systems can be found at http://sectools.org/tag/web-scanners.

Recommendation

The district should:

1. Implement a web vulnerability scanning system to test and secure custom web applications. These scans should be automated, and the Technology Services Department should be alerted immediately when a vulnerability is discovered.

Internet Firewall Security

The district uses a Cisco 5580 adaptive security appliance as a firewall. Cisco announced on February 11, 2011 that end-of-sale date for the Cisco ASA 5580 would be July 31, 2012. The last date for support for active service contracts is July 31, 2017.

This firewall is one of an older generation of firewalls that cannot provide the protection needed against many sophisticated cyber-attacks.

It has become crucial for districts to have an up-to-date firewall that can detect and block sophisticated attacks by enforcing security policies at the application level as well as the port and protocol level.

Recommendation

The district should:

1. Install and use an up-to-date firewall that can enforce security policies at the application level and the port and protocol level.

Security Oversight

The district lacks consistency in the processes and procedures used for important security functions. Different groups in the Technology Services Department oversee various levels of system security but do not communicate regularly with each other on security topics.

The district uses Microsoft's Active Directory as the primary authentication method for users to log on to the network and access resources such as files and the Internet. The domain controllers also provide critical network services such as DHCP and Domain Name Services (DNS).

The application support and systems integrations team oversees the domain controllers, and the network/telecommunication team oversees all other network functionality and security including web filtering, firewalls, intrusion detection, access control and data center security.

It is best practice to place responsibility for monitoring and management of all cyber security systems with one unified team.

Recommendation

The district should:

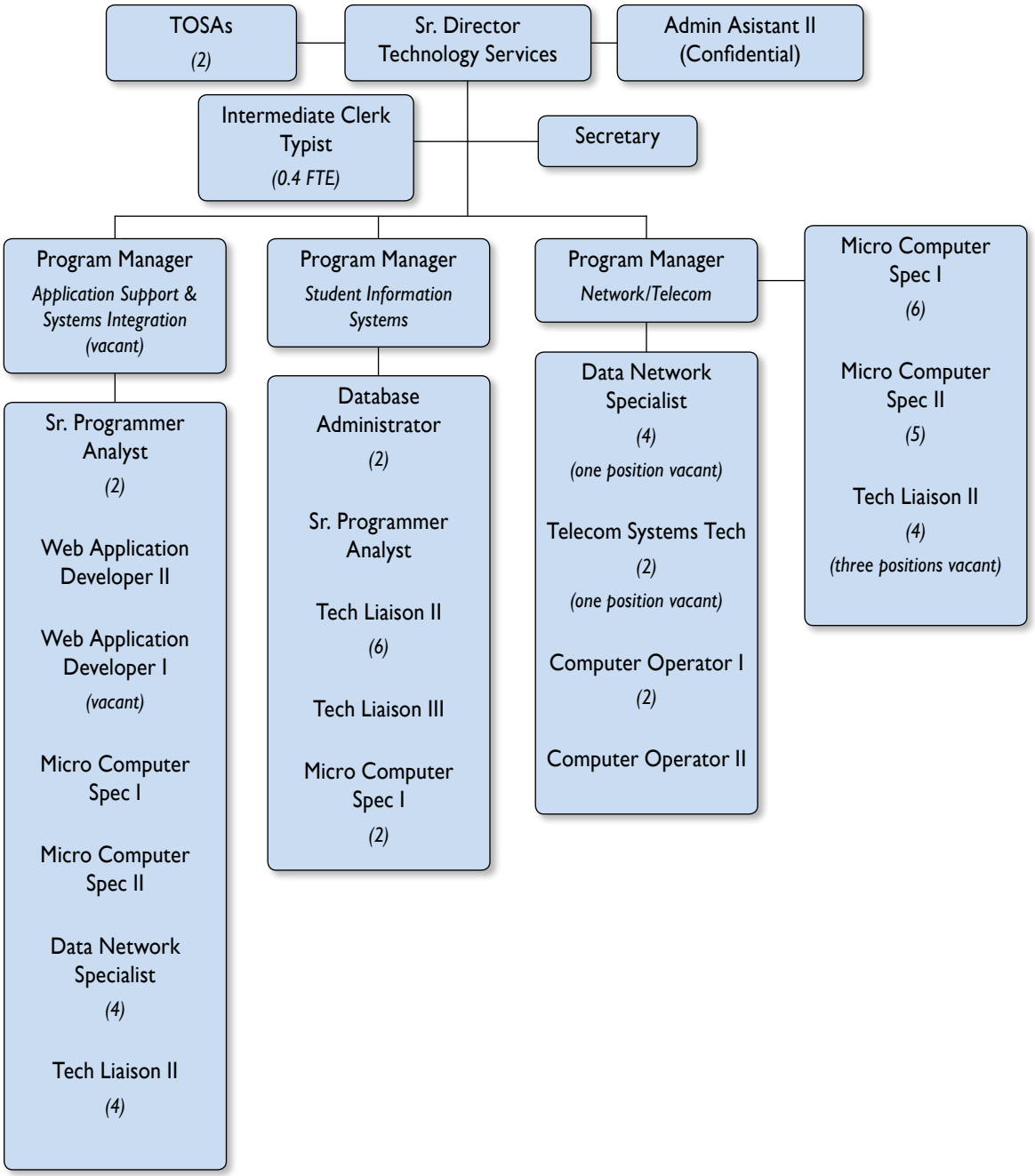
1. Combine all cyber security functions and duties under the network/telecommunication team.

Technology Support Staffing and Organization

Technology support is provided by 57.4 full-time equivalent (FTE) positions in the Technology Services Department. All positions are full time except for the intermediate clerk typist, which is 0.4 FTE. Nine positions were vacant at the time of FCMAT's fieldwork.

Leadership of the department is provided by the senior director of technology services, the program manager application support and systems integration, the program manager student information systems, and the program manager network/telecom.

The senior director of technology services is the department leader and reports to the superintendent. The department is organized as shown in the following organizational chart.



The following information, analyses and recommendations for current and proposed positions are designed to help the district optimize its technology support.

Leadership and Administrative Support

Senior Director, Technology Services

FCMAT was provided with a job description for the director of technology position that was last revised in 2010. The assistant superintendent of human resources stated that a job description for the senior director of technology services has been developed but has not been approved by the district's governing board.

The job description for senior director of technology services states that the position is responsible for the districtwide vision, implementation and administration of the district's technology service functions; increases effectiveness and reduces costs; serves as the systems manager; and provides highly responsible leadership and technical administrative support in technological services. This position is responsible for 56.4 FTE positions, including three program managers. This significant responsibility requires a department director with both technical and senior management skills.

The qualifications listed on the current job description for the director of technology include any combination of training, education and experience equivalent to graduation from a four-year accredited college with a bachelor's degree in computer science, business or public administration or other acceptable field; increasingly responsible supervisory or managerial experience in the development and maintenance of computers and network systems, and computer and technology repair and service; systems programming, user training, budgeting and management of contracts and contractors.

