San Diego County Technology Needs Assessment

University of San Diego
SCHOOL OF LEADERSHIP AND EDUCATION SCIENCES
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MOBILE TECHNOLOGY LEARNING CENTER

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This study was conducted by the Mobile Technology Learning Center (MTLC), a research entity operating under the auspices of the School of Leadership and Education Sciences at the University of San Diego. MTLC is designed to establish the university research environment of the future, while concurrently fueling innovation in PK-12 education. MTLC collaborates with PK-12 districts to research the use of mobile learning devices for teaching and learning to test research findings and provide future teachers with unique teaching and research opportunities. Additional information about MTLC is available at www.sandiego.edu/mtlc.

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Executive Summary

In partnership with the San Diego County Office of Education, researchers from the Mobile Technology Learning Center (MTLC) at the University of San Diego conducted a study of the K-12 school districts in San Diego County from November, 2013 to February, 2014.

The purpose of the study was to develop a greater understanding of the way school districts were using technology, as well as gather information about their technology needs, challenges, and future plans.

Data were collected from an online survey completed by a school district representative. Interviews were also conducted with school district representatives and superintendents. Representatives from 38 of the 42 diverse school districts in San Diego County participated in at least one part of the study, providing data related to 95% of the 766 schools in the county.

The findings from the study illustrate how there was considerable variation in the way technology was being used across the 38 participating school districts, with:

- 21% focusing primarily on a one-to-one iPad model
- 21% targeting increased technology use in specific schools, grades, or classrooms
- 18% allowing teacher preference to drive technology use
- 18% relying primarily on desktop computers (with some making greater efforts to integrate mobile technology)
- 16% relying primarily on mobile devices (yet not allowing the students to take these devices home)
- 5% focusing primarily on Bring Your Own Device programs (BYOD).

Most of the districts reported that students had some access to computing devices throughout the school day, but that the access was not continuous. Students in grades 4 – 8 were more likely to have full-time access to a device at school, while high school students were the least likely to have full-time access to a device at school.

Most of the school districts reported that they were moving toward wireless internet access, with almost half of the school districts responding to the survey reporting having integrated wireless internet access in 100% of the classrooms. Yet, more than half of the districts described how replacing aging infrastructure (e.g., wiring, networks, servers, switches, or cables) and aging devices (e.g., desktops, laptops, or tablets) was a challenge, and almost one-third of the school districts indicated that they had future plans to upgrade the bandwidth and/or improve the wireless access.

The districts described how a variety of technology resources and tools were being used in the classrooms, with document cameras, digital cameras, utility clouds, interactive smart boards, and learning management systems being among the most popular and widely used resources and tools. The evaluation of the use of these technology resources and tools was typically evaluated using classroom walkthroughs or self-assessments.

The districts described how they were adapting to new online testing requirements in various ways, with the majority of the districts indicating that they had a variety of plans to ensure that their students would have access to a computer for online testing. Some districts also described how testing requirements were shaping the decisions about which devices to purchase. Districts also reported that online testing requirements were affecting plans for personnel training and Individual Education Plans (IEPs), and creating the need for specialized technology to accommodate students with special needs.

Overall, most districts described a distributed leadership approach to professional development, with the responsibility for developing the capacity to integrate technology into the classroom being shared broadly and cultivated in a variety of ways. The districts, however, did vary in the extent to which they highlighted specific professional development activities.

For example, 42% highlighted how they provided professional development through paid staff support (e.g., through Teachers on Special Assignment or other paid positions or stipends). Twenty-nine percent described how the primary approach to professional development was to target the teachers who were the most interested in using technology, while 26% described how there were a variety of district sponsored professional development opportunities available for teachers (e.g., professional development days, training, webinars, web conferencing, training videos, and other online resources).

Not surprisingly, the amount of full-time technical support staff tended to correspond with the size of the district, with the larger districts reporting greater numbers of full-time district technical staff to assist with maintaining networks, technology, and information services, and the smaller districts reporting that they had very few, if any, full-time district technical staff.

Half of the districts (19/38) described how they work closely with the San Diego County Office of Education, with 13 districts describing how the county plays an instrumental role in the professional development of teachers by providing in-person and online workshops, presentations, and trainings relating to various applications, and others described how the county provided valuable technical support relating to internet connectivity, assistance with infrastructure upgrades, and network support.

If they were to have access to additional resources, almost half (47%) of the districts expressed an interest in using additional resources for professional development. This was followed by purchasing more devices (26%), investing in other infrastructure needs (21%) and bandwidth (16%), and technical support (18%).

Purpose of the Study

The connection between the use of technology, teaching and learning is complex,[1] with research suggesting that many factors contribute to the efficacy of the use of technology in schools and in the classroom, including: technology planning, local access to equipment and software, teacher attitudes and beliefs, support from administration and leadership, and local support for technology integration.[2]

In order to develop a greater understanding about the use of technology in school districts in San Diego County, researchers from MTLC conducted a study of the K-12 school districts in the county. The purpose of the study was to learn more about how the school districts were using technology, as well as gather information about their technology needs, challenges, and future plans.

Context for the Study

San Diego County is the second most populous county in California with approximately 3.2 million residents.[3] In the 2012-13 school year, 766 public schools served students in grades K-12 in San Diego County[4]. The majority of schools were operated under the administration of 42 school districts within the county. In addition to district-run schools, public charter organizations operated 103 schools, and the San Diego County Office of Education served students through its Juvenile Court and Community Schools program.

Depending on the school district of attendance, public school students in San Diego County experience different learning environments. The school districts vary by size, grade configuration, geographic adjacency to urban centers, and the demographics of the student population in terms of English language proficiency, socio-economic status, and race/ethnicity.

