Youth Technology Support Programs:

Meeting the Challenge of Technology Support in Schools

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Introduction

School district technology programs revolve around a host of important activities and people, including technology planning and budgeting, technology staff responsible for providing technology-related employee training and professional development, and enterprise-wide technology support strategies and systems. With the increasing reliance on technology for both educational and administrative purposes, the quality of enterprise-wide technology support strategies directly and immediately impact how students and teachers use information age tools in their schools.

Indeed, empirical studies on school technology programs suggest that the provision of high-quality support (defined as forward looking, responsive technology support that addresses both instructional and technical needs) can lead to a whole host of benefits for students, teachers, schools, parents, and community members. These benefits include cost savings, an increase in the frequency and variety of use of school technology resources, and a decrease in economic and racial/ethnic disparities in the use of school technologies (Mulcahy, 1995; Ronnkvist, Dexter, and Anderson, 2000; U.S. Department of Education, 2000; Vermont Institute for Science, Math, & Technology, 2000).

For many districts, providing high-quality technology support is a challenge: Only one-half (49 percent) of schools report having access to a full-time computer maintenance/technical support person at either the school or district level (Editorial Projects in Education, 2003). In addition, according to a 2001 U.S. Department of Education survey, one in five (21 percent) teachers nationwide reported that their support needs for installing and maintaining equipment, software, and networks were not at all well met, and fully half (50 percent) of all teachers reported that their support need for help with the integration of computer activities and curriculum were not at all well met (Adelman, Donnelly, Dove, Tiffany-Morales, Wayne, and Zucker, 2002). The failure to provide necessary technical support can undermine the investment in technology, reduce the effective use of existing school technology resources, and seriously weaken the prospects for leveraging future school IT investments. (See, for example, Adelman *et al.,* 2001; AIR, 2002; Fishman, Soloway, Krajcik, Marx, and Blumfeld, 2001; NetDay, 2001; Ronnkvist *et al.,* 2000.)

Recognizing the Value of Youth Technology Support in Mississippi: C·R·E·A·T·E for Mississippi

The value of the C·R·E·A·T·E for Mississippi model has been recognized at the state level in Mississippi. Under the State Technology Plan 2003-2008, an Instructional Technology Specialist should be in place in each public school by the 2005-2006 school year. By 2008, 70 percent of the middle and high schools are to have Student Tech Teams (STT) "to assist in offering instructional and technical support to teachers and students" (p. 17). Through the years, principals of participating schools have recognized the positive impact that STT can have in their schools and among the students themselves.

In response to the challenges of providing high-quality technology support, enterprising districts are employing a complete system of connected solutions, including the use of online support, deploying community volunteers, outsourcing some of the more technical services and—in increasing numbers of districts—solutions that rely on enlisting the aid of students (Bailey, 2003; Griffin Good, 2001; Kongshem, 2001; Shorr, 2003). Some technology directors will admit that such an approach makes them nervous. Yet, it shouldn't, if for no other reason than the fact that many students are far more familiar with technology and conversant with its uses than many adults in schools. Also, students tend to have more time to troubleshoot and learn new technology skills (Harris Interactive & Teenage Research Unlimited, 2003; Leach, 2004; Levin and Arafeh, 2002; Prensky, 2001).

It is important to understand the initial reticence some have about student involvement in technology support programs in schools. For instance, some are concerned that the security of school computer systems might be compromised or that unscrupulous students would violate the privacy of their classmates and school employees. Others are concerned that students themselves might miss out on gaining important academic skills by participating in these programs during the school day. While well intentioned and understandable, these concerns are being addressed and solutions have been developed by a growing number of youth technology support program providers. Those reviewed for this paper include Apple OS Help Desk, C·R·E·A·T·E for Mississippi, Generation TECH, MOUSE Squad, and Student TECH CORPS. In these programs, the benefits are substantial and long lasting:

- Students have meaningful technology support roles and learn relevant academic and real-world skills.
- Existing technology support teams have more time to focus on systemic technology support and implementation tasks.
- Schools see increased use and integration of school technology, along with cost savings on maintenance, troubleshooting, and on-the-spot support for teachers.
- Schools see a more positive school environment that comes with greater student involvement.
- Teachers have reliable technology that supports the teaching and learning environment.