The required knowledge and skills include knowledge of the principles and methods of systems analysis, computer programming and scheduling; principles and methods of information processing, storage retrieval and networking.

Required abilities include the ability to plan, coordinate and direct the work of subordinates; initiate, conceptualize, formulate, analyze and prepare new programs and systems; and assist in the development and installation of effective techniques for improving data processing design.

A 2013 article in *Educational Leadership* titled, "Power Up! / The Changing Role of the Technology Director," discusses the job description for a chief technology officer. The article states that the core competencies required of a technology leader are changing from:

- Configuring networks and local servers to mediating contracts for cloud-based and contracted services.
- Supervising technicians to evaluating outsourced work and setting up effective help-desk processes.
- Writing technology plans to working interdepartmentally with curriculum, staff-development, public relations, assessment, and strategic-planning leaders.
- Providing technology devices to staff and students to providing access to school network resources accessible with personal devices.
- Writing policies that dictate behaviors and ban activities to writing guidelines and curricula that encourage safe and responsible use.
- Knowing about the how to understanding the why of a new technology in education.

- Preserving the status quo to implementing new technology applications and best practices.

Many medium-sized to large school districts in California have a chief technology officer (CTO) as the executive leadership position overseeing technology. To ensure the proper use of technology throughout the organizations, the vast majority of these positions report directly to the superintendent and serve on the superintendent's cabinet.

Recommendations

The district should:

1. Eliminate the senior director of technology services position.
2. Create a new position of chief technology officer (CTO). Ensure that the job description for this position includes high standards for qualifications, particularly in education, training, managerial experience, knowledge and abilities. Sample job descriptions for CTO positions are included in Appendix A.
3. Ensure that the CTO position reports directly to the superintendent and is a member of the superintendent's cabinet.

Administrative Assistant II – Confidential

There is one administrative assistant II position in the Technology Services Department.

The job description for this position states that the six classifications of administrative assistant positions require employees to perform a wide variety of difficult and responsible secretarial and administrative tasks. The classifications are distinguished by the degree of initiative, decision-making, direction received, breadth of responsibility of the administrative unit, and the level of administrator to whom the assistant is assigned.

The positions are considered confidential when these employees, in the course of duties, have access to or possess information related to employer-employee relations or negotiations. This is consistent with Government Code 3540.1. The job description for the administrative assistant II position was last updated in 2009.

During FCMAT's fieldwork, the employee in this position stated that she coordinates the director's work and ensures that requests made of the department are routed appropriately. She stated she does not develop reports or records related to employer-employee relations or negotiations. The employee explained that she is one of the representatives of the confidential group of employees who meet monthly with the senior director of labor relations.

The employee's task list provided to FCMAT includes the following daily activities: coordinating the senior director's meetings and calendars; coordinating and managing events in the conference rooms; managing the auto door lock system; posting documents to Schoology; coordinating and managing the program managers' calendars; providing office support for teachers on special assignment; serving as office manager for the technology services office staff; managing calls and emails from vendors; and authorizing budget and expenditure transfers.

Recommendation

The district should:

1. If the district creates a CTO position, upgrade the administrative assistant II position to administrative assistant III in keeping with the increased level of initiative and independent decision making that will be required.

Secretary

There is one secretary position in the Technology Services Department.

The job description for this position states that the position performs responsible and varied secretarial and clerical work. Examples of duties include the following: take and transcribe dictation; type a variety of materials; compile reports; and maintain controls for budget accounts, logging purchase orders, mileage claims, and other expenditures. The job description was last revised in 1996.

During FCMAT's fieldwork, the employee in this position stated that they maintain control of the department's budget accounts: they receive all invoices, purchase requisitions, budget transfers, and expenditures. The employee's task list indicated the following daily activities: audit all invoices for accuracy and manage software purchases for school sites. They listed the following as monthly activities: producing budget reports; reconciling credit card statements; maintain E-Rate and teleconnect binders; E-Rate and teleconnect expenditure transfers on phone invoices; audit phone invoices; and cell phone expenditure transfers.

The employee's activities align with the job description.

Intermediate Clerk Typist

There is one intermediate clerk typist position in the Technology Services Department. It is a 0.4 FTE position. The job description for this position states that this classification of position performs a wide variety of moderately difficult and complex clerical tasks. It states that this position is to do the following: perform a variety of clerical and typing work involving specific routines; and type documents. The job description was last revised in 1987.

During FCMAT's fieldwork, the employee in this position stated that they clean and set up the department's three conference rooms; purchase items for department meetings; monitor department employee attendance; help with purchase orders; scan documents; input information into spreadsheets; and answer phone calls.

The task list submitted by the employee in this position indicates the following daily tasks: two hours spent managing the department's attendance; and one hour spent cleaning and setting up the conference rooms. The remaining tasks, such as ordering supplies, verifying that invoices have been paid, and managing overtime cards, are done upon request or monthly.

The work of the intermediate clerk typist could easily be divided between the secretary and administrative assistant II positions.

Recommendation

The district should:

1. Eliminate the intermediate clerk typist position.

Educational Technology

Teachers on Special Assignment as Technology Integration Specialists

The district has two teachers (one elementary and one secondary) on special assignment (TOSAs) as technology integration specialists.

The district does not have a job description for the TOSAs working as technology integration specialists; however, these employees provided a task list for their position that included the following: plan, prepare, and implement technology training and workshops for staff; prepare video tutorials and written documentation on the use of and best practices for district technology resources; facilitate the implementation of new technology; be a voice for teachers in communicating with department managers; and give input on decisions regarding programs, policies, and procedures.

These employees stated that they are responsible for training teachers on programs such as Schoology, distance learning, and blended learning. They would like to develop a matrix of how technology fits into the Common Core State Standards. Last school year they spent a considerable amount of time changing student passwords, and this school year they will be responsible for changing the teacher passwords.

Although these employees do not keep specific data on the impact of their work, they believe approximately 20% to 25% of teachers are using Schoology.

Recommendations

The district should:

1. As recommended elsewhere in this report, increase the number of teachers on special assignment from two to four to increase all teachers' knowledge and use of appropriate instructional technology. One of the new TOSAs should be an elementary school teacher and the other a secondary school teacher.
2. Use data and metrics to measure the impact of the TOSAs' work.

Director of Educational Technology (New Position)

The Professional Development section of this report contains a recommendation to create a new position of director of educational technology.

In addition to the duties and responsibilities listed in the recommendation and in the sample job description in Appendix A, it would benefit the district to make this position responsible for supervision of TOSAs in the Technology Services Department and collaboration with the director of professional development.

The experience required for the position will need to be similar to that required for other department directors, and the position should require an administrative credential because this is required for any position that supervises certificated personnel.