Of the 42 school districts in the county, 24 are elementary school districts serving students in grades K-6 or K-8; six are high school districts serving students in grades 7-12 or 9-12; and, 12 are unified school districts serving students in grades K-12. These configurations are for the

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[1] Shapley, K., Sheehan, D., Maloney, C., & Faranikas-Walker, F. (2010). Effects of technology on teachers' growth in technology competency, ideology, and practices. *Journal of Educational Computing Research, 42*(1), 1-33.
[2] Shuldman, M. (2004). Superintendent conceptions of institutional conditions that impact teacher technology integration. *Journal of Research on Technology in Education, 36*(4), 319-343; Swan, K., Holmes, A., Vargas, J. D., Jennings, S., Meier, E. & Rubenfeld, L. (2002). Situated professional development and technology integration: The CATIE mentoring program. *Journal of Technology and Teacher Education, 10* (2), 169-190.
[3] US Census (2014). *San Diego County 2013 Estimate.* Accessed at http://quickfacts.census.gov/qfd/ states/06/06073.html.
[4] CDE Dataquest lists the number of public schools in San Diego County for 2012-13 as 766. However, 12 of these schools did not generate student enrollment during that time period.

district-run schools. While charter schools mainly serve students in the same grade levels as their authorizing district, this is not always the case.

Districts can also be differentiated by their locations relative to populous areas.[5] Based on the National Center for Educational Statistics (NCES) geo-coding designations, half the school districts in San Diego County (21) are located in a large suburban area; twelve are located in a mid- or large-sized city; eight are located in a rural area, either in a fringe, distant or remote location; and one is located on the fringe of a town.[6]

In 2012-2013, the total public school student population in San Diego County was 499,850. Each school district varied in the number of students it served ranging from a low of 177 students to a high of 130,270 students.[7] The average number of students served by school districts in the county was 11,478.

Nearly half the public school students in the county (49.8%) were from socio-economically disadvantaged families. This percentage is based on participation in the federal Free and Reduced Lunch program, a common proxy used to determine low-income status. The percentage of students from low-income families varied by district and ranged from a low of 0% to a high of 86.6%. The percentage of students from low-income families statewide was 58.0%. Of the 42 districts in the county, all but two had at least one school eligible to receive federal Title 1 funding dollars to provide additional educational services to disadvantaged students.

Overall, 22.1% of public school students in the county were designated as English Language Learners (ELL). The percentage of ELL students varied across the districts, ranging from a low of 2.2% to a high of 64.9%. The percentage of ELL students statewide was 21.6%.

The student populations in both San Diego County and the state as a whole were racially and ethnically diverse. Across individual school districts within the county, however, the racial and ethnic diversity varied considerably. For example, in one district the percentage of Hispanic or Latino students was 89.9% of the total population. In another district, the percentage of similarly identified students was 7.8%.

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[5] NCES (2014). Primary/Secondary School Locale Code Files: 2005-2006. Accessed at http://nces.ed.gov/ccd/CCDLocaleCode.asp

[6] NCES has twelve urban-centric locale designations: City, Large; City, Midsize; City, Small; Suburb, Large; Suburb, Midsize; Suburb, Small; Town, Fringe; Town, Distant; Town, Remote; Rural, Fringe; Rural, Distant; Rural, Remote.

[7] This includes charter school students in schools authorized by the school districts.

Table 1: Race/Ethnicity of Student Populations in San Diego County and California*

Race/Ethnicity	San Diego County	California
African American or Black	5.5%	6.3%
Asian	5.9%	8.6%
Filipino	4.1%	2.5%
Hispanic or Latino	47.0%	52.7%
White	32.1%	25.5%
Two or More Races	3.5%	2.4%
Other[8]	1.8%	1.8%

* Includes students in both district-operated and charter schools.

Charter schools in the county served 10.8% of the public school students or 53,930 students. It should be noted that not all districts authorized charter schools and the percentage of students in a district attending charter schools varied from a low of 0% to a high of 98.9%.

Data Collection

A mixed-methods approach was used to collect data for this study. The technology district administrators from each of the 42 school districts were invited to complete an online survey comprised of 40 questions about the technology being used in each school district. Respondents were asked to provide detailed information about: hardware and software; personnel and technology integration; training and professional development; the Common Core and online state testing; and evaluation efforts. In addition, telephone interviews were conducted with the technology district administrators and superintendents to supplement the survey data. The interviews typically lasted between 30 and 45 minutes. They were recorded and transcribed verbatim and analyzed using a conventional content analysis, allowing for common themes to emerge from the data. Demographic information about the school districts was also compiled in order to provide greater context for the data analysis.

[8] "Other" includes students identified as American Indian or Alaska Native, Pacific Islander, or None Reported (Ethnicity).

Thirty-eight of the 42 school districts in San Diego County participated in at least one part of the study, with:

- 34 school district representatives completing the online survey;
- 32 superintendents participating in a telephone interview; and
- 29 technology district administrators participating in a telephone interview.

Overall, the participants in the study represented 95.3% (730) of the 766 schools in the county (See the Appendix for more detailed information about the study's design and the data collection process).

Technology Use

The superintendents and district administrators were asked to describe how technology was being used throughout the school districts.[9] In reviewing the interview and survey data, six themes or patterns emerged with respect to how technology was being used and deployed across the school districts across the county.

Table 2: Technology Use

	Percent*
District uses a One-to-One iPad model	21%
District targets increasing technology use in specific schools, grades, or classrooms	21%
District allows teacher preference to drive technology use	18%
District uses desktop computers	18%
District uses laptops, tablets, or handhelds	16%
District primary focus is on BYOD	5%

(n=38)
* Totals may not equal 100% because of rounding

Twenty-one percent (8/38) of the school districts described how they were moving toward one-to-one deployment of iPads (or devices with the IOS system, such as the Mac Book Pro). Four of these districts reported that all students (or almost all) in all grades have an assigned device. The other four districts reported targeting specific grades to be one-to-one with an iPad, ranging from grades 2 – 3 to grades 7– 9. Reasons for choosing the iPad (or devices with the IOS system) also ranged, with one district indicating they were "predominantly a Mac

[9] While some school districts authorize charter schools, content analysis of the data suggest that the respondents' responses were for district-operated facilities.

district prior to any iPads," to suggestions that the iPad "fit the bill better" and "lent itself better to students being creative and inventing."

Another 21% (8/38) of the school districts emphasized broader district wide efforts to target technology use and integration in specific places. In these districts, the target might be a specific school or set of schools, a specific grade or set of grade ranges (e.g., grades 4 – 8), or a specific classroom based on the subject being taught (e.g., English).