"MOUSE Squad is teaching all of us not only how to repair iBook computers, but also how to be responsible and work as a team. Joining MOUSE Squad was an opportunity I'm glad I did not miss."

—Student Information Manager, IS 30 MOUSE Squad, District 20, Brooklyn, NY

For these reasons, technology leaders in a substantial number of districts and schools across the country see the possibilities for a win-win partnership with having their students help them provide high-quality technology support. More than half (54 percent) of districts reported that students are providing at least some technology support in one or more of their schools, including troubleshooting problems, setting up equipment and wiring, maintaining IT equipment, and—to a lesser extent—assisting teachers, installing and maintaining software, and managing school networks (National School Boards Foundation, 2002).

For those interested in learning more about the growing trend of involving youth in technology support programs, this paper serves as an introduction. In the sections that follow, you will find descriptions of the various roles that students play in the technology support system, key features of leading youth technology support programs, and a discussion of the benefits of such programs for students, teachers, and their schools. In addition, five youth technology support program profiles and an extensive list of resources and references are included for those who want to further explore the many ways to engage and empower students in technology support.

Roles for Youth in the Technology Support Structure of School Systems

TECH CORPS Volunteers

While parents frequently volunteer to share their time and expertise in their children's schools, adults without children in the schools are often an untapped resource within any community. Representing nearly two-thirds of the households in this country, many of these individuals are eager to find ways to help the schools. For 9 years TECH CORPS has engaged over 10,000 IT volunteers across the country to be tech buddies for teachers, IT mentors for students, and technical support helpers for school technology coordinators.

Student involvement in providing technology support in schools is most effective as part of an integrated district-wide technology support strategy—not as a separate, standalone initiative. A typical district technology director has a wide array of responsibilities that include:

- Technology planning, budgeting, and implementation of the total technology program across multiple school buildings and/or campuses
- Keeping abreast of emerging technologies and education technology trends
- Frequently serving on the Superintendent's administrative team

District technology directors often rely on site-based individuals or teams to provide responsive technology support at the school level, including troubleshooting assistance, installation of new technologies, and frontline support for students, teachers, administrators, and others at the school. These teams might include a school technology coordinator, the library/media specialist, technology, business, or subject area teachers, parents, tech savvy volunteers from the community, vendors and consultants, and—increasingly—students.

Student involvement on these school technology support teams can take a variety of forms, as befits the needs and preferences of the technology director, site support team, and principal—from supporting the needs of individual classrooms to providing assistance with school-wide or even district-wide efforts. In many cases, involving students in providing technology support allows other IT support staff and technology leaders in schools to focus on systemic issues, such as providing instructional and curriculum integration support, negotiating district-wide technology purchases, developing technology policies and procedures, seeking and managing grants, and keeping up with the constant changes.

Expanding the Capacity of IT Support Staff: MOUSE Squad Technicians

Students serving as MOUSE Squad Technicians are typically well integrated into a school or district's existing technology support strategy, providing the first stage (level 1) of a system of trouble ticket escalation. MOUSE Squad Technicians receive technical support ticket requests and conduct service calls. If they are unable to resolve the ticket, it is referred to the next level of support, which is usually the school's technician or technology coordinator. In some instances MOUSE Squad Technicians refer tickets via phone to a centralized help desk. By providing level 1 technology support services, MOUSE Squads significantly expand the capacity of the school's and district's professional technology support staff so they can focus on higher-level issues.

With training and supervision, activities that students can perform vary from student to student, but most programs can allow students to perform the following tasks:

- Inspect and clean equipment
- Staff help desks and provide frontline support and troubleshooting
- Update or upgrade hardware and software, and install new operating system versions
- Add or delete users from systems, or modify user rights and properties
- Back up files on school networks
- Monitor the condition and functionality of networks and equipment
- Test web site accesses and links
- Install and remove equipment and applications
- Create or update IT frequently-asked-questions databases or newsletters
- Provide initial training and familiarization tours for equipment and software

Indeed, schools and youth technology support programs take a variety of approaches to finding the appropriate balance of student involvement. To meet the need for additional technology support, for example, C·R·E·A·T·E for Mississippi's Student Tech Teams (STT) work within the middle school environment to provide the first or "frontline" level of support. This relieves onsite technology leaders and district technology coordinators of many hours of work while at the same time providing teachers continued access to working technology in their classrooms. This support is offered to teachers and other students throughout the school day in team members' regular classes, before school, after school, during lunch, and during the STT's regular training time. Tech Team students meet a minimum of twice a week with onsite technology leaders who provide training that includes units on character education, professional workforce skills, technical skills, and instructional skills. Within the school setting, STT members assist teachers, administrators, and other students by providing technology support that includes: routine maintenance and cleaning of computers; delivery and setup of equipment in classrooms; routine updating of software; installation of new software; ghosting computers; troubleshooting problems with equipment; and providing in-class, just-in-time support during instruction.

