A district where school leaders smile...

because teachers shine.

Welcome to a Renaissance® in K12 education, a district where leaders know precisely what's happening in their schools. Classrooms where teachers shine, guided by data insights that light the student growth path in every state. Attending one of the big 2017 expos? See us at FETC Jan. 25–27, booth #1235, and at TCEA Feb. 7–9, booth #1239.

See a customized demo at www.renaissance.com/shine or call (888) 249-8690.
2017 SALARY & JOB SATISFACTION SURVEY
The results are in for our second-annual survey of IT pros working in K–12 schools and districts. For the most part, tech leaders are doing well in their professions and see a bright future for the industry.
By David Nagel

WHAT’S HOT IN 2017
Education technologies are, by their nature, capricious. So it makes sense to consider what could drive innovation among classrooms for the new year. A panel of K-12 experts weighs in.
By Dian Schaffhauser

WHAT’S HOT IN 2017
Education technologies are, by their nature, capricious. So it makes sense to consider what could drive innovation among classrooms for the new year. A panel of K-12 experts weighs in.
By Dian Schaffhauser

FEATURES
18 What Effective Blended Learning Looks Like
No two blended learning classrooms will look exactly alike — but here are some common elements for success

28 Coding Comes of Age
Coding is gradually making its way from club to curriculum, thanks largely to the nationwide science, technology, engineering and mathematics (STEM) phenomenon embraced by so many American schools.
The Outlook for 2017

EDUCATION IS RESILIENT.

Even while trepidation grows as federally driven change is once again about to slam into education, optimism for the future remains high. There’s a strong current of belief, particularly among educators and school staff who are involved with technology, that, whatever else is going on, education technology will see stability and solid growth in the coming years.

In our latest survey of K–12 technology staff and educators — which, incidentally, was conducted in the wake of another wildly emotionally charged presidential election — respondents were, with few exceptions, positive in their outlook for the profession and about their position within their institutions.

A healthy majority (62 percent) expect strong or even unbridled growth for the sector, with another 33 percent predicting continued stability. Most are also happy in their positions, and a vast majority expect to stay right where they are at least for the next 12 months — and with higher salaries.

Be sure to read more in our second-annual IT Salary & Job Satisfaction Survey, starting on page 6.

Ed Tech Trends for 2017

In this issue we also look to the future of ed tech in terms of the technology categories themselves. What are the emerging or ascending technologies for the coming year?

All things STEM and STEAM (STEM + arts) are on fire, from new next-generation standards to coding to maker spaces. Augmented and virtual reality are also growing rapidly — in fact, we’ve even launched a new newsletter this year (IMMERSE K-12) to meet the demand for this increasingly hot topic!

Learn more about these and other growth categories from our panel of experts on page 22.

Welcoming Our Latest Board Member

On another positive note, I’m happy to announce that we at THE Journal are reconstituting our editorial advisory board in 2017.

The first official new member is Project Tomorrow CEO Julie Evans. Project Tomorrow is the organization that produces the widely acclaimed Speak Up Survey, which helps further the cause of education and education technology by collecting input about ed tech from hundreds of thousands of teachers, administrators, tech professionals, students and parents each year and publishing reports that are freely available to all stakeholders. (You may also have noticed the fruits of this new relationship in the form of exclusive data published on the last page of this publication.)

Evans, who has been CEO of Project Tomorrow since 1999, actually developed the Speak Up Survey herself — one of many accomplishments in her decades-long career in education and technology that has been characterized by advocacy and a dedication to the mission of education. We’re proud to have her as a part of the board and, like our readers, look to the new year with a renewed sense of optimism!

To continue the conversation, e-mail me at dnagel@1105media.com.

Editorial Advisory Board

Elisa Carlson
Director of Instruction, Curriculum and Innovation, Surrey Schools (British Columbia, Canada)

Julie Evans
Chief Executive Officer, Project Tomorrow

Geoffrey H. Fletcher
Private Consultant

Ann Flynn
Director of Education Technology & State Association Services, National School Boards Association

Phil Hardin
Director of Project IMPACT, Iredell-Statesville School System (NC)

Christopher Harris
Coordinator, School Library System, Genesee Valley Educational Partnership (NY)

Cathy Hutchins
Principal, South Woods Elementary School, St. John’s County School District (FL)

Thomas C. Murray
State and District Digital Learning Director, Alliance for Excellent Education

Alice E. Owen
Educational Consultant

Mark Stevens
General Manager, NEA Academy

Donna Teuber
Team Leader for Technology Integration, Richland School District Two (SC)

Editor’s Note

David Nagel, Editor-in-Chief

The Outlook for 2017

Educational technology will see stability and solid growth in the coming years. There’s a strong current of belief, particularly among educators and school staff who are involved with technology, that, whatever else is going on, educational technology will see stability and solid growth in the coming years.

In our latest survey of K–12 technology staff and educators — which, incidentally, was conducted in the wake of another wildly emotionally charged presidential election — respondents were, with few exceptions, positive in their outlook for the profession and about their position within their institutions.

A healthy majority (62 percent) expect strong or even unbridled growth for the sector, with another 33 percent predicting continued stability. Most are also happy in their positions, and a vast majority expect to stay right where they are at least for the next 12 months — and with higher salaries.

Be sure to read more in our second-annual IT Salary & Job Satisfaction Survey, starting on page 6.

Ed Tech Trends for 2017

In this issue we also look to the future of ed tech in terms of the technology categories themselves. What are the emerging or ascending technologies for the coming year?

All things STEM and STEAM (STEM + arts) are on fire, from new next-generation standards to coding to maker spaces. Augmented and virtual reality are also growing rapidly — in fact, we’ve even launched a new newsletter this year (IMMERSE K-12) to meet the demand for this increasingly hot topic!

Learn more about these and other growth categories from our panel of experts on page 22.

Welcoming Our Latest Board Member

On another positive note, I’m happy to announce that we at THE Journal are reconstituting our editorial advisory board in 2017.

The first official new member is Project Tomorrow CEO Julie Evans. Project Tomorrow is the organization that produces the widely acclaimed Speak Up Survey, which helps further the cause of education and education technology by collecting input about ed tech from hundreds of thousands of teachers, administrators, tech professionals, students and parents each year and publishing reports that are freely available to all stakeholders. (You may also have noticed the fruits of this new relationship in the form of exclusive data published on the last page of this publication.)

Evans, who has been CEO of Project Tomorrow since 1999, actually developed the Speak Up Survey herself — one of many accomplishments in her decades-long career in education and technology that has been characterized by advocacy and a dedication to the mission of education. We’re proud to have her as a part of the board and, like our readers, look to the new year with a renewed sense of optimism!

To continue the conversation, e-mail me at dnagel@1105media.com.
At this price...
You win!

Spectrum is launching a new device charging cart. Built with the quality you expect from us, at an unbelievably low price.

See it first... FETC Jan 24-27 Orlando Booth 1040 TCEA Feb 6-10 Austin Booth 1229

Learn more at spectrumfurniture.com
THE JOURNAL

2017 SALARY & JOB SATISFACTION SURVEY
The results are in for our second-annual survey of IT pros working in K–12 schools and districts. For the most part, tech leaders are doing well in their professions and see a bright future for the industry.

BY DAVID NAGEL
Salaries are up, and so is the level of optimism for the future among IT pros in K–12 education. According to *THE Journal’s* second-annual IT Salary & Job Satisfaction Survey, the overall average salary for IT leaders and workers grew about $2,000 year over year. The vast majority also told us they see nothing but healthy or even unbridled growth in the future for IT in academia.

**Salaries**

The overall average salary for IT professionals in education — excluding teachers who have a dual role in technology — came in at $65,742. (See figure 1 on page 10.) That’s roughly $2,000 higher than last year’s overall average. (If we include teachers who participated in the survey, the average comes down a bit to $64,499, but still higher than last year’s overall average of $63,776.) C-level leadership remains at the top of the salary heap, averaging about $102,000 — up about $3,000 from last year. Other IT leaders, including directors, vice presidents, managers and the like, came in second at an average of $76,806, an increase of about $3,800 over last year’s reported average. Coming in third were database/business intelligence staff at $75,449, a drop of about $1,000 from last year.