Eighteen percent (7/38) of the school districts emphasized how the use of technology in the school district was being driven from the "bottom-up" by the teachers or principals at certain schools. In several of these school districts, teachers had the opportunity to apply for grant funds or to apply to be part of a pilot program. For example, as one superintendent explained:

> For the past two years, we have funded several hundred thousand dollars' worth of innovation grants here, and officially what we did is we put out grants to teachers and we said, "If you want to bring technology into your classroom we want you to fill out this application. Here's a rubric from which you will be scored. Here are the expectations for you once you get those devices."

Because teachers could request "a myriad of devices," there was considerable variability in the types of devices being used in the classrooms across the district (e.g., iPads, Lenovo Think Pads, Smart Boards, Promethean boards). Other district administrators described how specific teachers were "early adopters" who take the lead in using technology. As one district administrator explained, "I see it as driven by the teacher. Some teachers push the envelope. They want to be out front in the technology."

Eighteen percent (7/38) of the school districts reported that the majority of the district-owned devices were desktop computers, ranging from 69% to 95% of all district-owned devices. Several of these districts described using a lab-based model, which was particularly useful for testing, while others described having just a small number of mobile carts being deployed. Most of these districts, however, described plans for increasing the use of mobile technology in the future.

As one superintendent described, "There are pockets of some mobile technology piloting going on, and there'll be more of that next year." Others expressed an interest in eventually moving toward a one-to-one model, yet noted challenges such as needing to improve infrastructure (e.g., replacing routers and firewalls, upgrading the wireless), and lack of funding to purchase

"There are pockets of some mobile technology piloting going on, and there'll be more of that next year."

mobile devices. As one superintendent described:

> We started several iPad pilots in our district, and we were very excited about that work. But without the funding source to move that along we're not going to get there….Most of our money is being used for the infrastructure, as well as professional development for teachers. We don't have nearly enough money to even think about a one-on-one implementation for all kids. It's just not possible….We're big believers, [we] just don't have the money to do that.

Sixteen percent (6/38) of the school districts indicated that they had moved away from desktops and PCs, reporting that 93% to 100% of the district owned-devices were laptops, tablets, or some other type of handheld or mobile device. Yet, the availability of these devices and the deployment of the devices varied. For example, one superintendent described how individual schools were purchasing the mobile devices as needed – either in response to demand from the teachers or as funding became available. Another described how some schools in the district were completely one-to-one because they had access to greater funding, while other schools were just starting to pilot programs integrating mobile technology into the classroom.

While technically the devices these school districts have are mobile, most of these districts described how the devices were being deployed in computer labs, assigned to specific classrooms, or were on mobile carts. With the exception of a few pilot programs, students were not able to take these mobile devices home.

Finally, while half of the school districts responding to the survey reporting having BYOD programs (17/34), most of these were small, pilot BYOD programs. Five percent (2/38) of the school districts, however, indicated that BYOD was the primary focus. As one of these districts stated on the survey, the district was "heavily encouraging BYOD," and had district-provided Chromebooks for those who could not bring in a device. The other district described having a 15-year-old BYOD program at the middle school level, and that they were moving toward implementing BYOD at the high school and elementary school levels beginning in the following school year.

During the follow up interviews, one superintendent in a BYOD district offered this explanation:

> What we really haven't done with the General Obligation Bond money is buy computers. We're not certain we need to do that in our community, and the reason is we're fairly affluent, and about 95% of our kids bring their own devices to school every day.

Similarly, the superintendent of the other district, which was also fairly affluent, explained this vision for BYOD:

> We're certainly preparing at least for a three-to-one, and we have the wiring and the infrastructure to improve upon that if need be. But that's what helps us to say that we are a BYOD district, and we encourage kids to bring in their own device. We call ourselves device agnostic, and OS agnostics. So we don't care what operating system you use, we don't care what device you use, come on in and we're able to take care of your internet needs.

Access to Technology During the School Day

On the survey, the school districts were asked to describe how much access students had to computing devices during the school day. Most of the districts reported that students had some access to computing devices throughout the school day, but that the access was not continuous.

Based on responses to the survey, students in grades 4 – 8 were most likely to have full-time access to a device at school (or at home and school), while high school students were least likely to have full-time access to a device at school (or at home and school).

Table 3: Access to Technology during the School Day*

Grades	Few students have access throughout the day	Many students have access but not continuous access	Each student has access but not continuous access	Each student has full-time use at school only	Each student has full-time use at home & school
Pre K – 3 (n=29)	7%	45%	55%	17%	3%
4 – 6 (n=29)	3%	45%	48%	21%	14%
7 – 8 (n=27)	4%	44%	48%	11%	15%
9 – 12 (n=22)	14%	55%	55%	9%	0%

*School districts may have chosen more than one response.

Internet Access

Overall, most of the school districts reported that they were moving toward wireless internet access, with almost half (16/34) of the school districts responding to the survey reporting having integrated wireless internet access in 100% of their classrooms. Only 15% (5/34) of the school districts responding to the survey "agreed" or "strongly agreed" that the availability of broadband in the district was lacking. Not surprisingly, these were small, rural or suburban districts in the northern or western part of the county.

Eighty-five percent (29/34) of the school districts responding to the survey indicated that the schools connected to the internet using fiber optic cables for most, if not all, of the internet connections (ranging from 80% to 100%). Three percent (1/34) reported that most of the schools (80%) were connected through a T3-DS-3 cable. Twelve percent (4/34) of the school districts did not report this information.

Almost all (32/34) of the school districts responding to the survey reported using just one internet service provider. Thirty-eight percent (13/34) used AT&T, 35% (12/34) used the San Diego County Office of Education, and 21% (7/34) used Cox. Six percent (2/34) of the school districts used two of these providers.

Aging and Replacement of Devices

Data from the survey and the interviews indicated that the aging of the devices is a concern for many of the school districts. According to the survey data, the majority of the desktops and laptops in the schools were at least three years old, while the majority of the mobile devices were newer (less than two years old).

Table 4 : Aging of Devices

Age	Majority of desktops	Majority of laptops	Majority of mobile devices
Less than 1 year	3%	6%	6%
1 to <2 years	9%	14%	53%
2 to <3 years	24%	24%	38%
3 to <4 years	26%	24%	3%
4 years or more	38%	32%	0%

(n=34)

In the interviews, some of the district representatives reported that the average age of the desktop computers in their districts was much older, with some computers being seven or eight years old. They went on to explain that that not only do these older computers require more service and support, which is costly, but these older computers are not able to support the latest software that teachers could be using with students.