"Without the students, we couldn't possibly afford the level of technical support our teachers have come to rely on."

—Jeff Waddington, Technology Coordinator, Olympia, WA
Generation TECH

Features of Youth Technology Support Programs

Supporting School Staff to Support Students: Apple OS Help Desk

IT staff participation and supervision are essential to the success of the Apple OS Help Desk program. In this program, students work with instructors in a classroom environment to gain the necessary skills to work with IT Support staff in the operation of a help desk. Apple provides program instructors with training divided between Apple technical training and implementation of the curriculum and Help Desk project. This instruction is followed up with "Ask The Expert" sessions and ongoing online support. Additionally, teachers are encouraged to share their experiences with other teachers through a variety of methods including email, conferencing, and synchronous communication via Apple iSight instant messaging.

Any given approach to involving youth in providing technology support in schools may accommodate or be designed to involve different types of students (for example, at-risk students, girls, or other populations typically underrepresented in math, science, and technology careers; technology-savvy students; middle vs. high school students, etc.) and will emphasize the importance of the acquisition of slightly different skills (such as communication and interpersonal skills, organizational skills, technology skills, etc.). However, comprehensive programs will also include curricula and instructional materials, professional development, and tools and resources to manage technology support requests.

Curricula and instructional materials included in youth technology support programs are often aligned to a variety of state and national standards, including national IT skill standards, technology literacy skill standards, and content area standards. The curriculum web site of the Apple OS Help Desk program, for instance, includes, in addition to the course units, help desk project support links, a ticket manager system, and assessment resources. Each curriculum unit is mapped to standards (21st Century Skills/MCREL, Career/NWCET, and NETS/ISTE).

Professional development programs for school staff and administrators overseeing student involvement in technology support initiatives are critical to ensuring that students are well-trained, supervised, and are able to obtain the myriad real-world skills necessary to perform technology support work in schools. For example, at program startup, Generation TECH offers a workshop for school staff, including all those who will be key to the success of the program: the teacher or advisor for the Generation TECH class or club, the school or district technology coordinator, the principal and other administration staff, students, all existing technology support personnel, other interested teachers, and counselors who want to understand the nature of the new class. The workshop also serves to facilitate discussion among school personnel about the new roles and expectations surrounding student technical support. It consists of presenting a program overview, information about the use of the online tools, and information designed to address the individual issues that are unique to the school. Supplied print and

online materials reinforce these concepts and provide instruction after the workshop is over. In addition, Generation TECH offers a toll free telephone support line, unlimited email support, and monitored message boards.

"When teachers realized that our class would immediately fix their computers, they became a lot more adventurous with technology. While we had more to fix, the teachers were more comfortable."

—Generation TECH Student, Washington Middle School, Olympia, WA

Youth technology support programs also include tools and resources to help school-based student teams to manage technology support requests, including local and/or web-based software, hardware, and other print-based materials. For instance, in addition to hardbound curriculum materials and professional development services, MOUSE provides participating schools and districts with extensive materials, tools, and services. Each participating school receives an Access 2000 Help Desk database used to track ticket and maintenance work, weekly data collection, and annual data reports. They also receive ancillary materials including a poster set, student I.D.s and lanyards, and access to online resources, including printable versions of all curriculum materials, MOUSE Squad FAQ & Forum, and the MOUSE Squad Weekly Wire email newsletter. Students have opportunities to go on field trips, participate in industry "shadowships," take part in a monthly and annual awards program, and compete in an annual project-based applied data contest. Moreover, districts are provided with ongoing technical assistance, biannual data reports, and an annual site visit and program evaluation.

"We aren't treated as kids—we are treated as adults—and people look up to us for being part of Student TECH CORPS. We have a say in almost everything and we take care of things. When we have a problem that we are unable to solve, we are taught new things that we use in the future."