The only grouped category (figure 2) to see a decline this year besides database/business intelligence staff was network/data center/security staff, which fell off by a whopping $9,600 to land at $51,154. The most substantial year-over-year gains were seen by developers, systems analysis staff and trainers. Technology trainers’ average salary climbed about $6,000 to hit $61,195 this year. The average salary for K–12 software developers jumped more than $8,000 to $65,333. But systems analysis staff, which included analysts and senior analysts, left them both in the dust, jumping more than $14,000 to reach $56,000. (See figure 2.) There was a near-linear progression in overall unweighted average salaries based on institution size, with smaller institutions generally seeing lower salaries than large ones. The exception, as with last year’s results, was the category of schools with 2,000 to 2,999 students, in which salaries came in lower than those of IT pros in smaller institutions.

Excluding salaries from respondents with “teacher” in their job description, the smallest schools (those with fewer than 500 students) had an average reported IT salary of $54,116 ($55,755 with teacher salaries averaged in); in schools with 500 to 999 students, the average IT salary was $55,900 ($55,356 with teacher salaries); in schools with 1,000 to 1,499 students, the average salary was $66,256 ($65,191 including teacher salaries); in schools with 1,500 to 1,999 students, the average was $73,804 ($69,469 including teachers); in schools with 2,000 to 2,999 students, the average IT salary was $66,840 ($69,583 with teachers); and in schools with 3,000 or more students, the average was $78,831 ($77,725 with teachers factored in).

**Job Satisfaction**

Overall, this year’s participants indicated that they’re pretty satisfied with their careers. About 75 percent were either satisfied or very satisfied with their current positions. In particular, K–12 IT people are happy with their:

- Physical comfort (83 percent satisfied or very satisfied);
- Co-workers (79 percent);
- Hours (75 percent);
- Commute (73 percent);
- Supervisor (71 percent);
- Equipment (71 percent); and
- Benefits (62 percent).

Areas that could use some improvement? Salary, departmental budgets and “top brass.”

Among our respondents, about 46 percent said they’re satisfied or very satisfied with their salaries, while 33 percent were dissatisfied or very dissatisfied. Forty-nine percent were positive.
about the top brass in their organization, while 22 percent were
dissatisfied or very dissatisfied. One surprising category was
departmental budgets, with 34 percent dissatisfied or very dis-
satisfied and 47 percent satisfied or very satisfied. (See figure 9
on page 11.)

Looking Ahead

While respondents in last year’s survey were on the whole
optimistic about the future of their profession, respondents this
year are wildly so. Nearly 95 percent said they foresee either
continued stability (32.77 percent), healthy growth (a massive
50.73 percent) or unbridled growth and opportunity (11.21
percent). None of our respondents predict doom for the industry
in the near future, and only 5.29 percent are predicting a
“slow decline.” (See figure 8 on page 11.)

Most (91 percent) indicated that they do not anticipate
receiving a promotion in the next year, but about half (51.92
percent) said they expect a raise. (See figures 5 and 6.)

The bulk of our respondents are long-timers and have been
with their present employer for 11 or more years. About 36 per-
cent have stayed put for 11 to 20 years, and another 20.5 percent
have been in place for 21 or more years. So it’s not
surprising that the vast majority (81 percent) of respondents to
this year’s survey indicated they expect to stay where they are for
at least another 12 months. (See figure 7.)

David Nagel is editor-in-chief of THE Journal and editorial
director for 1105 Media’s education publications.

All figures available on pages 10 & 11
**Tech Trends**

**TECH TRENDS**

---

### Feature: Tech Trends

**IT EXPERIENCE**

Most respondents have been in IT for more than 11 years.

<table>
<thead>
<tr>
<th>HOW LONG HAVE YOU WORKED IN IT?</th>
<th>0-2 YEARS</th>
<th>3-5 YEARS</th>
<th>6-10 YEARS</th>
<th>11-20 YEARS</th>
<th>OVER 20 YEARS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUBLIC</td>
<td>12%</td>
<td>10%</td>
<td>21%</td>
<td>36%</td>
<td>21%</td>
</tr>
<tr>
<td>PRIVATE</td>
<td>10%</td>
<td>16%</td>
<td>26%</td>
<td>32%</td>
<td>16%</td>
</tr>
<tr>
<td>WEIGHTED AVERAGE</td>
<td>11%</td>
<td>12%</td>
<td>22%</td>
<td>35%</td>
<td>20%</td>
</tr>
</tbody>
</table>

Responses were weighted by institution type. Figures rounded.

**TIME WITH CURRENT EMPLOYER**

Most respondents have been with their present employer for more than 10 years.

<table>
<thead>
<tr>
<th>HOW LONG HAVE YOU BEEN WITH YOUR PRESENT EMPLOYER?</th>
<th>0-2 YEARS</th>
<th>3-5 YEARS</th>
<th>6-10 YEARS</th>
<th>11-20 YEARS</th>
<th>OVER 20 YEARS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUBLIC</td>
<td>6%</td>
<td>13%</td>
<td>19%</td>
<td>40%</td>
<td>22%</td>
</tr>
<tr>
<td>PRIVATE</td>
<td>16%</td>
<td>18%</td>
<td>26%</td>
<td>26%</td>
<td>14%</td>
</tr>
<tr>
<td>WEIGHTED AVERAGE</td>
<td>8%</td>
<td>15%</td>
<td>21%</td>
<td>36%</td>
<td>20%</td>
</tr>
</tbody>
</table>

Responses were weighted by institution type. Figures rounded.

**PROSPECTS FOR SALARY GROWTH**

A large minority of respondents expect to receive a pay increase next year.

<table>
<thead>
<tr>
<th>DO YOU ANTICIPATE RECEIVING A RAISE WITHIN THE NEXT 12 MONTHS?</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUBLIC</td>
<td>46.50%</td>
<td>53.50%</td>
</tr>
<tr>
<td>PRIVATE</td>
<td>68.00%</td>
<td>32.00%</td>
</tr>
<tr>
<td>WEIGHTED AVERAGE</td>
<td>51.92%</td>
<td>48.08%</td>
</tr>
</tbody>
</table>

Responses were weighted by institution type.

**PROMOTIONS**

Few people’s titles will be changing in 2017.

<table>
<thead>
<tr>
<th>DO YOU ANTICIPATE RECEIVING A PROMOTION WITHIN THE NEXT 12 MONTHS?</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUBLIC</td>
<td>6.99%</td>
<td>93.01%</td>
</tr>
<tr>
<td>PRIVATE</td>
<td>14.00%</td>
<td>86.00%</td>
</tr>
<tr>
<td>WEIGHTED AVERAGE</td>
<td>8.76%</td>
<td>91.24%</td>
</tr>
</tbody>
</table>

Responses were weighted by institution type.
For the most part, tech leaders are doing well in their professions and see a bright future for the industry.

**FIGURE 7**

**TURNOVER**

Most IT workers in K–12 expect to stay put for the next 12 months.

<table>
<thead>
<tr>
<th></th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUBLIC</td>
<td>17.33%</td>
<td>82.67%</td>
</tr>
<tr>
<td>PRIVATE</td>
<td>24.00%</td>
<td>76.00%</td>
</tr>
<tr>
<td>WEIGHTED AVERAGE</td>
<td>19.01%</td>
<td>80.99%</td>
</tr>
</tbody>
</table>

Responses were weighted by institution type.

**FIGURE 8**

**INDUSTRY OUTLOOK**

Most respondents foresee a healthy future for the sector.

**FIGURE 9**

**JOB SATISFACTION**

Salary, departmental budgets and “top brass” were the sorest points for our survey respondents.

Story continues on page 13
As superintendent of Illinois’ Kankakee School District, Genevra Walters has transformed a lackluster general ed program into the successful College and Career Academy Classrooms. With the help of technology in these classrooms, Walters has helped close the achievement gap for those students who were not enrolled in gifted or magnet programs.

In her short tenure at KSD, she has also helped the district go 1-to-1 in second through ninth grades, with kindergarteners and first graders getting easy access to iPads. She said she hopes to attain 1-to-1 access for Kankakee high schoolers within the next few years.

Prior to joining KSD in 2014 (located in her hometown), Walters served as a school social worker, assistant principal, principal and superintendent of SPEED, a special education school district based in Chicago Heights.

Walters hails from Kankakee, IL, about an hour south of Chicago. She graduated from Kankakee High School in 1986 and attended the University of Illinois at Chicago for both bachelor’s and master’s degrees in social work. She obtained her educational doctorate at Illinois State University in 2000.

THE Journal: What role did technology play in special education and the College and Career Academy Classrooms?