One of the districts reported having computers that were 10 or 12 years old, saying:

> We're certainly feeling the effects of that because they're not robust enough to be able to run some of the things that we would like them to be able to run. They freeze or they're not particularly stable or they reboot.

Replacing aging devices was also a recurring theme in the interviews. District representatives repeatedly described the importance or the need to have a plan to replace devices. One district representative noted that the industry standard is to replace devices every three to four years, while others emphasized that the "when it breaks" replacement model is "too time consuming" and "more costly in the long run."

On the survey, the school districts were asked if they were considering purchasing any new devices in the future. The most popular devices being considered by the districts were Chromebooks (68%, 23/34), iPads (68%, 23/34), touch screen desktops or laptops (53%, 18/34), and Windows 8 tablets (29%, 10/34).

Availability of Other Technology

Eighty-two percent (28/34) of the survey respondents "agreed" or "strongly agreed" with the statement "Teachers have access to peripherals such as color printers, scanners, digital cameras, and projection systems."

When asked about the availability of specific resources, 91% (31/34) reported on the survey that all or most schools had document cameras. Fifty-nine percent (20/34) reported that all or most schools had digital cameras and utility cloud/computing. Forty-seven percent reported that all or most schools had webcams and interactive white boards or projectors.

Table 5: Availability of Other Technology (at All or Most Schools)*

	Percent
Document cameras	91%
Digital cameras	59%
Utility cloud/computing	59%
Interactive white boards or projectors	47%
Webcams	47%
Handheld graphing calculators	38%
Digital video cameras	38%
Sound enhancement systems	35%
MP3 players	35%
Large screen monitors or flat panels	35%
Student response systems (Clickers)	29%
Science probes	18%
Digital microscopes	18%
Student response systems (Quizlet)	18%
Digital pens	15%
Wireless interactive slates (Interwrite Pad, Activslate, AirLiner, etc.)	12%
Smart tables	9%

(n=34)
*School districts may have chosen more than one response.

During the interviews, many of the district representatives described the advantages of having these technology resources. For example, they described how utility clouds made it possible for students to access files, regardless of the time of day, where they are, or which type of device they might be using. The benefits for teachers were also noted:

> What's great about that cloud environment is that the teachers can access their documents from anywhere. So, if they're working here, if they're working from home – as long as they have an internet connection they have access to all of their documents.

One district representative described how the utility cloud model helps minimize the potential for disruption:

> We've built a model where we can have replacement devices on hand and be able to swap out devices with literally zero impact on the teaching process. So, as opposed to students who have all of their documents on one machine or one iPad, or one [device], everything is in the cloud, so we can swap out…. So if anybody has a problem, they basically swap out for a new machine and the student doesn't know the difference.

Others commented about smartboards. For example, one superintendent described how the interactive nature of smartboards is particularly helpful in classes that do not have one-to-one implementation:

> The technology for the classes that are not one-to-one, they have the advantage of the smartboard technology, and that's very interactive. And you can use computers on the board, collaborating and really maximizing the use of the smartboard. And we're doing a lot of training on how to use the smartboard in a collaborative, creative way with students, so it's not just a whiteboard.

Another superintendent described watching a teacher use a smartboard to teach addition and multiplication of fractions by shading and manipulating the numbers. He commented, "It was like I see math…if only I had that when I was a kid, I may have understood math better."

Learning Management Systems

On the survey, almost all (32/34) of the school districts reported that learning management systems were available to teachers and students. While most school districts had just one type of learning management system, 29% (10/34) reported using two, three, or four types. The most popular learning management systems were Edmodo, Haiku, Moodle, and My Big Campus.

Table 6: Learning Management Systems*

	Percent
Edmodo	41%
Haiku	32%
Moodle	24%
My Big Campus	24%
Blackboard	6%
Canvas	9%
Illuminate	3%
Schoology	3%
None	6%

(n=34)
*School districts may have chosen more than one response.

In the interviews, district representatives described the advantages of learning management systems. As one superintendent explained:

> We're using Edmodo as a platform to help share resources, to create that social networking among teachers from different schools or within grade levels. Also every student has an account….They've been able to access apps through Edmodo to help with some key Common Core standards.

Another district representative described how small groups of teachers in that district are using Moodle extensively in their classes, taking advantage of the ability to create multiple assessments out of an item bank that allows students to take a test multiple times, explaining:

> The kid can take the test, Moodle will tell them what's wrong, coach them up on their responses, and they can take it again. And they can keep taking it until they're satisfied with their grade. The technology enables that model.

Centrally-Deployed Software and Other Learning Tools

On the survey, 88% (30/34) of school districts reported that software was centrally-deployed by the districts. The most frequently centrally-deployed software reported by the district representatives were word processing, presentation, spreadsheet or database programs.

Table 7: Centrally-Deployed Software*

	Percent
Word Processing (e.g., Word, Word Perfect)	79%
Presentation Software (e.g., PowerPoint, Prezi)	79%
Spreadsheet/Database (e.g., Excel, Access)	76%
Photo Editing Software (e.g., Photoshop, Paint)	53%
Educational Software (e.g., Let's go learn, iReady, IXL)	47%
Video editing Software (e.g., Movie Maker, iMovie)	47%
Desktop Publishing (e.g., Publisher, Pagemaker, Print Shop Deluxe)	38%
HTML/Web Page Development (e.g., Dreamweaver, FrontPage)	24%
Electronic Database Research (e.g., Galileo)	18%
Google Apps, Drive, or Domain	12%
Authoring/Hypermedia development (e.g., Hyperstudio, Director)	9%
Jupiter Grades	3%
OpenOffice	3%
No Software is Centrally-Deployed	12%

(n=34)
*School districts may have chosen more than one response.

During the interviews, district representatives identified other tools and software the school districts were using to facilitate learning in the classrooms.

For example, districts reported that students were using Dream Box Learning, Spatial-Temporal (ST) Math, and Ten Marks Premium to learn math; Imagine Learning for language and literacy; Prezi or Keynote for presentations; Notability for note-taking; and EasyBib for references. District representatives and superintendents also described how students were creating videos with Vimeo, and using GoAnimate and Pixton to create visual projects and demonstrate learning.