Recommendations

The district should:

1. As recommended in the Professional Development section of this report, create a director of educational technology position, or equivalent, that

reports to the chief technology officer and works closely with the district's Division of Teaching and Learning to uphold the district's curricular vision whenever instructional technology is implemented and used.

2. Adopt a job description for this position that includes the responsibility for supervision of TOSAs in the Technology Services Department and collaboration with the director of professional development, and that requires an administrative credential.

Application Support and Systems Integration

Program Manager, Application Support and Systems Integration

This position is currently vacant. The job description for this position describes it as responsible for developing, planning and facilitating the efficient deployment, integration, administration, management, and support of districtwide information systems, software applications, databases, and websites.

The duties and responsibilities include the following: manage district data systems including but not limited to financial/business systems, instructional applications, specialized management systems, and Internet service provider services; consulting with group managers; and developing and maintaining technical and operational procedures to implement and support hardware and software components of the district's application systems.

The qualifications for the position include five years of progressively responsible and successful leadership experience in the management of large-scale information systems. The knowledge required includes public sector business and education practices and standards; systems development and maintenance techniques; software development lifecycle; computer systems management practices; and programming languages.

It would improve efficiencies and accountability if this vacant position was eliminated and the responsibilities for leading and managing all applications support, including support for student information systems, were combined under a new group called application support. This group would be led by a director of application support. More information on this subject is included elsewhere in this report.

Recommendation

The district should:

1. Eliminate the program manager, application support and systems integration position. Ensure that the duties of this position are included in the new proposed director of application support position.

Senior Programmer Analyst

The district has two senior programmer analyst positions in application support and systems integration.

The job description for these positions states that this classification of position is responsible for the following: develop methods of applying computer technology to solve problems; develop and implement complex programs; and act as lead person. The senior programmer analyst's job is to act as a project leader on complex applications, and/or work independently on more complex

programming and analyst activities. The job description was approved by the governing board in 1986.

The senior programmers in application support and systems integration divide their work: one focuses on data mining and custom reporting; the other focuses on keeping the legacy systems functioning properly. Although there is an effort to move away from custom programs, the district still has approximately 400 custom programs in a variety of programming languages. The senior programmer analysts noted that some of the custom reports they work on are required by union contracts.

These two employees' tasks include the following: installation and maintenance of various databases, servers, and scripts; monitoring and maintaining web application servers; designing, coding, and implementing custom reports; supporting the QSS integrated financial system; and creating, removing and altering user log-ons and menus.

The assignments and tasks of these two positions align with the job description.

As part of the reorganization proposed in this report, these two senior programmer analyst positions in application support and systems integration would become part of the new administrative systems group in application support and would report to the administrative systems supervisor position described later in this report. This would help improve collaboration, cross-training, and focused support.

Recommendation

The district should:

1. Reassign the two senior programmer analyst positions in application support and systems integration to the proposed administrative systems group in application support and have them report to the proposed administrative systems supervisor position.

Web Application Developer I

This position is vacant and the volume of work in this area does not justify filling the position.

Recommendation

The district should:

1. Eliminate the vacant web application developer I position.

Web Application Developer II

The district has one web application developer II position in application support and systems integration. The job description states that this classification of position is responsible for the following: assisting users in the configuration and troubleshooting of more complex web-based applications; analyzing business needs and developing solutions; and implementing standards for application development and deployment.

This position requires knowledge of best practices, procedures, resources and applications for web-based development; current and emerging web technologies and standards; database environments; web server environments; user interface design principles and tools; and software development lifecycle methodologies. The job description was last revised in 2013.

The employee in this position focuses primarily on business-related functions. Tasks include front-end and back-end web development, and the employee often solves problems and directs people to products or solutions that will fit their needs, including off-the-shelf products. Daily tasks include user support; web application development; web content management system configuration and troubleshooting; and web database development.

This employee's job responsibilities align with the job description. Because most of this position's work is related to student data, it would improve overall support and benefit the district to have this position in the proposed application support, student systems group.

Recommendation

The district should:

1. Reassign the web application developer II position to the application support, student systems group.

Microcomputer Specialist I and II

The district has one microcomputer specialist I position and one microcomputer specialist II position in application support and systems integration. The job descriptions for microcomputer specialist I and II state that positions in this classification are generally responsible for developing methods of applying microcomputer technology to solve problems. The job description was last revised in 1996.

The microcomputer specialists I position has the following responsibilities: evaluate and install microcomputer software; interact with users to analyze and resolve microcomputer problems; set up new PC workstations and related equipment.

The microcomputer specialist II position is responsible for performing all duties of the microcomputer specialist I position and handling more complex software problems. This position may also perform on-site surveys of work to be performed; estimate work hours; and assign, assist with, inspect, direct, coordinate, and prioritize the work of the microcomputer specialist I.

Representative duties include performing analysis of microcomputer-based application development, modification and hardware/software capabilities; resolving micro application software problems; responding to user requests; evaluating user needs and making recommendations; and setting up, installing, maintaining and repairing microcomputers and local area networks as well as peripheral and related devices.

The employees in these positions listed activities that align with the job descriptions. These include managing the computer replacement program; setting up and installing applications on Apple iPads; repairing computers; installing and supporting computer equipment and software; providing phone and email support; and on-site computer, network and peripheral setup and repair. This is consistent with FCMAT's observations.

As students' use of technology in schools increases, many school districts have begun to reevaluate and modify technology support staff job descriptions. This includes updating and expanding the duties and responsibilities to include current technology and updating the qualifications needed for these positions. Some districts have also changed the titles of positions to better indicate the work being performed. For example, some districts use the title of technology support specialist and have created different levels of that position based on the complexity of duties and the tasks or systems the position serves.

Creating different levels of support positions allows a district to assign tasks based on the complexity of the work performed and provides a way for staff to advance as their skills and education increase. Many districts assign an initial support ticket to a level one technician and allow the technician to escalate the ticket to next level if needed. This type of tiered approach allows support staff to route work to a staff member who has the skill and knowledge needed to complete it successfully.

Examples of duties for each level of technology support specialist include the following:

- Technology Support Specialist I -- Assigned basic support tickets that include hardware and software service requests, and basic setup and configuration of devices, including mobile devices. Maintains documentation and performs preventive maintenance.
- Technology Support Specialist II -- Assigned more complex tickets that may require additional research, redesign and complex configuration. May be assigned as the primary technician for a system. Responds to tickets that have been escalated by a technology support specialist I. Provides mentoring and training to support technology specialist I staff members.
- Technology Support Specialist III -- Specializes in either network administration or system administration and performs tasks similar to or the same as the technology support specialist II position. Serves as the backup technician for either the network or system administrator. Responsible for completing projects, and coordinates installation of equipment with other support staff. Responds to tickets escalated by technology support specialist II staff. Provides mentoring and training to technology support specialist I and II staff members.