Genevra Walters: Students in special education and students with disabilities have an IEP (individualized educational plan). We were even broader in our implementation of technology than you might expect. We used traditional devices, but we also used assisted tech — technology to communicate, mobile, technology to modify instruction.

Students who struggle are often more dependent on technology to learn. More affluent kids are used to lots of technology because they could afford it. We could not afford not to have technology. For the disadvantaged students, their access to technology needs to increase in order to close the opportunity gap.

THE Journal: Parents who see their children playing on electronic devices day and night may have some skepticism about the advantages of technology. What do you tell them?

Walters: I’ve been trying to communicate to the community at large, the local community, many of whom believe that our students are becoming too dependent on technology. But technology changes so fast now. We need to understand that we’re actually training children for jobs that don’t even exist now. Because of that, if we don’t teach them to make sure technology is part of their everyday lives, they may not be able to access the jobs that are available in 10 to 20 years. Parents, teachers and students need understand it is actually part of a life of a child, not a separate thing that happens to students.

But we also need to monitor the use of technology. There are some students (with whom) we need to make sure that you have a balance. It’s important to have a balance in life to become a good, healthy, well rounded adult.

Students who struggle are often more dependent on technology to learn. More affluent kids are used to lots of technology because they could afford it. We could not afford not to have technology. For the disadvantaged students, their access to technology needs to increase in order to close the opportunity gap.

THE Journal: What is your view of the Department of Education’s (former) proposal that federal funds must supplement, and may not supplant, state and local funds? How does that affect the implementation of technology at the local level?
Walters: We look at schools that have a high poverty rate, and we look at our priorities — Title I funds are for technology first. Then based on what’s left, we look at what kind of support we need in the classroom for students to grow. We don’t use the money for anything that does not demonstrate student growth.

Local funds are for instructional materials. In terms of technology — that’s where we’re able to use federal funds, which actually helped us get Chromebooks for second through ninth grade and iPads for kindergarten through first grade.

THE Journal: Do you see technology having an impact on the way young people learn?

Walters: Youth culture is different compared to adults. It’s different because technology is changing the way their brains operate. There’s research that indicates that children are having a different attention span, or level of attention, than adults. Technology does change the way the brain is forming, or the ability to attend to a project. We still need to teach our students to attend to things with concentration, to build resilience.

THE Journal: What about books and reading?

Walters: I think a combination of both [analog and digital] is best. I still like to feel the page. I like reading online. But I still like to hold a book in my hand.

THE Journal: Do you have an opinion about BYOD, or bring your own device?

Walters: We’re struggling with deciding with what that should look like. I think having more [analog and digital] is best. I still like to feel the page. I like reading online. But I still like to hold a book in my hand.

What about books and reading?

Walters: I think a combination of both [analog and digital] is best. I still like to feel the page. I like reading online. But I still like to hold a book in my hand.

THE Journal: What about policies regarding personal smartphones in class and possible cheating?

Walters: In junior high and high school, we have common areas where they can use their smartphones. Or if a teacher asks them to take them out during instruction, that’s all that’s allowed.

It’s a device. They can use their iPhones or smartphones when appropriate — the issue is really behavior management.

We have to re-examine this whole concept of cheating anyway. They may be using [smartphones] in a group setting anyway. Is it sharing or is it cheating? We have to work that out.

Richard Chang is associate editor of THE Journal. Contact him at rchang@1105media.com.

FEATURE | Tech Trends (continued)

METHODOLOGY

THE Journal polled its readership in the months of October, November and December 2016. We put out an open invitation to IT professionals in education and incentivized them to participate with a $250 Amazon gift card as a prize for one randomly selected winner and promised confidentiality for respondents. The survey was advertised on thejournal.com and in newsletters and e-mail promotions to our subscriber list, and recipients were asked to encourage colleagues to participate as well.

We received 430 fully completed surveys. Responses were manually culled that were clearly false or inappropriate for the survey. For example, some higher ed IT staffers responded to the poll; their answers were excluded, as were responses from principals, vice principals and other non-IT staff and administrators except those who held dual positions in technology. Those who responded with patently unrealistic salaries were also eliminated. A small number of teachers completed the survey. Of those, many were either technology educators or educators who held dual roles in technology support or instructional design. Their responses were included where noted.

The final tally for qualified respondents was 379, of which 331 were from public institutions (71 elementary, 97 secondary, the remainder combined or district-level); 48 were from private institutions (12 elementary, 12 secondary, the remainder combined or district-level).

Vetted responses from qualified public and non-profit institutions were weighted by institution type to be representative of the nation as a whole based on data from the United States Department of Education. In some cases, weighting was not possible (as in the case of individual job titles). However, as our sample was fairly close to reality, weighting did not have a large impact on averages.

We also asked for, but did not weigh against, geographic location and size of the institution’s student body.

As with last year’s survey, geographically, our respondents tracked closely with ED’s regional data for K–12 institutions (using census regions). New England: 4.75 percent; Mid Atlantic: 10.82 percent; East North Central: 11.35 percent; West North Central: 6.33 percent; South Atlantic: 27.7 percent; East South Central: 8.71 percent; West South Central: 12.93 percent; Mountain: 5.54 percent; and Pacific: 11.87 percent.

However, also as with last year’s survey, student body size among our participants tended to be on the larger side than would be representative of the nation as a whole. The breakdown in student body size among vetted respondents was: 0–499: 19.2 percent; 500–999: 24.9 percent; 1,000–1,499: 11.3 percent; 1,500–1,999: 6.3 percent; 2,000–2,999: 7.6 percent; and 3,000 or more: 30.7 percent.

The survey consisted of 14 questions, 13 of which were mandatory. A final open-ended question asking for additional comments was optional.
Ransomware is becoming a major issue in the world of education. When BitSight issued its report in September 2016 declaring education the biggest target for ransomware, the news put school officials on notice that they were vulnerable to this form of cyberattack.

Ransomware currently comes in two flavors: encrypting and locker. MarsJoke is one example of encrypting ransomware. This locks user data with an AES 256 encryption algorithm. Winlocker is an example of the second variety. This locks the victim out of his or her computer. In both cases, the user is commanded to pay a bitcoin ransom in order to regain access. Some schools have already learned about ransomware from experience.

- Oxford School District in Missouri suffered a data lockdown in February after a phishing e-mail infected the school system’s servers with malware, encrypted files and demanded a bitcoin ransom worth about $9,000 at the time.
- Horry County Schools in South Carolina also experienced a lockdown during the same period, possibly when an out-of-date server running legacy applications became infected and spread the malware to dozens of other servers on the same network.

In April, Follett Corp. learned schools running its software faced break-ins through unpatched versions of Destiny, the company’s popular library management application. Cyber criminals took advantage of vulnerabilities in JBoss, Red Hat’s middleware, to deliver the ransomware.

Unless your entire district staff is savvy to e-mail phishing, add this to your list of security concerns. The question becomes whether or not to shell out a ransom in these situations. The report hedges, mostly coming down on the side of agreeing with the FBI, which in April officially recommended not paying.

“Paying a ransom doesn’t guarantee an organization that it will get its data back. We’ve seen cases where organizations never got a decryption key after having paid the ransom,” says FBI Cyber Division Assistant Director James Trainor. “Paying a ransom not only emboldens current cyber criminals to target more organizations, it also offers an incentive for other criminals to get involved in this type of illegal activity. And finally, by paying a ransom, an organization might inadvertently be funding other illicit activity associated with criminals.”

In other words, education technology leaders will have to decide for themselves on an appropriate response. While the South Carolina district paid a ransom of around $10,000, the Missouri district didn’t. The difference was that Oxford was armed with a recent backup that allowed the IT organization to “wipe everything clean” and bring technology services back online for the district and its schools, according to published reports. Even then, though, some services were down for weeks.

As with most things cybersecurity-focused, hardened systems are the first line of defense. As the FBI emphasizes, prevention requires:

- Currently patched operating systems, software and firmware
- Use automatically updated anti-virus and anti-malware solutions
- Close oversight of privileged accounts
- Properly configure access controls
- Disable macro scripts from files transmitted through e-mail
- Perform regular backups with integrity checks
- Separate backups from the computers and networks they’re protecting

User education is clearly at the top of the FBI list, above all other preventative measures. As malware sophistication increases, getting users trained to recognize the problem and take appropriate action is really your final defense.