Online Testing

On the survey, the districts were asked to describe how students would have access to computers for online state testing.

Thirty-eight percent (13/34) reported that the vast majority of students (80% to 100%) would have access to a computer in a computer lab. Twelve percent (4/34) reported that the vast majority (80% to 100%) would have access to a computer in the student's primary classroom where each student has a computer. Nine percent (3/34) reported that the vast majority (80% to 100%) would have access to a computer in the student's primary classroom using a rotational model. Forty-one percent (14/34) reported that the vast majority of students (80% to 100%) would access a computer in a variety of these ways.

Table 8: Access to a Computer for Online Testing

	Percent
In a computer lab	38%
In the student's primary classroom where each student has a computer	12%
In the student's primary classroom with a rotational model	9%
In a variety of these ways	41%

(n=34)

In the interviews, district representatives described how online testing requirements were affecting the timeframe of moving toward the use of more devices. One said, "I think it's pushing us to move forward faster." Another remarked "We're seeing that as an opportunity and choosing to try to get more of our kids onto mobile devices," and a third explained "That is our first goal, at least in the next year and a half, to make sure that we have the devices and the infrastructure ready for students to take those tests."

Others described how online testing requirements are having an impact on the type of devices the students will be using. For example, as one superintendent explained:

> One of the things we're working with is trying to figure out what the best type of device is for doing the testing and the online learning that we want to implement.

Another district representative said:

> Now that things are becoming clearer about the Smarter Balanced testing all the time, we're not convinced that the iPad is going to be a good testing device. I think it may be a really awesome instructional device, but it has some limitations for the testing, particularly at higher grades where there's more typing involved and the test circuit gets more complex.

Other districts were already trying to accommodate the hardware requirements for the state online tests. For example, one superintendent described how the district had to buy new Netbooks to make sure they had an 11.5 inch screen. Another brought up the issue of needing a keyboard:

> It's definitely creating some more challenges, because at the same time here, because we went and bought a ton of [iPads]…. Well, now of course, you need to have an external keyboard.

He went onto describe how the keyboards cannot be wireless because they could "un-sync" in the middle of testing, so the school district was now testing out a keyboard that would be wired and connect directly to the iPads through a port.

District representatives also described how online testing requirements were affecting personnel training, IEP planning, and specialized technology needs.

At the time of the survey, 41% (14/34) reported that their test administrators were Smarter Balanced trained. While estimates regarding how much time would be needed to train staff and students for an online testing system varied across districts, from a just a few hours to more than a day, the majority of the school districts estimated that they would need four hours or less to train school technology coordinators, test administrators (teaching and non-teaching personnel), and students on an annual basis.

Table 9: Estimated Training for Online Testing

	0 – 4 hours	5 – 8 hours	9+ hrs	I don't know
School technology coordinators	65%	21%	15%	0%
Test administrators who are teachers	68%	9%	21%	3%
Test administrators who are non-teaching personnel	56%	21%	21%	3%
Students (integrated approach)	76%	12%	9%	3%
Students (direct isolated approach)	82%	9%	6%	3%

(n=34)

Eighty-eight percent (30/34) reported that district IEP teams were aware of the changes in technology requirements relation to online testing for students with special needs. Eighty-five percent (29/34) reported that technology needs were being addressed in IEPs. Sixty-two

percent (21/34) reported that the district had a plan for supporting the impact that these changes would have on online testing for students with special needs.

Seventy-nine percent (27/34) of the school districts reported that all students with special needs had access to the specialized technology they would need to participate in online state testing for the Common Core. When asked about the kinds of technology needed for students with special needs, screen magnifiers and touch screens were those most frequently reported.

Technical Support

During the interviews and on the survey, the districts were asked to provide information about how they provided technical support to their teachers and students.

The complexity of providing technical support was conveyed by one of the superintendents in this way:

> We have roving School Computer Technicians that are physically on campus about once a week. A couple of the schools have paid to have their own full-time person, but for the most part, they get a person that comes once a week. In addition to that we have District Office technicians that do a lot, and we're doing this more and more, gearing up more to remote kinds of support. We have a Help Desk that people can call in or email and then the person can log in virtually to take a look and see whatever issue that someone is having. We have on site repair for our machines. If a machine does need to be repaired, they bring them in here and our technicians work on them and send them back to the school sites. We have network staff that manage[s] the network.

Overall, the number of full-time technical support staff tended to correspond with the size of the district, with larger districts reporting greater numbers of full-time district technical staff to assist with maintaining networks, technology, and information services, and smaller districts reporting that they had very few, if any, full-time district technical staff.

Table 10: Full-Time Equivalent District Technical Staff (FTEs) by District Enrollment

District Enrollment	0 FTEs	1-2 FTEs	3-5 FTEs	6-8 FTEs	9-11 FTEs	12 or more FTEs
Less than 1,000 (n=6)	50%	33%	17%	0%	0%	0%
1,000 to 4,999 (n=8)	13%	37%	37%	0%	13%	0%
5,000 to 10,000 (n=7)	0%	0%	57%	29%	14%	0%
10,000 to 19,000 (n=6)	0%	0%	17%	17%	33%	33%
20,000 or more (n=7)	0%	0%	0%	0%	0%	100%

For example, the superintendent of small district explained how that the district could not afford a full-time technical staff member, saying "At this point, we're a very lean district office and we don't have a tech director or even somebody who is full-time just able to do the troubleshooting." Another superintendent of a small district said, "It's just our once a week tech support person, and the technology department at the [San Diego] County Office of Education. That's really it at this point."

"At this point, we're a very lean district office and we don't have a tech director or even somebody who is full-time just able to do the troubleshooting."

Staffing was also reported to be an issue in some of the larger districts. For example, according to one superintendent of a large district, "Our IT departments and support services are spread about as thin as you can get."

Even those districts that had recently added technical staff described facing staffing challenges:

> We've been fortunate to add to our department, even in times when money's been very, very tight. But, we could easily use more people to help us. As the importance of what people do changes and becomes greater with technology, the importance of having support staff is also something that would help us out a lot. We don't have a Help Desk, for example, someone to man a phone during business hours and always be there to answer technical questions. That would be nice, but we don't have that.