—Christine, age 14

One added feature of youth technology support programs that can be particularly beneficial for participating students is the enrichment added by IT mentors from the community. Programs such as Student TECH CORPS come with a team of community volunteers dedicated to helping both the lead teacher and the students with ongoing professional development. Meeting with student teams as frequently as twice a month, these mentors provide instruction and assistance with unresolved problems as well as advice on how resolved problems may have been fixed more easily. Most importantly, these adult IT mentors serve as role models for students, offering workplace experiences and expectations that can better prepare students for success.

Benefits of Youth Technology Support Programs

Meeting Individual Learning Goals While Balancing Workflow: Generation TECH Learning Contracts Keep Students Focused

When a student joins Generation TECH, a learning contract is created between that student and their advisor. A learning contract may involve, for instance, programming a web site, creating a set of help guides, using a particular piece of software, or creating a reusable resource on how to install a software application from the school network. This project is for the student to work on whenever there is a lull in solving technology support issues. Recognizing the importance of a balance between providing just-in-time technology support and pursuing more personal technology interests, the Generation TECH advisors work with their students to balance the technology support work and learning contract projects so that students reach both their personal learning goals while helping meet the technology support load in their school.

When well implemented, the potential benefits of youth involvement in school technology support programs are numerous and can accrue to participating students and their schools, if not also to the wider community in which the school is located. Variation in approaches notwithstanding, students participating in such programs can benefit by:

- **Acquiring 21st century skills** through increased fluency in applying information technology in authentic, meaningful ways, and developing the necessary interpersonal and teamwork skills to interact with teachers and other school staff
- **Improving academic achievement,** as evidenced by improved grades and academic test scores in related subjects, such as English/language arts, science, and mathematics
- **Increasing confidence and engagement in schooling** through meaningful involvement in school operations as evidenced by improved attendance, better relationships with peers and teachers, and improved citizenship
- **Gaining workforce skills,** including skills for IT or IT-intensive science, technology, math, and engineering careers, as well as interpersonal, communication, leadership, and organizational skills
- **Obtaining industry-recognized IT certifications,** including opportunities to obtain both vendor-neutral and vendor-specific certifications
- **Engaging in a service learning** initiative by sharing their time and skills within their school community
- **Earning course credits toward graduation,** including community service credit, as determined by participating schools and districts

To take one example, students participating in the C·R·E·A·T·E for Mississippi program are expected to maintain standards set by the schools for academics, conduct, and professional behavior. These expectations have encouraged many participating students to improve their academic standing and maintain good conduct records. In addition, participating students are developing leadership and technology skills that reach far beyond the

"We have had no computer downtime since the Student Tech Team began at our school."

—Linda Clifton, Tupelo Middle School, Tupelo, Mississippi

classroom. Service projects in the South Delta, Hollandale, and Tupelo school districts expanded the impact of the program beyond their schools and into their communities through parent workshops and technology support for community organizations. Their work with senior citizens won the Tupelo Middle School team a Youth Entrepreneurship Education Springboard Award from the Appalachian Regional Commission. A sixth grade student in West Point won second place in the Mississippi Educational Computing Association's multimedia presentation design contest, and a ninth grade student in South Delta has established a business called "Stephen's Creations" designing business cards, presentations, flyers, and other products using a computer that he helped rebuild. Students using their new technology skills to springboard into today's workforce is just one of the positive outcomes of participation. Program leaders report that when talking with the students and observing them at work in their respective schools, it is obvious that participation is valued by the students. Additionally, they report that conversations with parents, teachers, and administrators affirm that the presence of the support teams in the schools is equally valued by the students, the teachers, and the community members receiving support.

One of the most exciting features of youth technology support programs is that students of all academic levels and of different ages are participating in them. Because such an array of students is reaping the benefits of participation, changes to the school environment should be expected. The potential benefits of operating such programs and initiatives for schools and districts include:

- **Changing the school culture,** through empowering students to lead by example and encouraging increased technology use by previously reluctant staff members
- **Engaging a broader group of students** in playing an active role within their school community
- **Improving the responsiveness of the overall school technology support system** by adding competent student assistance
- **Improving the effectiveness of technology coordinators,** who can spend more of their time to pursue the "higher order" goals of long-range technology planning, providing intensive staff development, curriculum consulting, and follow-up support to teachers and other school staff
- **Providing cost savings** relative to the costs to provide such support through other mechanisms internal or external to the school

For instance, as a component of its 2002-2003 program year evaluation, MOUSE worked with industry partners to establish metrics to attach a financial value to the work that participating students performed in their schools. By analyzing weekly help desk data, MOUSE was able to determine that an optimally operating MOUSE Squad provides an estimated $14,400 of technology support services to its school community. In 2004, New York City MOUSE Squad students will provide technology support services valued at an estimated $770,000.