Casa Grande Elementary School District, which has also experienced ransomware up close, appears to agree. In a staff memo dedicated to the topic, IT acknowledged “several” people within the Arizona school system had their computers infected. Then the district proceeded to help its users understand how to respond in the event of an infection with a step-by-step list of instructions and clear advice on how to recognize infected messages.
THE SMALL DISTRICT CHALLENGE
Smaller schools and districts face some unique challenges when it comes to defending against ransomware.

When the State Educational Technology Directors Association (SEDTA) issued its latest recommendations for broadband capacity, there was a major difference in the current report as compared to the 2012 report related to how it handles estimates based on district size. One particularly interesting note is how it considers smaller school systems.

In 2012, the State Education Technology Directors Association’s original set of bandwidth goals offered a lone minimum. By the 2017-2018 academic year, every school should aspire to provide Internet access speeds of 1 Gigabit per second (Gbps) for every 1000 users; whether those were students, staff or guests.

In the report just issued, “The Broadband Imperative II: Equitable Access for Learning,” SETDA re-examined their recommended capacity from the perspective of school size. While medium school districts (those with around 3,000 students) stayed the course at 1 Megabit per second (Mbps) per student for 2017-2018, smaller districts (fewer than 1,000 students) now have a target of at least 1.5 Mbps per user with a minimum of 100 Mbps for the district. Large school systems (those with more than 10,000 students) have a goal of at least 0.7 Gbps per 1,000 users.

SEDTA bases its recommendations on “research, analysis of data sets from districts across eight states regarding both capacity and usage, and consultation with experts in the field.” The report emphasizes, “some districts will need more than the recommendations depending upon their digital learning environments.”

Study the math for a moment, though, and you’ll quickly realize that smaller districts are actually being pushed to have more capacity per user than mid-sized and large districts. “Basic administrative and automation functions” consume a larger proportion of the overall network usage. That actually increases the per-user bandwidth requirement.

For example, the report states, “an extremely small school with 15 students and a 1.5 Mbps per user connection technically meets the current connectivity requirement, but they don’t have enough bandwidth for more than a few intensive bandwidth activities at the same time.”

On top of the stack of student uses are those school overhead functions, such as state reporting, student information system usage, and security functionality.

If there are 50 students in a district, a quick calculation suggests bandwidth capacity of 75 Mbps (or 50 x 1.5 Mbps). But because that’s below the minimum threshold of 100 Mbps for the district, the recommendation would be to contract for at least 100 Mbps. The targets rise across the board for 2020-2021. At that point, small districts are encouraged to have at least 4.3 Mbps per use with a minimum of 300 Mbps for the district.

Along with internet bandwidth IT organizations at small districts also need to consider the wide area network (WAN) capacity. As the report advises, it’s “important to ensure that the individual school site has a connection from the core network that is at least as large as the recommended target.” As a starting point, SETDA advises at least 10 Gbps per 1000 users for WAN access in the 2017-2018 timeframe.

That’s not expected to change for the 2020-2021 school year. Virtualization efforts will shift the capacity burden from the WAN to the internet service provider. As a result, however, districts will want to choose networking components that can keep up with the pace of future requirements.

As CoSN’s Smart Education Networks by Design (SEND) initiative advises, districts struggling to figure out how to right-size their infrastructure to support a digital transformation in learning shouldn’t try to do so alone. “Learn from other districts [that] have been where you are. Aggregate purchasing, design, implementation and network management in order to get top performing networks affordably,” district technology leaders told the Consortium for School Networking. “Work with your vendors as partners rather than as commodity vendors in order to create service level agreements and learn together.”
Schools suffer two major disadvantages when it comes to security. First, while they may be aware of potential vulnerabilities and attacks, they’re not necessarily in the same position as private industry to hire and retain deep security expertise. Second, spending on IT infrastructure isn’t the first priority for district budgets.

To get around both those obstacles, savvy IT leaders are trying an end-run that utilizes a new service delivery model. It’s probably no surprise to any IT hiring manager the information security talent gap is widening. More than six in 10 survey respondents (62 percent) told (ISC)² their organizations have too few information security professionals. Another study by ISACA found there aren’t enough qualified security job candidates, and those individuals worth hiring may command salaries beyond the scope of the typical school district budget.

Given that scenario, it’s no wonder school districts have a hard time attracting top security talent, says Dan Sell, who manages Security-as-a-Service (SECaaS) for security company SonicWall. “No disrespect meant to school districts, but if you’re a hotshot security person, you’re going to go work for a bank or some other industry that has cachet.”

There’s also the recurring challenge of ever-growing Internet requirements. Consortium for School Networking (CoSN) named broadband and network capacity the top priority in 2016 for IT leaders. Buying a firewall appliance can be a major investment. In a high-growth scenario, however, that doesn’t always work to the district’s advantage. Driven by a dramatic rise in the use of student devices, the growth in digital content and the arrival of online assessments, school IT organizations are grasping to keep up with the pace of broadband connectivity. “All those factors are making people blow through their firewalls,” Sell says. “When you’ve used capex, and you’re hoping to get five years out of the firewall, you may have a big ‘Oh, shoot!’ moment when you realize at 18 months that all of a sudden it’s not the right model anymore.”

One new approach can address both those challenges of hiring and acquiring right-sized security appliances: “Security-as-a-Service” (SECaaS). This delivers security as a subscription, covering baseline security operations every school requires: intrusion detection, web content filtering and anti-virus and anti-malware coverage.

SECaaS works like this:
1. You hire a local SonicWall partner with certified security experts to provide the cybersecurity your district needs.
2. Security staff provides all equipment needed for your specific computing environment, sets it up, and performs all configuration tasks. The firewall appliance runs the same security management system the largest enterprise customers rely on to protect their assets.
3. Those security experts handle the cybersecurity monitoring and reporting from their facility and keep you informed at the level you choose.

As part of your annual IT planning, you assess when you need to upgrade, swap out or return the physical security gear. Managed Internal Broadband Services are E-rate eligible, so schools can build the annual subscription fee for SECaaS into Category Two funding requests.

The SECaaS approach fits perfectly into the annual budget mindset of most school districts, says Sell. “If you have capital constraints—and almost all schools do—the whole premise is you have no upfront cost, you work with a local security expert, you pay a monthly subscription price, and you get flexibility to return or upgrade the gear. That’s a pretty straightforward value prop.”
Outsource your network security with SonicWall Security-as-a-Service.

Not every organization has the in-house resources needed to support IT security. This flexible, affordable subscription-based service protects your campus from modern day threats. SonicWall offers a strong security foundation with scalable networking and interconnected content filtering solutions that span your school district systems. Whether your students are using school-issued devices in class or off campus, SonicWall Security-as-a-Service (SECaaS) helps protect students from inappropriate content and keep you in CIPA compliance. SECaaS is also eligible for E-rate discounts.

For more information about SonicWall solutions for education, visit www.sonicwall.com/SECaaS_K12.
All three of these scenarios are examples of effective blended learning in action. Blended learning combines the best of face-to-face and online instruction in ways that can customize the learning experience for each student, while making content more accessible.

As these diverse models suggest, blended learning can look very different from one classroom to the next. But when blended learning is done well, it typically involves some form of student choice or agency in their own learning, experts say — and there are other commonalities as well.

Michael B. Horn, co-founder and distinguished fellow of the Christensen Institute, said at least three-fourths of United States school districts have implemented some form of blended learning — and he estimated about 10 million students are benefiting. Besides giving students a choice
Blended learning looks different in each of these classrooms. Some teachers, like the high school algebra instructor, have taken a “flipped classroom” approach, while others have adopted a station rotation model.

in how they learn best, Horn said, effective blended learning shares the following characteristics:

- The teacher has an engaged role and is using the technology to get to know students better.
- There is a strong classroom culture in place that is widely shared and practiced. “Every routine, from asking for help to moving from one activity to the next, is very crisp and well understood by students,” Horn said.
- There is a clear purpose to every learning experience. “There should be thoughtfulness and intentionality behind the use of each mode or activity,” he said. “It’s not done ad hoc.” Instead, there is a strategy behind it: “I’m using this modality to accomplish this specific purpose — and here’s why.”

Redefining the Teacher’s Role

In the Lawrence Public Schools, “we have blended learning classrooms at all grade levels and in all subject areas,” said Jerri Kemble, assistant superintendent for educational programs and technology.

A few years ago, district leaders created a program in which teachers could apply to become blended learning instructors. Applicants received training in how to lead a blended learning environment, and their classrooms were equipped with iPads, MacBooks and collaboration stations featuring flat-panel displays. “We started with eight blended learning classrooms in 2013; now, we have more than 200,” Kemble said.