Small and large districts alike explained that the lack of a help desk or service desk was an issue. For example, as one district representative explained "We can't have a Help Desk. We're just two people." Another said:

> I don't have that service desk to take calls, to organize things, and so those eight technicians that I have are pretty much really overworked…. they have to field the phone calls, they have to field emails and do the service, do the warranty repairs, so they don't have that buffer and a service desk to route those types of things.

During the interviews, several district representatives also highlighted the importance of having technology that doesn't require a great deal of "touching" or "downtime." For example, one district representative explained that they decided to go with Chromebooks because "We really wanted something that was cloud managed so that we would have a lot less necessity of touching every single device every day."

Similarly, another district representative said:

> We chose the Chromebook mainly because it is really inexpensive for us, it is easy to maintain and if we get a large number of them…We can easily put the testing software and configure it within half an hour, compared to what we have with the PCs.

Professional Development Approaches

Superintendents and district administrators were asked to describe how professional development and support was provided throughout the district. In doing so, they emphasized three different approaches to professional development and support.

Forty-two percent (16/38) of the school districts emphasized how professional development and support was provided through specific staff positions. While the configuration of this support varied, the most common description was for Teachers on Special Assignments (TOSAs) – teachers who are responsible for creating resources and providing training to other teachers. Others described how the district had a paid position (or positions) for Educational Technology Specialists, Technology Resource Teachers, Digital Teacher Leaders, or Teachers on Assignment. Many of the districts, however, emphasized the part-time nature of these positions. For example, as one superintendent explained:

> They're teaching all day so it's not a full-time position, but they'll come to a meeting here at the District Office and they're sort of our liaison, if you will, of information between the District and the school sites…They'll take information back and they'll share it with their staff members, help us with training sometimes.

While some of the districts described how teachers receive a small stipend for participating in district training opportunities and sharing the information with others, several districts indicated that some teachers went through a more intensive certification process (e.g., through Apple or Google) to learn how to use different applications to improve teaching and learning.

In contrast, 29% (11/38) of the districts emphasized how professional development and support was being driven by "teacher interest" or "through their own initiative." For example, one superintendent explained how the district relies on cohorts of teachers who are "comfortable" with the idea of using technology in the classroom and are willing to go to in-house or off-site trainings. Another superintendent explained:

> We don't have teachers that we pay to do [professional development]….The deal I have with them is you're going to get this technology first. I'm going to provide you whatever training you need. I'm going to provide you with what you need to know, you learn it, and then you have to be willing to teach other people how to use it…. I have probably a dozen or so teachers throughout the district that I rely on to do that kind of stuff for me.

Another district administrator explained:

> A lot of that is left up to the teacher….One of the things we've talked about doing is just offering a class or whatever they may need, and then see who shows up. But even that, most of the time you end up with one person or nobody showing up.

Twenty-six percent (10/38) of the school districts emphasized how professional development and support was provided through various district level activities, such as professional development days, training, webinars, web conferencing, training videos, and other online resources. As one superintendent explained "We've put a lot of money into making sure that the teachers understood how to use Illuminate" (the learning management system). Another explained how there was "regular professional development" and "ongoing training." A third superintendent said: "We train all our teachers. So the idea is everybody has to be technology savvy."

Three percent (1/38) of the districts did not provide any information about professional development and support.

Table 11: Professional Development Approaches

	Percent
Paid staff support	42%
Interested teachers	29%
District professional development support	26%
No response	3%

(n=38)

Distributive Leadership

Most of the school districts indicated they were cultivating a distributive leadership approach with respect to technology integration and professional development – meaning the responsibility for developing the capacity to integrate technology into the classroom was being shared broadly and cultivated in a variety of ways.[10]

For example, all of the districts responding to the survey reported providing professional development opportunities for teachers in at least one form (with the exception of two district representatives who reported that they didn't know this information), including: in-service trainings (74%, 25/34), off-site workshops (74%, 25/34), on-site training and professional development (68%, 23/34), peer coaching and mentoring opportunities (62%, 21/34), workshops given in computer labs on professional days (50%, 17/34), and online workshops (44%, 15/34).

Developing the capacity for administrators to use technology was also a priority, with 71% (24/34) of the districts responding to the survey indicating that they were providing training to administrators as well, ranging from off-site professional development opportunities (56%), to face-to-face workshops (47%), to online training (41%).

In the interviews, superintendents and district representatives repeatedly highlighted how teachers were learning from each other (with some noting how teachers were learning from students, as well), and emphasized the need to create a "supportive" or "risk-free" environment for teachers. As one superintendent explained, "It is

> *"It is more about trying to support and inspire people who are ready to take this next step and providing them with some resources and training."*

[10] Fusarelli, Kowalski, & Petersen (2011). Distributive leadership, civic engagement, and deliberative democracy as vehicles for school improvement. *Leadership & Policy In Schools, 10*(1), 43-62.

more about trying to support and inspire people who are ready to take this next step and providing them with some resources and training."

Many of the superintendents, as well as the district representatives, indicated support from the school board, principals, and parents was also helping them to develop the capacity to integrate technology into the classroom. As one superintendent remarked, "The school board has been incredibly supportive. I mean that's the only reason we can do this and spend the money is because they're backing us up on it."

Others expressed similar sentiments:

> The board has been very supportive of the direction we've gone with our technology. They get it. They understand the vision. They helped to set that vision.
>
> Our principals, I think, have been all in.
>
> Our parent population is very engaged.
>
> The school board's been very, very supportive, not just on a financial aspect but on allowing us to do what's in the best interest of students. They've been supportive in the way they approach the purchase of equipment, the implementation of the equipment, and then kind of the reevaluation of the program.

Partnerships with local business and technology companies were also reported to be instrumental in supporting technology in the schools. One superintendent explained:

> We've also had lots of support from the business community in terms of just resources of time and talent and thinking, whether it be from our large corporations that are within the boundaries of the district, or our smaller business partners, and, then, even those from the vendor world.

During the interviews and in the survey, half of the districts (19/38) made a point of describing how they work closely with the San Diego County Office of Education, with 13 districts describing how the county plays an instrumental role in the professional development of teachers by providing in-person and online workshops, presentations, and trainings relating to various applications (e.g., Google Apps, using multi-media stations, using the cloud, using email, document sharing, website maintenance, Leading Edge certification).