Recommendations

The district should:

1. Reclassify the microcomputer specialist I position in application support and systems integration as a technology support specialist I position. Sample job descriptions are included in Appendix A.
2. Reclassify the microcomputer specialist II position in application support and systems integration as a technology support specialist II position. Sample job descriptions are included in Appendix A.
3. Assign both of the technology support specialist positions to the proposed user support group in technical services and have them report to the proposed user support supervisor.

Data Networking Specialist

The district has four data networking specialists in application support and systems integration. The job description, which was last updated in 1996, states that these positions are responsible for networking and mainframe data file applications.

According to the job description, data networking specialists are responsible for developing methods of networking micro and mainframe data file applications; developing and maintaining wide area networks that interface local area networks and microcomputers with mainframe appli-

cations; developing and implementing complex programs to achieve desired results; and acting as a lead person on networking projects.

The employees in these positions discussed the division of work and indicated that each employee serves as the point person for specific projects. The employees focus on their individual projects and tend to work in isolation. There is no backup or cross training on the projects in which they are involved.

The task lists these employees submitted show the division of projects. Their assignments were aligned with the job description; however, the duties performed are more closely related to the jobs of either network administrator or systems administrator depending on the specific responsibilities and duties performed. Because the job description is 20 years old, it is not similar to current job descriptions in this field.

Recommendations

The district should:

1. Reclassify two of the data networking specialist positions in the application support and systems integrations group as network administrator positions. Sample job descriptions are included in Appendix A.
2. Reclassify two of the data networking specialist positions in the application support and systems integrations group as systems administrator positions. Sample job descriptions are included in Appendix A.
3. Assign the two proposed network administrator and two proposed systems administrator positions to the proposed technical services group and have them report to the network, telecom and systems supervisor.

Technology Liaison II

The district has four technology liaison II positions in application support and systems integration; two of these positions are vacant.

The job description for this position states that it is to develop training materials for districtwide information technology applications; coordinate and conduct training programs; and provide support and troubleshooting services for districtwide networked software applications, online programs and network services. The job description was last updated in 2006.

The employees in these positions in application support and systems integrations stated that their responsibility is to provide helpdesk support for everything except the student information system. They focus on supporting and troubleshooting districtwide networked software applications, online programs and network services. The employees indicated that although the job description states they are to help train staff, they no longer have time to provide formal training.

The tasks and assignments of the technology liaison II employees are not aligned with this position's job description; they are more similar to those of a help desk specialist position.

Recommendations

The district should:

1. Reclassify the two technology liaison II positions in application support and systems integration as help desk specialist positions. Sample job descriptions are included in Appendix A.

2. Assign the two proposed help desk specialist positions to the proposed technical services group and have them report to the user support supervisor.

Student Information Systems

Program Manager, Student Information Systems

The job description for program manager, student information systems states that the position plans, organizes, coordinates and supervises the operation, maintenance and function of the district's student information system. The job description was approved by the governing board in 2009.

Representative duties and responsibilities include participating in the formulation and development of student information system support policies, procedures, programs and standards; managing all support, development, and training related to the district's student information system; and preparing and transmitting data files within established time limits for state- and federally-mandated reports.

Qualifications for the position include a minimum of three years of experience in managing processes and staff responsible for databases and application server deployment and maintenance. The position requires knowledge of student information systems in a school district and of reporting requirements for various student-related reports and surveys.

The task list provided by the employee in this position indicates the employee spends about 50% of his day on programming, analysis and second-tier user support. Approximately 25% of the employee's day is spent on direct supervision of employees.

To improve efficiencies, shared knowledge, best practices and overall accountability for software applications, many districts the size of San Juan Unified place all application support employees and duties in a single application support group, typically led by a director of application support. A minimum requirement of four years of experience managing processes, systems and staff would be appropriate for the director position.

It would benefit the district to have two subgroups in application support: one for administrative systems and one for student systems. Having a working supervisor lead each subgroup would help increase each group's focus and accountability in its respective area of responsibility.

Recommendations

The district should:

1. Eliminate the position of program manager, student information systems. This, as well as any other proposed changes to positions in this report, may be subject to collective bargaining.

2. Combine the application support and systems integration group and the student information systems group into a new group called application support.

3. Create a new position of director of application support, or equivalent, to lead the proposed application support group, and have this position report to the proposed chief technology officer. A sample job description is included in Appendix A.

4. Create a new position of administrative systems supervisor and have this position report to the proposed director of application support. A sample job description is included in Appendix A.

5. Create a position of student systems supervisor and have this position report to the proposed director of application support. A sample job description is included in Appendix A.

Senior Programmer Analyst

The district has one senior programmer analyst position in student information systems. The job description states that positions in this classification are responsible for developing methods of applying computer technology to solve problems; developing and implementing complex programs; and acting as lead person. The senior programmer analyst's job is to act as a project leader on complex applications and/or work independently on more complex programming and analyst activities. The job description was approved by the governing board in 1986.

The employee in this position is focused on data analysis and management for special education. It is their responsibility to integrate special education data into the student database system. This takes approximately 50% of the employee's time; the remaining time is spent supporting the legacy QSS student information system (which is both separate and different from the current QSS financial system) and helping the database administrators with their work. These assignments and tasks align with the job description.

It would help improve collaboration, cross training and focused support to move the senior programmer analyst in student information systems to the proposed student systems group in application support, and have this position report to the student systems supervisor.

Recommendation

The district should:

1. Reassign the senior programmer analyst in student information systems to the proposed student systems group in application support, and have the position report to the student systems supervisor.

Database Administrator

The district has two database administrator positions in the student information systems group. The job description for these positions states that they are responsible for installing, analyzing, maintaining, tuning, monitoring, securing, and troubleshooting a variety of highly complex computer and database management systems. The job description was approved by the governing board in 2009.

The position's duties include database installation, maintenance, tuning, backup, and recovery; upgrading procedures related to database systems and servers; developing specifications, design, and implementation of database queries, scripts and views; data mining and warehousing; developing, maintaining and enforcing database procedures, standards and security practices; and assisting users in the development of ad hoc reports.

The two database administrators work with the Q student information system (formerly known as Zangle), CALPADS and the QSS integrated financial system, and often collaborate with the web application developer II. These employees monitor the daily functions of various databases, and manage various large projects to completion. In addition, they create specialized queries and reporting.

The task lists these employees submitted includes the following daily tasks: database system administration and monitoring; ad hoc data requests; data synchronization; and CALPADS state reporting.

The database administrators' job responsibilities typically include using specialized software to store and organize data, and may include capacity planning, installation, configuration, design of databases, migration, performance monitoring, security, troubleshooting, and backup and data recovery.

These employees' job responsibilities align with the job description.

Recommendation

The district should:

1. Reassign the database administrators in student information systems to the proposed student systems group in application support, and have the positions report to the student systems supervisor.

Technology Liaison II

The district has six technology liaison II positions in student information systems. The job description for these positions states that employees are to develop training materials for districtwide information technology applications; coordinate and conduct training programs; and support and troubleshoot districtwide networked software applications, online programs and network services. The job description was last updated in 2006.