Blended learning looks different in each of these classrooms. Some teachers, like the high school algebra instructor, have taken a “flipped classroom” approach. Kemble said, while others have adopted a station rotation model. “Elementary classrooms are really well suited for that because they’ve always used that kind of model in setting up various learning stations,” she said.

Blended learning takes more time to plan, she said, because teachers must prepare multiple activities that will appeal to students’ various abilities and learning preferences. To support its blended learning instructors, the district has assembled a group of teachers on special assignment who curate open educational resources for other teachers to use.

“These course shells reside in Blackboard, our learning management system,” Kemble said. “Teachers can pull those and use as much or as little of the content as they’d like. It’s a really nice resource for teachers who are just starting to blend their classrooms.”

Tucker, who teaches at Windsor High School in Sonoma County, said she agrees this kind of model in setting up classrooms.

Tucker, who teaches at Windsor High School in Sonoma County, said she agrees that blended learning requires more work up front. “You’re designing these multiple learning experiences for kids,” she said. “That can be daunting for teachers. But I have to say, it’s so rewarding on a level I never could have imagined when I spent my days using a stand-and-deliver model.”

Tucker co-teaches within a unique blended learning model that she developed with her colleague, Marika Neto. “She takes the lead on science; I take the lead on technology and social media, and then we both share the responsibility for teaching English,” Tucker said. “We share 60 students in two adjoining rooms, and we co-teach for four and a half hours. Instead of teaching those students in isolation, we’re teaching them in concert around big issues. For example, our first unit was focused on nutrition, food production and the human body. Students were reading The Omnivore’s Dilemma and were doing labs and experiments related to the body’s digestive system and how your body responds to things like sugar.”

Tucker and Neto have access to a Chromebook cart with about 30 devices, and students are encouraged to use their own personal devices as well. “Even if we had a fully 1-to-1 scenario, we wouldn’t have kids go online for every task,” Tucker said. “I think a healthy variety of online and offline activities is crucial to keeping them engaged.”

As they completed the unit on nutrition, students designed their own group projects to address health-related challenges. Some created a website with information about local food options in Sonoma. Others recorded podcasts in which they interviewed health professionals about topics such as the dangers of being a vegan, or whether there is an ideal diet. Still others created infographics to help consumers make healthier food choices.

Tucker said she sees her role shifting from a communicator of knowledge to a designer of engaging, high-quality learning experiences for her students.

“Whenever I’m tempted to stand in front of kids and tell them something,” she said, “I think: Can I create a flipped video so they can self-pace their learning? Can I ask them to research this topic and share what they learn and be experts for each other?”

She added: “I want kids to discover information and make meaning for themselves because it’s so much more powerful when they get to drive the learning.”

Think About What Technology Is Good At

In the Meriden Public Schools, there is a “no zero” grading policy to encourage the completion of all work. Middle and high school students have their own school-
TEACHING WITH TECH

issued devices, and students spend part of their class time working independently online, reading digital texts and using courseware from providers such as myON, Discovery Education, Odysseyware and ST Math.

“There are times when there is direct instruction, and there are times for small group or individual work,” said Barbara Haefner, director of curriculum and instructional technology for the district. In many classrooms, she said, “there are ‘must-do’ activities that students have to complete, and then students can pick from several ‘can-do’ activities as well.”

When students are familiar with the technology and they understand the culture of the classroom, they can work independently at their own pace. “You can give them that choice and know that’s going to be a constructive use of their time,” said Superintendent Mark Benigni.

Part of the challenge in leading blended learning effectively is understanding when — and how — to use technology and when other modalities might be more appropriate.

Educators should “think about what technology is really good at and use it in those ways,” Horn advised. “Technology is really good at delivering content, for example. It’s great for helping people repeat and practice different skills over and over again.”

On the other hand, “technology is not as good at giving robust feedback on a project where you’re moving to much higher levels of Bloom’s taxonomy,” he said. “It’s not that great for leading a Socratic discussion among students to reach higher levels of understanding. It’s not as good as a teacher in being able to understand the emotion of a student and try a different approach in the moment to reach that student in a deep, one-on-one way.”

Professional development is critical in helping teachers understand these distinctions.

“You can’t throw a teacher out there and say, ‘OK, start blending.’ Kemble said. “Teachers need to have some structures and ideas in place.”

Lawrence Public Schools provides professional development that is ongoing and embedded. “On two Tuesdays per month, teachers can attend special blended learning sessions covering topics like flipped learning, and they also have time to collaborate on lessons,” she said. “We pay for substitutes to cover the teachers’ classes, and they come to our central office and work here. We also have learning coaches to help them along the way. We feel it’s important for our teachers to be able to grow and move forward with blended learning.”

Meriden also has student-centered learning coaches who work hand in hand with teachers. “Just like our students are at different levels, our teachers are at different levels as well,” Benigni said. “We don’t expect that teachers will be blended learning experts right away. But we do expect they will embrace this [model] because this is where learning is going. We try to meet teachers where they are and provide staff on-site to support them.”

Dennis Pierce is a freelance writer with 20 years of experience covering education and technology. He can be reached at denniswpierce@gmail.com.

YOU CAN’T THROW A TEACHER OUT THERE AND SAY, ‘OK, START BLENDING.’ TEACHERS NEED TO HAVE SOME STRUCTURES AND IDEAS IN PLACE.

RESOURCES FOR THE BLENDED LEARNING TEACHER

Khan Academy offers videos and lessons on just about all the core subjects, including mathematics, science and engineering, computer science and programming, English grammar, history, music, economics, art history, test preparation, college admissions and entrepreneurship. Much of the content is free if you register. khanacademy.org

Catlin Tucker is a Google certified teacher, best-selling author, trainer and frequent ed tech speaker. She currently teaches high school in Sonoma County, CA. Her books include “Blended Learning in Grades 4-12,” “Creatively Teach the Common Core Literacy Standards with Technology” and “Blended Learning in Action,” published by Corwin in September 2016. She writes the “Techy Teacher” column for ASCD’s Educational Leadership magazine, and her own site is catlintucker.com.

StudySync offers an extensive digital library, with more than 1,200 classic and contemporary texts, both fiction and nonfiction; weekly writing practice; online writing and peer review; multimedia lessons; and standards-based assignments and assessments. StudySync is generally available on any device and adheres to rigorous ELA standards. studysync.com

“Most Likely to Succeed: Preparing Our Kids for the Innovation Era” by Tony Wagner and Ted Dintersmith is an influential book that reimagines what high quality education can be in the 21st century. Published by Scribner, it provides tips on how schools can refocus and prepare children for the jobs of the future.

Tonywagner.com/1933

Other online curricula and lesson providers include myON, Discovery Education, Odysseyware and ST Math.
Developed to help teachers integrate differentiated instruction and assessment techniques into their lessons, NetSupport School provides multiple assessment and collaborative teaching tools that can be used across all types of platforms and devices to help engage students – regardless of learning style.

- Launch surveys to assess comprehension and progress
- Send out lesson objectives and learning outcomes
- Share the teacher’s screen directly onto devices
- Direct students to appropriate websites and monitor activity
- Respond discreetly to student help requests
- Compatible across multiple platforms

Award-winning and with over 27 years of development expertise, it’s no wonder NetSupport School is the complete classroom management solution of choice.
Tom Redmon, a teacher at Hamilton School District No. 3 in Montana and a facilitator for LearnZillion, said he thinks the push on STEM has helped build the prominence of coding too. Once a week the students in his fourth grade pull out devices from a Chromebook cart and either practice keyboarding or coding “or a combination of the two.” Code.org provides the curriculum he and his fellow teachers use for that. To the kids, he added, “it’s kind of just games.” But alongside that, “they are getting a strong coding background.”

Even though the topic of coding is also coming up “in teacher conversation more often,” Redmon said, adoption isn’t moving as fast as he might have expected. “As with a lot of new innovations, particularly with technology, things seem to be slow to get started. I’m seeing teachers who are really just uncomfortable dipping their feet in. And some of it is generational. Some of it is just the teacher not being willing to put in the time to explore new options.”

Cheryl Williams, interim CEO for the International Society for Technology in Education (ISTE), concurred. One problem is that “we really don’t really have the workforce to teach them that — no fault of the workforce.”

Jeff Knutson, senior manager of education content for Common Sense Media Education, sees the subject of coding as something that teachers “can learn along with their students,” in a nod to promoting the growth mindset. “It’s a great way for teachers to model for their students how they approach something that’s new or unfamiliar.”