Six districts described how the county was providing valuable technical support, such as internet connectivity, assistance with infrastructure upgrades, and network support. In addition, superintendents and district representatives described how their staff participate in other external professional development activities, such as conferences sponsored by San Diego CUE (Computer-Using Educators) and the International Society for Technology in Education Conference.

Infrastructure, Hardware, or Software Challenges

Almost all of the school districts (37/38) identified at least one challenge relating to the infrastructure, hardware, or software needed to support technology resources in the classroom and schools.

Replacing aging infrastructure (e.g., wiring, networks, servers, switches, or cables) and aging devices (e.g., desktops, laptops, or tablets) that "become obsolete very quickly" was also the most common challenge, noted by 58% (22/38) of the school districts. As one superintendent explained, while infrastructure improvements are not "glamorous" or "obvious," they are needed and they "take a big chunk out of your budget."

Bandwidth was (or had recently been) a problem for 42% (16/38) of the school districts. As one superintendent noted, "The biggest challenge is having enough bandwidth….You can have all the devices in the world, but if you don't have the speed, it's not going to work."

Another district representative explained, "Our bandwidth is always an issue because we're constantly adding all these devices to support the new testing….We keep hitting our limits, our ceiling on our bandwidth."

Similarly, districts described the need to invest in more wireless technology (26%, 10/38) and securing more devices for students (21%, 8/38). Others described challenges in terms of costs or lack of funding (24%, 9/38):

> It's a very expensive proposition and outlay, trying to ensure that all our schools are wired and have wireless capacity to support the number of mobile devices and the speed of machines that we're getting, nowadays and so forth, that's always a challenge.

Deploying and providing technical support to large numbers of devices was also challenging for 11% (4/38), with one district representative explaining: "A challenge is that you increase the number of devices every year by 7,000, and that's a lot of devices." Another noted that the district had recently doubled the number of devices without adding instructional or technical personnel.

Finally, five percent (2/38) indicated that finding the right digital content and/or learning management system was a challenge.

Table 12: Infrastructure, Hardware, or Software Challenges*

	Percent
Aging infrastructure and/or devices	58%
Bandwidth	42%
Wireless access	26%
Technology costs and/or lack of funding for technology	24%
Numbers of devices	21%
Technical support	11%
Learning management software and/or digital content	5%
No response	3%

(n=38)
*School districts may have indicated more than one challenge

Use of Additional Resources

The districts were asked about how they would use additional resources. Almost half (18/38) indicated that they would use additional resources for professional development.

For example, one superintendent expressed an interest in having "some teachers that were highly trained to be able to go in and show other teachers how they can get so much more by using some of the technologies." Another district representative said, "I think that the focus on professional development is just critical. Keeping teachers engaged around training that's successful and meaningful, I think is really important. You can never have enough money for that, right?"

Just over one quarter (26%, 10/38) indicated they would purchase more devices in order to move closer to one-to-one deployment.

Twenty-one percent (8/38) indicated that they would use additional resources for various infrastructure needs, such as: increasing the speed of connections, replacing firewalls, and upgrading networks. Sixteen percent (6/38) said they would use additional resources to help them increase bandwidth.

Eighteen percent (7/38) would use additional resources for technical support, such as acquiring a "tech team" or "equipment technicians." As one district representative noted "you always can use more technicians to be out there to help fix [things], because the more devices you use, the more things there are to need tweaking."

Sixteen percent (6/38) said they would use additional resources to secure digital instructional materials, software licenses, and/or learning management systems.

Table 13: Use of Additional Resources

	Percent
Professional development	47%
More devices	26%
Infrastructure	21%
Technical support	18%
Bandwidth	16%
Software and/or digital instructional materials	16%
No response	9%

(n=38)
*School districts may have indicated more than one resource

Evaluation

On the survey, the majority (24/34) of the school districts indicated that they were evaluating technology integration through classroom walkthroughs, and just over half (18/34) reported conducting self-assessments. Some districts reported using district-designed observation tools, conducting lesson plan reviews, or using a technology integration matrix. Six percent (2/34) reported using a vendor tool and 6 percent (2/34) reported hiring an external evaluator. Most school districts that were evaluating technology integration reported using at least two evaluation methods.

Table 14: Evaluation*

	Percent
Classroom walkthroughs	71%
Self-assessments	53%
District-designed survey	35%
District-designed observation tool	18%
Lesson plan review	18%
Not currently evaluating	15%
Technology integration matrix	12%
Vendor tool	6%
External evaluator	6%
Other	3%
I don't know/no response	9%

(n=34)
*School districts may have chosen more than one response.

During the interviews, several superintendents and district representatives described the value of these evaluation efforts. For example, one district representative described how an external evaluation of a one-to-one program helped to demonstrate that if students have access to a device all the time, they are going to be more successful. At the same time, others expressed a desire for more information for benchmarking and comparison purposes.

Future Plans

When asked about future plans, the districts described an array of plans. Thirty-two percent (12/38) were focused on making infrastructure improvements, such as upgrading bandwidth (11%, 4/38), upgrading wireless (13%, 5/38) or upgrading both bandwidth and wireless (8%, 3/38). Another five percent (2/38) indicated that there were plans to go with a different carrier for internet connection. In contrast, five percent (2/38) were more focused on acquiring online content and/or digital curricula materials.

Twenty-one percent (8/38) described plans to provide students with greater access to technology or devices, as explained by this superintendent:

> I would like to continue to expand student access to technology. We found that it's incredibly effective when classrooms are set up in a one-to-one situation where a child has access to a device throughout the school day and that's their kind of personal device to use. So short term, that's a goal, to continue to expand that sort of access.

Others were more focused on improving the way they support teachers by providing more professional development (8%, 3/38) or improving the integration of technology support with professional development and support. Others (8%, 3/38) emphasized concurrent plans to acquire more technology resources for students and teachers and provide more professional development support.

Five percent (2/38) emphasized getting ready for Smarter Balanced and Common Core online state testing:

> The short term goal is getting the District really prepared for the SBAC testing, Common Core testing. That is our first goal at least in the next year and a half – to make sure that we have the devices and the infrastructure ready for students to take those tests.

Eleven percent (4/38) indicated that they either didn't have any plans or that they were planning to keep with the status quo.