The employees in these positions collaborate and back each other up on some but not all projects. Their assignments include support for the Q student information system, Schoology, CALPADS, gradebook, school schedules, attendance, enrollment, and summer school. One technology liaison II provides occasional training on student attendance; the other five do not have user training responsibilities.

These positions' tasks and assignments are not aligned with those in the job description; they are more closely aligned with those of a student information systems specialist position.

Recommendations

The district should:

1. Reclassify the six technology liaison II positions in student information systems as student information systems specialist positions, and revise the job

descriptions to include the new title and accurate descriptions of the duties performed. Sample job descriptions are included in Appendix A.

2. Assign the six proposed student information systems specialist positions to the proposed student systems group in application support, and have the positions report to the student systems supervisor.

Technology Liaison III

The district has one technology liaison III position in student information systems. The district did not provide a job description for this position.

This position manages all aspects of support for the Q student information system including CALPADS and data for the California School Information Services (CSIS). This position also coordinates the student information system helpdesk provided by the technology liaison II staff, and solves problem as needed. The employee in this position also performs vendor-provided software upgrades and sets user permissions but does not do the work of the database administrators.

This employee's tasks include ongoing projects such as the transfer management system; installing Q updates; assigning and editing Q permissions; implementing new Q modules including testing, custom screens (if needed), and creating and maintaining drop-down screens; setting up and maintaining Parent and Student Connect portals; and troubleshooting issues including those related to Schoology and the School Messenger notification system.

This position's duties and tasks are more similar to those of a coordinator or supervisor of services to users of student information systems than they are to those of a liaison.

Recommendations

The district should:

1. Eliminate the technology liaison III position in student information systems.
2. Create a working or hands-on student systems supervisor position and ensure that its duties and responsibilities include supervision of staff and the responsibilities of the technology liaison III position. A sample job description is included in Appendix A.
3. Have the proposed student systems supervisor position report to the director of application support.

Microcomputer Specialist I

The district has two microcomputer specialist I positions in student information systems. The job description for this classification of positions states that they are to develop methods of applying microcomputer technology to solve problems. The job description was last revised in 1996.

Employees in this position are to evaluate and install microcomputer software; communicate with users to analyze and resolve microcomputer problems; and set up new PC workstations and related equipment.

Representative duties of the position include analyzing microcomputer-based application development, modification and hardware/software capabilities; resolving micro application software problems; responding to users' requests regarding problems; evaluating user needs and making

recommendations; and setting up, installing, maintaining and repairing microcomputers and local area networks as well as peripheral and related devices.

The employees in this position primarily serve the food services department by supporting its point-of-sales equipment, computers and software, including the district's eTrition student nutrition system. In most districts these positions would be part of a technical user support group.

Recommendations

The district should:

1. Reclassify the two microcomputer specialist I positions in student information systems as technology support specialist I positions. Sample job descriptions are included in Appendix A.
2. Assign both of these proposed positions to the proposed user support group in technical services and have them report to the proposed user support supervisor.

Network/Telecommunications

Program Manager, Network/Telecommunications

The program manager, network/telecommunications is responsible for network, telecommunications, networking systems, and user support for school sites. The job description indicates the position develops, plans and facilitates the efficient deployment, integration, administration, management, support and maintenance of districtwide network infrastructure, network technology (local and wide area networks, known as LAN/WAN), telecommunications, and related technical services. The job description was approved by the governing board in 2009.

The duties and responsibilities of this position include managing, supervising, coordinating, and configuring districtwide network systems and infrastructure; collaborating with other technology management to present a cohesive integration of technology; and providing technical expertise and information to the senior director of technology services.

The qualifications for the position include a minimum of four years of progressively responsible and successful leadership experience in network design, network engineering, systems engineering, network security, and telecommunication management. The position also requires knowledge of network operating systems, network security principles, telecommunications network design, and state and federal laws and regulations relating to telecommunications, teleprocessing, and networks.

The program manager, network/telecommunication's task list indicates that this employee spends 25% of their time managing and coordinating operation, management, and enhancement of district network, telecommunications, and VMware infrastructures and systems; 25% of their time managing and coordinating operations of their staff; and 25% coordinating work between teams and other sections of the technology services department. This is consistent with FCMAT's observations.

In many districts the size of San Juan Unified, support for technical services, including support for the network infrastructure, telecommunications, and systems, is combined with user support, which includes support for school site computing equipment and helpdesk functions. This combined group is often called technical services and is usually led by a director position. Under

this arrangement, management of network infrastructure, telecommunications, and networking systems is typically led by a network, telecommunications, and systems supervisor; and management of field technical staff and helpdesk staff is typically the responsibility of a user support supervisor.

Recommendations

The district should:

1. Increase the scope of the program manager, network/telecommunications position, and adjust the job description, to include the assignment of all school site and departmental user computer support currently located in other technology services groups. Because these changes increase the responsibilities of this position, both in scope and in number of direct reports, reclassify the position to director of technical services. A sample job description for this proposed position is included in Appendix A.

2. Create a network, telecommunications, and systems supervisor position that reports to the proposed director of technical services position. Include in this position's duties the responsibility for network systems, and define the position as a working supervisor. A sample job description is included in Appendix A.

3. Create a user support supervisor position that reports to the proposed director of technical services position. A sample job description is included in Appendix A.

Data Networking Specialist

The district has four data networking specialist positions in its network/telecommunications group; one of these positions is vacant. The job description, which was last updated in 1996, states that this position is responsible for networking and mainframe data file applications.

According to the job description, data networking specialists are responsible for developing methods of networking micro and mainframe data file applications; developing and maintaining wide area networks that help local area networks and microcomputers interface with mainframe applications; developing and implementing complex programs to achieve desired results; and acting as a lead person on networking projects.

Typical duties and responsibilities of the data networking specialists in network/telecommunications include installing and configuring switches and routers, wireless access points, firewalls, server virtualization, domain name services, storage area networks, and data backup and recovery.

These employees' assignments and duties are aligned with those in the job description; however, the job description is 20 years old and does not resemble current job descriptions of this type; it more closely resembles those of either a network administrator or a systems administrator position depending on the particular responsibilities and duties performed.

Recommendations

The district should:

1. Eliminate the vacant data networking specialist position in the network/ telecommunications group.
2. Reclassify one data networking specialist position as a network administrator position. Sample job descriptions are included in Appendix A.
3. Reclassify two data networking specialist positions as systems administrator positions. Sample job descriptions are included in Appendix A.
4. Assign the proposed network administrator and systems administrator positions to the proposed technical services group and have them report to the network, telecommunications and systems supervisor.

Voice and Data Telecommunications Systems Technician

The district has two voice and data telecommunications systems technician positions in network/ telecommunications; one of these positions is vacant.

The job description states that this position performs specialized work in the development, installation, repair, alteration, maintenance and modification of district voice and data telecommunication systems and equipment, and troubleshoots and resolves operating problems. The job description was last revised in 2003.