The investment schools make in their students through technology support programs is reciprocated by the students as they put their newfound skills and knowledge back to work in their schools. Schools are helping students gain greater self confidence and valuable skills as they successfully complete tasks and see how their work benefits the school community, while at the same time schools are receiving the assistance they need to make effective use of their technology investments.

Profiles of Select Youth Technology Support Programs

Programs profiled in this paper include Apple OS Help Desk, C·R·E·A·T·E for Mississippi, Generation TECH, MOUSE Squad, and Student TECH CORPS. Following are brief overviews of each of these programs, including links to each organization's web site.

Apple OS Help Desk. In the spring of 2003, Apple launched a program targeted to schools interested in developing a student-based tech support component, either as an extracurricular project or as a one-semester course for credit. Specifically developed to support schools and districts implementing a "1 to 1 Learning" environment (each student using a laptop to support their education program), this program is useful for all schools that want to ensure that students engaged in tech support benefit fully from the experience. Students gain real-world experience working as help desk technicians and assisting the IT support staff in resolving level one issues. Students are provided lessons developed from the materials used to train AppleCare support technicians. Students learn to respond to end-user issues by asking key questions, researching problems in the Apple Knowledge Base, processing the solution with the user, and documenting the process using Apple methods. Students learn to manage and use a support database, write problem reports, and post FAQs to an intranet web site, as they learn professional skills from the recognized industry leader in customer support (*Consumer Reports,* 2002, 2003). In addition to foundational customer support skills mapped to industry standards, students may gain certification in Apple Mac OS X troubleshooting. Professional development for the teacher or adult supervisor is provided for each participating school. In some cases, high schools and middle schools are working together to create a tech-ed path for students. More information about Apple OS Help Desk can be obtained at http://www.apple.com/education/oshelpdesk.

C·R·E·A·T·E for Mississippi, a consortium of school districts, organizations, and Mississippi State University's Center for Educational and Training Technology (CETT), is a collaborative effort designed to prepare students in Mississippi for successful careers in the 21st century. Consortium members developed a working School Mentor Model (SMM) for technology integration that contains the elements identified through research as critical for

stimulating teachers' technology use in their classrooms with the ultimate goal of enhancing student performance. The SMM addresses the barriers that hinder technology integration, including teachers' lack of access to technology, lack of adequate professional development training and time to hone their technology skills, and lack of just-in-time technology support. Student Tech Teams implemented at all participating schools provide a major source for this technology support as well as instructional support in many cases. These middle school students (grades 5-8) serve under the direction of Educational Technologists who provide building-level technical and instructional support for teachers and administrators. Operating under the direction of CETT with the Tupelo Public School District serving as the lead educational association, C·R·E·A·T·E for Mississippi, now in its fourth year of operation, has had an impact within the state of Mississippi and beyond through its work in 23 Core Schools and by presenting its model for technology integration at numerous state and national conferences and on its web site at http://create4ms.org.

Generation TECH is an outgrowth of the exemplary Generation Y Technology Challenge Grant model of students working with teachers to integrate technology into classroom curriculum. The goal of Generation TECH is to create a rich, academically-oriented experience for students involved in tech support in their school, and at the same time provide the school with a sustainable program that supports technology integration and the learning community. Generation TECH has been implemented in middle and high schools, and provides these schools with a flexible set of training, tools, and curriculum resources that can support a class, club, or T.A. setting.