Besides, Knutson observed, “There are so many coding platforms now that couldn’t really make it any easier for a teacher to get started and for students as well.” Code.org, for example, offers free courses for teachers to use in their classes, divided by elementary, middle and high school, parsed by subject for the older students, and including lesson plans, frameworks and standards. Like Mendoza, Knutson would throw the study of coding into the category of literacy. “Code is everywhere. We live in a digital world. It’s empowering if students cannot just understand that but that they can take...
part in it and have a place in that conversation of digital communication.”

Student Privacy
Last year student data privacy concerns shot to the top of the list, considered “unanimously hot” by everybody who weighed in on the subject. This year is no different. Student privacy is still uppermost in the minds of educators, but those educators are coming at it with a bit more maturity.

“If you had interviewed me three years ago,” said Keith Krueger, CEO of the Consortium for School Networking (CoSN), “I would have said privacy is a new trend. But I think there’s been a recalibration. There’s less of a breathless, ‘Oh, my gosh! There’s going to be all kinds of new laws and parent anger around student data.’” Now, he noted, “There’s a recognition that that is a new reality. There’s an expectation around privacy, a new strategy around reframing it from privacy to what I would say is trust.”

What that requires on the part of educators, he added, is to be “more transparent about how you collect data and why you collect data.”

CoSN, for its part, has introduced a new voluntary “Trusted Learning Environment Seal,” intended to help school districts communicate to parents and others the privacy efforts they take to adhere to best practices related to the appropriate uses of student data.

Schools need to continue finding ways to talk about how they use data, agreed Karen Cator, president and CEO of Digital Promise. “There is so much data being collected, and we are just learning more and more about where that is, who has access to it and how it’s being used.” It’s especially important, she said, “when we’re talking about children” to be “completely aware and vigilant about privacy.”

Another privacy-related effort comes from Common Sense Media, where the organization in 2016 introduced an initiative to provide privacy evaluations for the apps it reviews on its education site. According to Knutson, “No teacher ever wants to put their students at risk in any way. But part of the challenge for educators in dealing with the privacy issue is that it gets very technical really fast, to a level that can jump beyond most people’s understanding.”

Active Learning
Active learning has gotten a new lease. David Ross, the CEO of the Partnership for 21st Century Learning (P21), clarified that this concept is a “rebranding” of project-based learning, which, he added, used to be called “experimental learning.” All of these spring from the idea that students want to do something more than simply listen to the teacher, and tech can play a role in making that happen.

Part of the movement is “flat out common sense,” Ross said. “Name an adult who can sit still for 90 minutes and listen to somebody drone on. If an adult can’t learn that way, how in the world can kids learn that way?”

But another aspect is that brain research also has shown that “the way people learn is to have real-life engaging experiences.” He doesn’t buy into the idea that a mobile world has created kids with shorter attention spans. “I have two teenage sons, and they can stay focused on something for hours if it engages them.” Tech is often the way to “lure them to learning.”

What’s important, Ross advised, is that the active learning has to be relevant to the student and include activities “anchored in the real world and anchored in significant content, whether it’s Common Core or Next Generation Science Standards.”

Pulling in learning standards is an essential element to active learning because it can help provide structure, suggested ISTE’s Williams. “We’ve been talking about this for a long time — creating your own learning. It’s not just ‘Let kids do whatever they want.’ There has to be structure. There have to be guideposts. There has to be adult involvement.”

Achieving a pure active learning classroom environment is a challenge, Williams acknowledged. “All of this is the ideal — where teaching and learning and technology intersect and where very few places can attain it because it’s, quite frankly, more expensive to do than the sitting in rows in a chair and having a teacher talk.” It requires funding and “highly trained professionals to work with students.”

Promoting active learning isn’t “saying what we did in the past is irrelevant,” she said. It’s just that educators need to find new ways for students to “demonstrate their learning and take in facts and actually make them meaningful for themselves.”

Augmented Reality
Augmented reality, in which students experience a virtual layer on top of the real world, is heating up among teachers for one primary reason: Pokémon Go. “I play Pokémon Go every single day all over the world,” claimed P21’s Ross. “And I think it opened teachers’ eyes to how augmented reality is something that even somebody with low-tech skills can use.” If he were still in the classroom, he said, “I would use Pokémon Go to teach geography or geocaching or mapping, which is a sadly lacking skill in most schools. It has opened a tremendous door and for educators to ignore that opportunity, I think, would be a big mistake.”

The cover of the New Media Consortium/CoSN Horizon Report in 2016 featured a young student wearing a virtual reality headset. Virtual reality and augmented reality were named as an important development in ed tech for K-12 with a time-to-adoption of two to three years. CoSN’s Krueger said he thinks the easy and low-cost availability of Google Cardboard headsets are driving much of that interest. He points to a virtual tour of Yosemite National Park, led by President Obama. “I’m not saying that will transform learning,” he said. “But it’s certainly a cool use of technology for letting students visit places and experience things they couldn’t normally do.”

Elementary teacher Redmon isn’t convinced, primarily because so many of the apps and headsets require the use of smartphones, which younger children don’t have access to. Augmented reality “might be a hot thing, but it isn’t going to be hot in elementary school.”
It’s just a matter of time before that lack of technology dissipates, insisted Sean Nank, a math teacher at Oceanside High School in California, a member of the faculty at both California State University San Marcos and American College of Education and a facilitator for LearnZillion. In his education courses, for example, he’s hearing “a lot more people talking about using augmented reality and virtual reality in their classrooms. A year ago I didn’t hear it at all.”

Nank equates that technology to the early days of 3D printing in schools. “When the price got down so dramatically, you started seeing those popping up. Now for the last couple of years they’re everywhere. The same thing is happening with virtual reality. The price is coming down, and interest is starting to build. I can see that coming into the classroom more because it’ll be more affordable.”

Maker Spaces

If there’s one overarching theme in the latest Horizon Report on ed tech, it’s that teachers want to “make learners creators, not just consumers,” said CoSN’s Krueger. Doing so, of course, doesn’t necessarily require something that runs on power or with batteries. “We could take glue and construction paper and make something,” he pointed out. Yet, the “new tools” make the possibilities “so compelling.” Krueger points to the “Prosthetic Hand Challenge,” a program kicked off by sixth grade students in a South Carolina school to 3D print a hand for a girl their own age and has since attracted hundreds of classes from 32 countries to create hands for people around the world.

The value of that kind of maker activity, observed Krueger, is “first of all, just understanding and connecting with other people, with solving a real problem of accessibility.” He noted that he’s not saying “every class should be making hands,” but that kind of activity is a “good way to show service” and to share their process with other kids. “They have made it so 400 schools today can do the same thing.”

For teachers who are intimidated about the maker movement, Common Sense Media’s Knutson said that maker spaces can start modestly and grow from there. “A makerspace could be something as small as a corner of your classroom or an activity that you do that encourages students to become makers, to make something with their hands.”

That approach to instruction “really taps into a more constructivist style of pedagogy, and I think that teachers and students are into that,” he said.

Knutson, a former teacher, described a “zine-making station” in his own classroom, where he’d encourage students to “come over and use different tools and supplies so they could make a zine to self-publish their work.” Their efforts might start out with something as simple as a book layout that was stapled together along the spine. “But it was easy for students to take that and transition it into, ‘Oh, now I should put a cover

TECH TRENDS

LOOKING UP IN 2017

The nine topics covered in our main article aren’t the only ed tech categories on the rise for 2017. Panelists also mentioned these three areas of interest.

Learning analytics and applied research. The current emphasis on data-driven decision-making via dashboard is being overshadowed by work in neuroscience, cognitive science and psychology. Those research areas, in turn, are driving more insight and understanding about the subjects of learning and brain development “and the importance of environment on learning,” said Digital Promise’s Karen Cator.

Social-Emotional Learning. Under the new rules of the Every Student Succeeds Act (ESSA), each state has to come up with its own accountability system, which may include a “fifth indicator” chosen by the state for assessing student success. The same regulations include a “focus about social-emotional learning,” said P21’s David Ross. “It’s literally in the federal law. Every state is trying to figure out, how do I teach social-emotional learning?”