This position requires knowledge of the theory, function and design of communications, electronic, and telecommunications systems and equipment; use of standard practices, materials, tools and equipment used in repairing and maintaining electronic and other telecommunications equipment; and wide area networks interrelating with local area networks.

This is the sole position responsible for the telephone systems for all locations, and the position has no internal backup due to current staffing levels. There is limited documentation on the design of the phone and voice systems and their configuration. Work is contracted out to vendors when necessary, though this is rare.

The task list the employee in this position submitted details work such as administering site PBX servers; repairing phones, broken wiring, and other items; and managing long distance services. This is consistent with FCMAT's observations, and the job description accurately describes the work done by the employee in this position.

Most school districts the size of San Juan Unified have detailed documentation regarding their telephone system and have staff cross trained to keep the system functioning in case of staff turnover or extended absences.

Recommendations

The district should:

1. Eliminate the vacant voice and data telecommunications systems technician position.
2. Develop detailed documentation for the telephone systems.

3. Ensure that additional staff in the network/telecommunications group are cross trained sufficiently to maintain and repair the telephone system.

Computer Operator I and II

Two of the district's computer operator I positions and one of its computer operator II positions are in the network/telecommunications group.

The job description states that positions in this classification are typically responsible for operating computer systems, multiple online teleprocessing systems, auxiliary consoles and peripheral equipment on large-scale computer systems, and for troubleshooting and resolving operating problems. The computer operator II position is distinguished from the computer operator I by the responsibility to provide lead and technical direction to computer operator I employees and to resolve more difficult and complex operational problems.

Examples of duties include operating computer systems; troubleshooting and resolving operating problems; organizing input and output queues; and monitoring operation of system, communication and database software. The job descriptions for these positions were approved by the governing board in 1986 and have not been updated.

Employees in the computer operator I position monitor printers and computers and make sure printing jobs run as intended. The computer operator I who works at night also mops and dusts when they have time.

The task lists submitted by the computer operator I employees include the following daily tasks: monitor HP/QSS systems for print jobs, tape mounts; monitor air conditioners and servers for audible and visual alarms; print payroll prelists, checks; clean equipment and computer room; and answer phones as needed.

The computer operator II does the same work as the computer operator I employees; however if there is a problem that the computer operator I employees cannot resolve, he contacts staff who can help resolve the problem.

In the past, the district had a large amount of printing and other work for the computer operator II, but the volume has decreased dramatically. To keep busy, the computer operator II keeps the printers and computers clean and inventories supplies.

The task list the computer operator II submitted includes the following daily tasks: system backup on all three HP3000 systems; set up tapes for nightly full backups of data; clean accounts payable and payroll sealer machines prior to runs; check accounts payable and payroll printer setting prior to each run; shred misprint forms after each run; inventory accounts payable and payroll forms daily; and turn off various devices.

There does not appear to be sufficient work for three computer operators.

Recommendations

The district should:

1. Closely monitor the workloads of the three computer operator positions. If there is not sufficient work for three positions, consider reducing the number of positions.

2. Assign the computer operator positions to the proposed application support group and have them report to the administrative systems supervisor.

Microcomputer Specialist I, Microcomputer Specialist II, and Technology Liaison II

The microcomputer specialist I and II positions and the technology liaison II positions are in the network/telecommunications group and are responsible for computer equipment installations.

Microcomputer Specialist I

The district has six microcomputer specialist I positions in the network/telecommunications group. Two of these positions are assigned to service point-of-sale systems and computer devices for food services; the remaining four positions are dedicated to school site support. The employees in all of these positions spend a majority of their time working at school sites.

The job descriptions for microcomputer specialist I and II state that positions in this classification are to develop methods of applying microcomputer technology to solve problems. The job description was last revised in 1996.

Microcomputer specialist I employees are responsible for evaluating and installing microcomputer software; interacting with users to analyze and resolve microcomputer problems; and setting up new PC workstations and related equipment.

Representative duties include analyzing microcomputer-based application development, modification and hardware/software capabilities; resolving micro application software problems; responding to user requests regarding problems; evaluating user needs and making recommendations; and setting up, installing, maintaining and repairing microcomputers and local area networks as well as peripheral and related devices.

The employees in these positions listed activities that match those in the job description. These include repairing computers; installing and providing support of computer equipment and software; providing phone and email support; and on-site computer, network, and peripheral setup and repair. This is consistent with FCMAT's observations.

Microcomputer Specialist II

The district has five microcomputer specialist II positions in the network/telecommunications group. Three of these positions have specific roles: one is assigned primarily to the regional occupational program, one to all mobile device repairs, and one to Apple images and Apple device management. The two remaining positions are dedicated to school site support.

Microcomputer specialist II positions are responsible for performing all duties of the microcomputer specialist I positions, as well as handling more complex software problems. Microcomputer specialist II employees may also perform on-site surveys of work to be performed; estimate work hours; and assign, assist with, inspect, direct, coordinate and prioritize the work of microcomputer specialist I employees.

Representative duties include analyzing microcomputer-based application development, modification and hardware/software capabilities; resolving micro application software problems; responding to user requests regarding problems; evaluating user needs and making recommendations; and setting up, installing, maintaining and repairing microcomputers and local area networks as well as peripheral and related devices.

The employees in these positions listed activities that match those in the job description, including managing the computer replacement program; setting up and installing applications on Apple iPads; repairing computers; installing and providing support for computer equipment and software; providing phone and email support; and on-site computer, network, and peripheral setup and repair. The activities listed were consistent with FCMAT's observations.

Some microcomputer specialist II staff members work primarily at the technology center; others visit school sites and other departments to provide assistance.

Technology Liaison II

The district has four technology liaison II positions in the network/telecommunications group; three of these positions are vacant.

The job description states that employees in this position are to develop training materials for districtwide information technology applications; coordinate and conduct training programs; and provide support and troubleshooting services for districtwide networked software applications, online programs and network services. The job description was last updated in 2006.

The technology liaison II assigned to network/telecommunications does complex network and computer repairs. This includes installation and maintenance of network equipment and computers, installation of data wiring, and installation and maintenance of networking equipment in telecommunication racks.

The tasks and assignments of the technology liaison II position in network/telecommunications do not align with those in the job description; they are closer to those of a technology support specialist II position, which is described elsewhere in this report.

Analysis of School Site Support

These various technicians serve more than 70 sites in a district with approximately 39,000 students and 4,700 employees, almost all of whom need computer support for a total of more than 27,000 devices. All these technicians work out of and are dispatched from a central location. Help tickets are entered in the HEAT system and assigned to a staff member, who then travels from the Technology Services Department out to the location to fix or install the equipment. These are the same technicians who set up and install all new equipment and system images at the schools, which leaves little time for repairing and troubleshooting existing hardware.