Table 15: Future Plans

	Percent
Upgrade bandwidth and/or wireless	32%
Provide students with greater access to technology and/or devices	21%
No changes or future plans	11%
Provide students with greater access to technology and devices, and provide more professional development to teachers	8%
Provide more professional development to teachers	8%
Change internet service providers	5%
Integrate technology support with professional development and support	5%
Improve access to digital content and curricula	5%
Prepare for online state testing	5%

(n=38)

Appendix

To develop the survey instruments and interview protocols for this needs assessment project, researchers at the Mobile Technology Learning Center conducted a review of the literature to identify previous surveys, data collection protocols, and other resources related to assessing the technology needs within schools. These included:

1. Instruments created for the evaluation of the Maine Learning Technology Initiative conducted by Center for Education Policy, Applied Research & Evaluation, University of Southern Maine

2. Instruments created for the evaluation of the Texas Technology Immersion Pilot conducted by Texas Center for Educational Research

3. Instruments created for the Nevada Schools Educational Technology Needs Assessment conducted by the College of Education University of Nevada, Las Vegas

4. Instruments created for Project Red conducted by the Greaves Group, The Hayes Connection, and the One-to-One Institute

5. School Technology Needs Assessment (STNA) survey created by the Serve Center at the University of North Carolina at Greensboro

6. Principal School Technology Leadership Survey created by CASTLE (UCEA Center for the Advanced Study of Technology Leadership in Education) at the University of Kentucky

7. School Technology Survey conducted by the Office of Superintendent of Instruction, State of Washington

8. Technology Instructional Practices Survey conducted by the Minnesota Department of Education

9. Technology Resources Survey conducted by the Bureau of Educational Technology, Florida Department of Education

10. Technology Readiness Tool conducted by the California Department of Education

11. Telephone survey of public school districts conducted by MCH Strategic Consulting

12. 2010 E-Rate Program and Broadband Usage Survey: Report by the Federal Communications Commission

13. Sample survey questions from a needs analysis conducted by Camden City, NJ, Public Schools

14. Sample survey questions from Speak Up sponsored by Project Tomorrow (a nonprofit organization)

15. A survey of America's Teachers and Support Professionals on Technology in Public Schools and Classrooms conducted by the National Education Association in collaboration with the American Federation of Teachers

16. The North Carolina State School Technology Plan

17. Fullerton School District Technology Plan

18. Technology Plan for Contra Costa County Office of Education

19. Guidance provided by Texas Education Agency regarding No Child Left Behind and conducting a Comprehensive Needs Assessment in schools

Researchers from MTLC solicited feedback on drafts of the survey and interview protocols from staff, as well as representatives from the key stakeholders groups, including a superintendent, a technology officer, and San Diego County Office of Education officials, in order to improve the content and coverage of the study's questions. The survey, interview protocols, and study procedures were then reviewed and approved by the University of San Diego's Institutional Review Board.

Contributors

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Joanne G. Carman is an associate professor of political science and public administration at the University of North Carolina at Charlotte. She received her Ph.D. in public administration from the Rockefeller College of Public Affairs and Policy at State University of New York at Albany (2005). Dr. Carman teaches in the Master of Public Administration program, and serves as the advisor and coordinator for the Graduate Certificate in Nonprofit Management. She has more than 15 years of experience, working as a consultant and conducting applied research and program evaluation in a number of areas, including: community development, higher education, developmental disabilities, housing, substance abuse, teen pregnancy, and collaborative service delivery. Her most recent publications have appeared in the American Journal of Evaluation, the Foundation Review, and Nonprofit and Voluntary Sector Quarterly**.**

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Veronica Garcia is a social sciences research associate at both the Center for Education Policy and Law and the Mobile Technology Learning Center. She also serves as an adjunct professor in the Teaching and Learning Department. Her dissertation focused on the life histories and literacy experiences of formerly incarcerated Latino males. Veronica was a former high school English and Advancement Via Individual Determination (AVID) teacher in Los Angeles. She has worked with high school youth to conduct critical education research in their schools through university, non-profit, and district programs. Veronica has presented in national professional conferences, such as the National Council for Teachers of English, American Educational Research Association, and Digital Media and Learning. Veronica has taught social foundations courses for new teachers at UCLA and USD. She is a co-author of the book entitled Critical Media Pedagogies: Teaching for Achievement in City Schools published through Teachers College Press.

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Michael Corke joins the staffs of the Mobile Technology Learning Center and the Center for Education Policy and Law at the University of San Diego as the Senior Research Associate. Dr. Corke brings 15 years of experience leading evaluation and research projects in education settings. His academic preparation includes undergraduate and master level training in psychology and exercise science from San Diego State University as well as a PhD in education research methodology from Claremont Graduate University and San Diego State. Dr. Corke's research interests include: STEM, student resilience, informal education and technology in schools. Prior to this appointment, he spent 13 years doing research and evaluation in a public-private partnership focused on community redevelopment through the education system.

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Julie is the Deputy Director for the Institute for Entrepreneurship in Education as well as a Senior Research Associate at the Mobile Technology Learning Center. Julie is a graduate of University of San Diego's School of Leadership and Education Sciences Ph.D. program in K-12 public/private school leadership. Her dissertation focused on parent empowerment as a social movement and parent trigger legislation in the United States and was nominated for the William P. Foster Outstanding Dissertation Award. In 2012, Julie was named a David L. Clark National Graduate Research Scholar by the University Council for Educational Administration (UCEA) and Divisions A and L of the American Educational Research Association (AERA). Working with CEPAL since 2008, Julie specializes in innovative practices in K-12 education, including new school and learning space design. She was involved in the development of a charter high school on the 6th and 7th floor of the new San Diego Central Library. The school, e3 Civic High opened in September 2013 and has been nationally recognized for its intentional alignment of pedagogy and learning spaces.

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Kai Thomas is a Leadership Studies doctoral student on the K-12 track. She received her BA in English with a minor in Creative Writing from Spelman College and her MA in Communication for Public Relations from Ellis University. Kai's research interests are in educational technology for K-12 environments, specifically utilizing technology to increase the success rate of underrepresented students and developing alternative models to traditional pedagogy through the use of hybrid/blended classrooms. Kai has been a graduate assistant with MTLC since she began her doctoral studies in the fall of 2012.