Media Literacy, News Literacy, Information Literacy. A recent report from Stanford confirmed what many teachers already knew: Students have trouble judging the credibility of information they find online. That’s just one clue, said Common Sense Media’s Kelly Mendoza, that the need for heightened attention on media literacy is crucial. “We’re in the wake of the issues about truth and fiction around the presidential election and determining what is truth and what is fiction. That’s difficult even for an educated adult. There’s the whole issue around fake news.” All of this, she added, “is alarming. If you think about it, teens are always connected. They may be on social media platforms, and a lot of those platforms have content that may be news and it may be promoted or sponsored or fake news.”

Fortunately, with this renewed interest comes a wealth of digital resources that can help educators integrate media literacy into their curriculum. “At the core of media literacy is critical inquiry, the questions that you ingrain as a teacher into anything you’re doing,” Mendoza said. “It could be a research assignment, it could be that you’re showing a video and you ask these questions about the video content you show. It could be that they’re reading a textbook or article, and you embed critical thinking as a normal part of your instruction: Who wrote it? Why did they write it? What is the message? Is it trustworthy? How can I tell that? What sort of points of view are represented or missing?”
Proven solutions for student success.

Blended by design using rich diagnostic data to connect the student experience across digital and classroom learning environments.

i-Ready

CurriculumAssociates.com/Research
on this,’ and ‘Now I should get creative and make that cover something unique and different.’ Or they’d work with different page layouts. So all of a sudden, students could get really creative not just with the message that they’re communicating but with the medium. It can turn writing into more of a multi-dimensional activity for students.”

Knutson’s colleague Mendoza agreed that maker spaces don’t require technology or even dedicated resources. ‘I was talking with a school district that has maker ‘carts,’ which I’d never thought of. It doesn’t have to be a complete overhaul of your classroom. You could have a cart with some materials and activities and create stations for your students.” The main point, she asserted, is to “get students up and actually trying and tinkering and problem solving through the making.”

But the maker movement will never really get a strong hold in K–12, said P21’s Ross, until the learning experience is more “codified.” Accomplishing that means finding ways to help teachers and kids “create around significant content in math, history, science, whatever.”

Past conversations with Dale Dougherty, considered by some to be the “father” of the maker movement,” have convinced Ross that the movement is too enthralled by its “anarchic focus” to operate well in the “practical policy world of public schools.” In order for the movement to make a “deep impact on K–12,” he said, “some organization has got to bridge that gap and cross the chasm.”

**Next Generation Science Standards**

Whereas the term “Common Core” seems to have become anathema to governors and parents alike around the country, Next Generation Science Standards haven’t suffered the same ignominy. In fact, it’s a topic that’s truly heating up, according to education experts who commented for this article.

ISTE’s Williams suggested that the naysayers haven’t hit upon NGSS in the same way as Common Core because “it’s much less volatile” and it has avoided the wrath of people who don’t like the “notion of judging teacher effectiveness by how the kids in their classes do.”

Teacher support will play an influential role in how successful the science standards turn out to be, added high school teacher Nank, who is married to a high school biology teacher. “With my degree in math, I can teach Algebra I and Geometry, I can teach Algebra II and Pre-Calculus. I can teach integrated or segregated courses. But in science you have subject-specific credentials. If you have a credential in biology and NGSS wants you to integrate it, what does that mean for your entire teaching career?” he wondered. “Can a person in biology teach a course that integrates biology and chemistry? And the person in chemistry—can they teach a course that has chemistry and biology? What about a person who has physics? How do you integrate that?”

If the answer is no, he replied, “What resources do we need to bring to bear to these teachers to enable them to be ready to teach an integrated type of science course?”

Ultimately, all kinds of changes could happen as NGSS gains momentum, affecting “what it looks like in the classroom, what teachers should do differently, what it looks like for students, what the curriculum looks like and the pedagogical strategies.” Nank’s hope is that addressing those kinds of questions will “be the center of the conversation very soon.”

**Open Educational Resources**

As teachers seek out new digital content, open educational resources
(OER) serve a useful purpose — they’re free or low-cost. But the problem is hunting down the good stuff. Right now the most common way teachers find lessons is through Google, said elementary teacher and LearnZillion facilitator Redmon. Next on the list is Pinterest. While those sites are portals into all kinds of free materials, he said, the results don’t necessarily get vetted the way they should before they’re used in the classroom. “I don’t think that’s happening as much as it should. And I think there’s a lot of low-quality stuff out there.”

Redmon would rather see teachers head to sources such as his own, LearnZillion, or Engage NY, where there’s much more curating of lessons happening.

ISTE’s Williams, who serves on an education advisory board for the National Park Service, is impressed by the extent of educational materials made freely available by federal agencies. “The Library of Congress archives, the Park Service, NASA — they’ve developed all this stuff that’s free that could be resources for teachers and schools if they knew they were there.”

Math teacher Nank recalled piloting an iPad program in his district where four teachers spent thousands of hours developing assessments and curriculum. Thankfully, he asserted, those days are gone. “Quite honestly, there are not enough hours in the day for teachers to do everything they need to do for their classroom and their students and still fulfill the technology they know they need in the classroom. OER is the perfect remedy to get those types of resources in the students’ hands without over-burdening the teachers. Every minute you spend on the technology is a minute that you lose for planning, grading and interventions and working with the students.”

**Robotics**

Alongside coding and maker spaces, robotics as a learning tool is on the rise. What’s helped bring it into more schools is falling costs, Nank said. “It’s starting to be affordable for a lot of people to be able to do it.”

Plus, he said, robotics “captures” students’ motivation and attention so much more than coding on its own. “If you give them a reason for learning the technology and integrate it into what they’re already interested in, that’s where it’s really going to start to take off.”

Common Sense Media’s Knutson said the pick-up is occurring because of the proliferation of robotics hardware. “As we see the consumer market become more infused with maker space robotic toys and tools, we’re seeing educators find applications for those things and move them into the classroom.” Popular products he cited include Wonder Workshop’s Dash and Dot, Ziro robotics kits and Lego Mindstorms as good places for teachers to start.

“It’s a great combination of the learn-to-code movement and the maker movement,” Knutson said. “It brings together all of the excitement around the learn-to-code movement and adds to it a physical component that’s really compelling and engaging for kids.”

**STEAM**

Even as the arts as a lone discipline is on the wane in K–12, primarily due to funding issues, STEAM — science, technology, engineering and math with the arts mixed in — is on the rise. More cynical observers might suggest that the arts have become part of STEM to follow the money. “Sure! We want to get on that bandwagon,” suggested ISTE’s Williams. But more importantly, the arts “can be a gateway to all kinds of fact learning,” she said. For example, “Music is very mathematical.”

Likewise, Williams noted, “When we concentrate too much on the hard cognitive things without understanding the importance of appealing to the emotive side of who we are as learners, then we miss a whole entry point. We narrow students’ experiences, and we narrow people’s views of the world.”

She said she also believes it can help broaden the appeal of STEM. “I worked for years on women’s issues. We know that for whatever reason we’ve had a hard time attracting female students to some of these areas. But if you can appeal to them or draw them in from an arts standpoint and involve them, it makes it a richer field.”

Although Nank is a math instructor, he’s convinced that “without that A in STEAM, you’re not going to get innovation.” In a master’s level course on research methods that he teaches, he gets a lot of students who are arts or music teachers beginning work on their theses in his class. He often hears them comment on how disconnected they feel from the rest of the STEM activities in their schools. So the key to STEAM succeeding is “getting the A to really be a part of it, as opposed to the STEM [teachers] basically having their own part and then the A being kind of off to the side, not truly integrated.” Once that integration happens, Nank said, “then I think it will be really hot.”

Dian Schaffhauser is a senior contributing editor for 1105 Media’s education publications THE Journal and Campus Technology. She can be reached at dian@dischaffhauser.com or on Twitter @schaffhauser.
embrace of STEM-infused curricula has accelerated coding’s ascendance. Zach Latta, executive director and founder of San Francisco-based Hack Club, said the rise of coding is closely tied to a problem-solving ethos that beckons students to build new solutions. Latta provides coding curricula free of charge to help students in America, and internationally, to start coding clubs.

“We started 2016 with 42 schools, and today we are in 150 schools, so we’ve grown by 257 percent,” said the 19-year-old Latta, who was named one of Forbes’ “30 Under 30” (Educational Category) in 2016.

“Cupertino High School’s club leader told me he started with 70 at the first meeting, and was expecting half to drop off. But they had over 60 people come to every single club meeting. They told me some students were even quitting sports to join the club.