The number of hours these staff spend providing support varies from school to school, as does the method of funding the support, which creates inequities. At one school FCMAT was told that a parent group pays for a part-time person to help support classroom technology. At another school donations are sought from corporations and community groups to help pay for a part-time person to provide this support

As the use of technology in the classroom has increased, so has the need for timely technical support. With few technicians dispatched from a single central location, many schools, and thousands of items of technology equipment to maintain, install and troubleshoot, the district's school site technology support cannot provide adequate service. Wait times for service are lengthy, and school staff repeatedly reported that technology support is not adequate; some schools receive less than one day of on-site support per week, and not enough time is allocated for the number of repairs requested.

The need for additional school site technology support staff is discussed in detail in the following section.

Recommendations

The district should:

1. Reclassify the six microcomputer specialist I positions in network/telecommunications to technology support specialist I positions. Assign these positions

to the proposed user support group in technical services and have them report to the proposed user support supervisor.

2. Reclassify the five microcomputer specialist II positions in network/telecommunications as technology support specialist III positions because of the more complex skills required. Assign these positions to the proposed network, telecom, and systems group in technical services and have them report to the proposed network, telecom, and systems supervisor. Sample job descriptions are included in Appendix A.

3. Eliminate the three vacant technology liaison II positions in network/telecommunications.

4. Reclassify the remaining technology liaison II position as a technology support specialist II position. Sample job descriptions are included in Appendix A. Due to the network-related duties, assign this position to the proposed technical services group and have it report to the network, telecom and systems supervisor.

Additional School Site Support Staffing

The number of staff providing school site technology support is low and is reflected in long wait times for installation and repairs as well as ongoing frustration among school site staff.

The reorganization proposed by FCMAT creates a user support unit in the technical services group to provide dedicated support for school sites. Following the preceding proposed reorganization would result in the existing positions listed in the table below being reclassified as indicated and reassigned to the new user support unit as either technology support specialist I or II positions.

Existing Position	Current Group	Proposed Title	Quantity
Microcomputer specialist I	Application support and systems integration	Technology support specialist I	1
Microcomputer specialist I	Student information systems	Technology support specialist I	2
Microcomputer specialist I	Network/telecom	Technology support specialist I	6
		Subtotal	9
Microcomputer specialist II	Application support and systems integration	Technology support specialist II	1
		Subtotal	**1**

Different amounts and types of technology are used at each grade level, and higher grades usually require more technology and technical support. In many cases technology support equal to 0.5 FTE can meet the needs of an elementary school. This often increases to 0.75 FTE for middle schools and K-8 schools, and rises to 1.0 FTE for high schools. The district's alternative school and continuation school could be served by a 0.5 FTE technology support specialist I.

The following table gives the number of full-time equivalent technology support specialist positions needed by type of school.

School quantity and type	FTE needed per school	Subtotal FTE needed	Type of position
41 elementary schools	.50	20.5	Technology support specialist I
8 middle schools	.75	6.0	Technology support specialist I
1 alternative school 1 continuation school	.25	.5	Technology support specialist I
Total technology support specialist I FTE needed		**27**	
9 High schools	1.0	9.0	Technology support specialist II
Total technology support specialist II FTE needed		**9**	

To provide staffing as outlined above, the district would need a total of 27 technology support specialists I positions and nine technology support specialists II positions in the user support unit.

The proposed restructuring would reassign nine technology support specialists I positions and one technology support specialist II position to the user support unit. After doing this, the district would still need 18 (27-9) new technology support specialist I and eight (9-1) new technology support specialist II positions. It is best practice to add positions in phases, starting with several technology support positions, then analyzing and evaluating the need for additional support at the school sites for a time before further staffing changes.

One way to assign the technology support specialists is to have them report to the district office at the beginning of each work day for a brief meeting with their supervisor to review any critical information about the status of the network and support requests. Districts with effective technology support often view the technology support staff as a pool from which assignments can be made without permanently assigning specific staff to a particular school. This can help ensure continuity of service when a staff member is absent or leaves the district because other staff will already be familiar with the school that staff member was serving and can take over these responsibilities quickly.

Recommendations

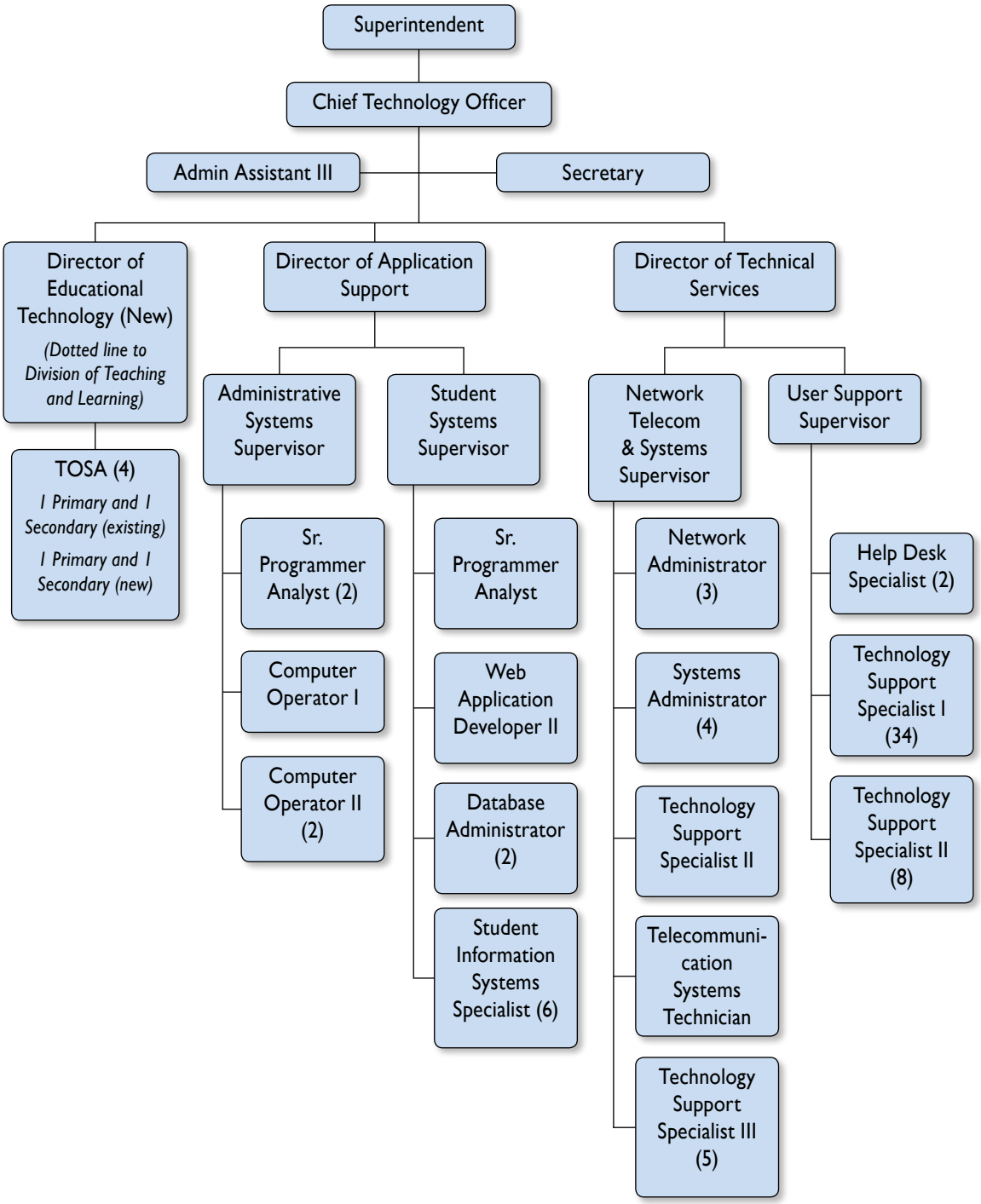
The district should:

1. Evaluate the need to add up to 18 new technology support specialist I positions and eight technology support specialist II positions.
2. Assign the proposed technology support specialist I and II positions to the proposed user support group in technical services and have them report to the proposed user support supervisor.
3. Organize and use technology support specialist I and II employees as a pool from which employees can be assigned as needed.

Reorganization Summary

The district's Technology Services Department's current organizational structure is extremely inefficient and has caused significant breakdowns in communication, support, project management and accountability. To improve services to all users, FCMAT recommends a reorganization of the department. The proposed reorganized structure is presented in the following organizational chart.

Proposed District Technology Services Department Organizational Chart



The proposed revised structure focuses on creating a restructured department that will allow the district to provide unified technology leadership, support and accountability to internal departments and school sites.

The table below lists the district's current technology support positions, summarizes the changes to each as recommended in this report, and shows any estimated annual cost savings. This does not include the costs of statutory and health and welfare benefits.

Current Positions and Proposed Changes

Current	Current group	Proposed	Proposed New Group	Estimated Annual Cost Savings
Senior director of technology services	Leadership and administrative support	Position eliminated	N/A	$150,963
Administrative assistant II	Leadership and administrative support	Administrative assistant III	N/A	
Secretary	Leadership and administrative support	N/A	N/A	
Intermediate clerk typist	Leadership and administrative support	Position eliminated	N/A	$12,612
Teachers on special assignment (2)	N/A	Teachers on special Assignment (2)	Educational technology	
Program manager, application support and systems integration	Application support and systems integration	Position eliminated	N/A	$112,209
Senior programmer analyst (2)	Application support and systems integration	N/A	Application support, administrative systems	
Web application developer I	Application support and systems integration	Position eliminated	N/A	$66,156
Web application developer II	Application support and systems integration	N/A	Application support, student systems	
Microcomputer specialist I	Application support and Systems integration	TSS I	Technical services, user support	
Microcomputer specialist II	Application support and systems integration	TSS II	Technical services, user support	
Data networking specialist (2)	Application support and systems integration	Systems administrator (2)	Technical services, network, telecom & systems	
Data networking specialist (2)	Application support and systems integration	Network administrator (2)	Technical services, network, telecom & systems	
Technology liaison II (2)	Application support and systems integration	Help desk specialist (2)	Technical services, user support	

Current	Current group	Proposed	Proposed New Group	Estimated Annual Cost Savings
Program Manager, Student Information Systems	Student information systems	Position eliminated	N/A	$112,209
Senior Programmer Analyst	Student information systems	N/A	Application support, student systems	
Database administrators (2)	Student information systems	N/A	Application support, student systems	
Technology liaison II (6)	Student information systems	Student information systems specialist (6)	Application support, student systems	
Technology liaison III	Student information systems	Position eliminated	N/A	$49,884
Microcomputer specialist I (2)	Student information systems	TSS I	Technical services, user support	
Program Manager, Network/Telecom	Network/telecom	Position eliminated	N/A	$112,209
Data networking specialist (1)	Network/telecom	Network administrator (1)	Technical services, network, telecom & systems	
Data networking specialist (2)	Network/telecom	Systems administrator (2)	Technical services, network, telecom & systems	
Data networking specialist (1)	Network/telecom	Position eliminated	N/A	$66,156
Voice and data telecommunications systems technician (1)	Network/telecom	N/A	Technical services, network, telecom & systems	
Voice and data telecommunications systems technician (1)	Network/telecom	Position eliminated	N/A	$58,764
Computer operator I and II	Network/telecom	N/A	Application support, administrative systems	
Microcomputer specialist I (6)	Network/telecom	TSS I	Technical services, user support	
Microcomputer specialist II (5)	Network/telecom	TSS III	Technical Services, network, telecom & systems	
Technology liaison II (1)	Network/telecom	TSS II	Technical services, network, telecom and systems	
Technology liaison II (3)	Network/telecom	Position eliminated	N/A	$130,428 ($43,476 each)

The following table lists the recommended new positions and the estimated salaries for each. This does not include the costs of statutory and health and welfare benefits. The suggested placements on the district's salary schedule are solely for evaluating the organizational restructuring; total costs may be considerably higher once the district's Human Resources Department determines

the appropriate salary placement and includes health and welfare and statutory benefits in the total compensation.

Proposed New Positions and Salaries

Title	Estimated Annual Salaries
Chief technology officer	$150,963 (cabinet salary schedule)
Director of educational technology	$118,141 (management salary schedule, salary range 25)
Teachers on special assignment (2)	$111,142 ($55,571 each) (credentialed teachers' salary schedule, step 6)
Director of application support	$118,141 (management salary schedule, salary range 25)
Director of technical services	$118,141 (management salary schedule, salary range 25)
Administrative systems supervisor	$85,703 (management salary schedule, salary range 12)
Student systems supervisor	$85,703 (management salary schedule, salary range 12)
Network, telecom & systems supervisor	$85,703 (management salary schedule, salary range 12)
User support supervisor	$85,703 (management salary schedule, salary range 15)
Technology support specialist I (18)	$1,035,072 ($57,504 each) (general unit salary range 44)
Technology support specialist II (8)	$492,960 ($61,620 each) (general unit salary range 47)

The transition to the new organizational structure shown above can be accomplished by a combination of attrition, reclassification, redefining roles and job descriptions, and other means.

As indicated earlier, changes in positions, titles and salaries may be subject to collective bargaining. The proposed reorganization also includes new positions, the representative duties and responsibilities of which are described earlier in this report. Appendix A contains sample job descriptions for all recommended new or revised positions.

Recommendations

The district should:

1. Work with its employee bargaining units as necessary when making changes to positions and adopting and revising job descriptions.
2. Consider making the proposed changes to management positions first. This would allow the management staff to be involved in restructuring and staffing their areas of responsibility.

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Appendices

Appendix A

Sample Job Descriptions

Appendix B

Study Agreement