Generation TECH provides:

- Professional development and support for the teacher/advisor and other tech team members at the school or district
- Staged curriculum focused on creating a multi-semester learning continuum where advanced students mentor beginning students and create reusable resources for the school
- Online student project management tools
- Online teacher class management and assessment tools
- Free unlimited use of a full-featured, customizable browser-based help desk and trouble ticket tracking system designed specifically for schools
- Access to a database of all Generation TECH student-created help resources and learning modules

The dual focus of Generation TECH insures that the academic and personal learning goals of the student are balanced with the support needs of the school. The curriculum offers a one semester beginner course covering basic computer and network operations; intermediate units covering troubleshooting, help desk, and customer service; and advanced units covering advanced tech skills, help and learning resource creation, and mentoring beginning students.

To support long-term sustainability of the Generation TECH student tech support program, students are offered opportunities for growth, personal development, and learning correlated to their personal interests. Going beyond simple tech support to being a leader and teacher means that students will stay in the program for many semesters, providing the basis for a positive tech support culture that is nurtured by veteran mentor students as they move up the ranks in responsibility and prowess.

More information about the Generation TECH training, curriculum, and pedagogy can be found at http://www.genyes.org.

MOUSE Squad™, now in its fourth year of operation, provides elementary, middle, and high school students with opportunities to build 21st century skills, and to apply this learning to solve technical problems faced by their schools. The program, modeled on help desks that have become standard in business and industry, prepares and supports participants in the creation and operation of a student-run, school-based, data driven, technical support help desk. The core elements of the program include: student and teacher computer repair, database and help desk operations training, a comprehensive standards-based curriculum, online tools and information communication technology (ICT) career pathway development programs for participants, and an awards program. The MOUSE Squad help desk operates during the school day and/or after school and provides teachers, administrators, and students with a trained support staff to troubleshoot and solve technical problems. By the conclusion of the 2003-2004 school year, MOUSE Squads will operate in 55 New York City public schools serving 4,500 teachers and 65,000 students, as well as over 20 schools in Michigan, Connecticut, and Washington D.C. MOUSE Squad is operated by the New York City based nonprofit MOUSE (Making Opportunities for Upgrading Schools & Education). More information about MOUSE Squad can be obtained at http://www.mouse.org.

Student TECH CORPS, a program from TECH CORPS®, delivers core technology training and certification to middle and high school students, and then harnesses this newly acquired student knowledge to power Student-Run Help Desks designed to provide valuable technology support in their school buildings. Student TECH CORPS provides:

- Basic technology training: 30 hours of online training in hardware repair, operating systems, software applications, networking, computer peripherals, and customer relations—designed specifically for the middle and high school student
- Testing and Certification: online and performance-based testing of each student's knowledge, requiring 80% mastery to achieve basic-level certification
- Student-Run Help Desk: all procedures, training, and call tracking software required to successfully implement a Student-Run Help Desk to support the school's technology infrastructure

"Our school system has had a student "tech team" for several years; however, Student TECH CORPS provided us with recruitment tools, grading rubrics, and baseline training for beginners. In addition, the Service Call Tracker software has helped focus our efforts and made us more efficient when doing repairs. We were easily able to adapt the Student-Run Help Desk model to mesh with the systems we already had in place. I believe our students feel a new sense of professionalism and our staff has reacted favorably to this new sense of customer service."

—Lisa Berry, Technology Coordinator

Like all TECH CORPS programs, Student TECH CORPS comes with a team of community-based IT volunteers who share their time and expertise with students and school personnel. During the 2003-2004 school year, Student TECH CORPS was deployed in 55 middle schools across the country. And, by combining technology skills with service learning experiences, more than 50% of the students enrolled in Student TECH CORPS programs are girls!

For more information about Student TECH CORPS, visit http://www.techcorps.org/student.

Conclusion

"I think this experience will broaden their horizons and give them the self confidence they need to accept the challenge of working with new technology."

—Kevin Cheatham, West Lauderdale Middle School, Collinsville, Mississippi

There is little doubt that youth involvement in providing technology support in schools could become commonplace. Indeed, there is much about this approach that suggests that the benefits to participating students and schools could be real and substantial. As one component of a well-run, locally managed technology support program, these programs can offer meaningful opportunities for students to be involved in the operations of schools and to benefit from meaningful and challenging work. While addressing many common implementation barriers, existing programs—such as Apple OS Help Desk, C·R·E·A·T·E for Mississippi, Generation TECH, MOUSE Squad, and Student TECH CORPS—are helping schools and districts to rise to the challenge of providing high-quality technology support. In so doing, they directly and immediately impact students' and teachers' ability to make effective use of existing school technology.

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