AMPA PREPARATORY SCHOOL has taken the plunge into coding. Tenth graders at the Florida school can choose a STEM-focused curriculum that offers courses in Robot C, C programming and Swift iOS app development for iPads to go along with classes in engineering and robotics.

According to Chad Lewis, director of technology at Tampa Prep, the STEM focus requires students to at least be entering Algebra II in 10th grade, in addition to a high level of success in prior math and science classes. STEM students, as well as others, may opt for coding-specific courses that feature Python programming that can be used to build apps for the iPad.

“Using Python, one of our students built a tardy check system that we use in the school every day,” Lewis said. “They connect a USB scanner, and the kids scan their ID card when they’re tardy. It will automatically print out their time and picture and e-mail the attendance dean. Our coding students are leveraging Python, Linux and other coding languages, and it all integrates into the Google Apps ecosystem.”

Tampa Prep also offers a Cyber Patriot Club for “white hat” hacking, as well as a Coding for Girls camp. Far from abandoning the club realm, Lewis said he merely believes that coding (aka “hacking”) is too important not to be featured in the curriculum. And while he said he believes computer science is essential, he contends that the creative and practical aspects of coding are crucial ingredients to maintain student interest.

Once relegated to after-school and extracurricular activity status, coding is steadily making its way into the curriculum, both in the United States and abroad. The nationwide embrace of STEM-infused curricula has accelerated coding’s ascendance.

Zach Latta, executive director and founder of San Francisco-based Hack Club, said the rise of coding is closely tied to a problem-solving ethos that beckons students to build new solutions. Latta provides coding curricula free of charge to help students in America, and internationally, to start coding clubs.

“We started 2016 with 42 schools, and today we are in 150 schools, so we’ve grown by 257 percent,” said the 19-year-old Latta, who was named one of Forbes’ “30 Under 30” (Educational Category) in 2016.

“Cupertino High School’s club leader told me he started with 70 at the first meeting, and was expecting half to drop off. But they had over 60 people come to every single club meeting. They told me some students were even quitting sports to join the club.

Coding Comes of Age

Coding is gradually making its way from club to curriculum, thanks largely to the nationwide science, technology, engineering and mathematics (STEM) phenomenon embraced by so many American schools.
Providing the tools
to inspire the
problem solvers of tomorrow.

VEX IQ is a robotics platform designed to transform STEM learning. Students as young as eight years old can jump right in and snap robots together using the innovative tool-less construction system.

Whether you’re building a robot at home, teaming up to compete on the world stage, or inspiring the STEM problem solvers of tomorrow in your classroom... you’re building a better future.

sales@vex.com • 903-453-0802

VEX and VEX Robotics are trademarks or service marks of Innovation First International, Inc. Copyright © 2002-2017, All Rights Reserved, VEX Robotics, Inc. is a subsidiary of Innovation First International, Inc. All other product names/marks of others are the property of their respective owners.
We were in seven countries earlier this year. Today we are in 13 countries.”

Latta said more computer science mandates will inevitably continue to appear in school curricula, but ultimately it’s not enough to spark the lasting enthusiasm that can fill the professional void. “There is a dearth of computer scientists and software engineers,” he said. “However, Hack Club’s expressed goal is to create more hackers in the world. These are people who build things [largely using HTML, CSS and JavaScript] that often un-intuitively change the world.”

**Computer Science Helps Put the ‘A’ in STEAM**

Ly Nguyen, a computer science teacher at Mountain View High School in Mountain View, CA, has moved beyond the now familiar “hour of coding” that many high schools are doing throughout the country. In addition to the Computer Science Club, the Girls-Who-Code Club and the Robotics Team, Mountain View High School has Intro to Computer Science, AP Computer Science and an App and Game Design class. Yet another Advanced Computer Science class will be added in 2017, and Nguyen said the class will incorporate coding in the course work.

Particularly in the App and Game Design class, the main function is to write code and build apps and games on a large scale. App and Game Design ends up being the perfect place to add the “A” (for arts) in STEM to make STEAM.

“A lot of art can be involved in computer science when you design games,” said the 35-year-old Nguyen, a 12-year teaching veteran. “When you design a user interface, you would need the mindset of an artist to make the interface look beautiful. Computer science has become a field that is very broad. No longer do you just need a specialized person who does coding; you need a person who knows art to contribute. Many different disciplines can combine to make a wonderful product.”

“We’re also trying to incorporate art at Tampa Prep,” added Chad Lewis.

“What we need are classes that have specific curriculum elements that use arts in STEM. We do have some art students in our Introduction to Design classes where they learn computer aided drafting/design. These arts students want to be able to develop art projects using CAD. They want to take their skills in art and transfer them to the digital realm.”

**The Earlier Grades**

With a total enrollment of slightly more than 100, the one-school (K–8) Congress Elementary School District is in many ways the perfect laboratory for introducing younger children into the world of coding. Located in the town of Congress, AZ, the rural school has capitalized on the popularity of robotics to unobtrusively show students the power of code.

“As I was helping to develop the curriculum for Lego Robotics, a large piece of it was programming,” said Suzanne Sims, IT Director at the Congress Elementary School District. “We looked for resources beyond the Lego programming software to provide an enriched understanding of coding. The website Code.org provided self-paced tutorials for students and a comprehensive curriculum.”

With the growing popularity of robotics, and an all-school participation in the Hour of Code, many students began to become more interested in programming. That interest led teachers and administrators to make plans for integrating coding directly into the curriculum. Additional teacher training from Code.org followed, and enthusiasm has grown from there.

“K–2 students have Android tablets, and teachers are taking the initiative with coding apps such as The Foos,” Sims said. “Now we have implemented a maker space once a week for the entire school. Some created passion projects include the use of coding. Many students are also learning Scratch to create apps that integrate with their project. Other additions are the Dash and Dot robots using Blockly.”

**The Student Perspective**

Far from the hotbed of Silicon Valley, schools such as Roslyn High School in Roslyn Heights, NY (Long Island), have also embedded coding within the coursework. Rachel Sterneck, a senior at Roslyn, reported that the school currently offers two classes that heavily integrate coding into the mix – Intro to Java and AP Computer Science.

During her junior year, Sterneck confessed, she found her computer science courses “rigid and boring” with what amounted to too much top-down instruction. After taking additional courses outside of high school, Sterneck said, “I decided to start a coding club in my high school because I felt the classes I was taking outside of school were a lot more hands-on. We were learning how to make websites and apps, instead of just copying down notes from our teacher. So the coding club would amplify my experience.”

While researching possible curricula, Sterneck found Hack Club’s website (hackclub.com) from a Google search. “I applied and spoke to Zach Latta, and he agreed to work with me,” she said. “Ever since I started working with Hack Club, the coding club in my high school has been so successful. We have about 35 students at each meeting, which is a lot more than the average size club in my high school.”
Latta’s mission to produce hackers who build new things and solve problems has resonated with Sterneck and coding club members. “There is no limit to what you can code, and what you can actually build with code,” Sterneck said. “If you have any idea, you can put all the effort you want into it and make whatever you want. The resources that Hack Club uses are cloud-based, so even if you are working on a school computer, you can still work on it at home.”

Outside the United States, Hack Club has helped lay the foundation for coding clubs as far flung as India and beyond. Students such as Athul Blesson, a 12th grader at Sree Sarada Vidyalaya secondary school in Matteoor, Kalady, Kerala, India, can now join the coding club or take coding classes where students have the option to learn HTML, C++, C and Java.

“Before coding, I was a very silent person who never got involved in any sort of extracurricular activities. I was lazy. When I started coding, it gave me confidence....”

“Coding helps me visualize my ideas,” Blesson said. “Before coding, I was a very silent person who never got involved in any sort of extracurricular activities. I was lazy. When I started coding, it gave me confidence and it took away my laziness. Student-led coding clubs like Hack Club provide a very good opportunity to learn coding.

“When I started my first Hack Club, I got great positive response,” continued Blesson. “More than half of my school became part of my club.... Clearly, coding is a basic literature in this digital age. It teaches us an interactive way of learning, and it is a great way to bring ideas and innovations to life.”

Elisha Coad, a junior at Classical Christian Academy, a private school in Post Falls, ID, has taken coding matters into his own hands, also with help from Hack Club. “There are no programming or coding classes at my school, and no coding clubs except for mine,” Coad said. “There are no local hackathons or events of the sort. Because of this, my coding club is the only exposure to programming my members receive.”

Even as more schools catch up to the coding phenomenon via specific courses, the club route will remain viable as a separate venue for pure creativity. Ultimately, it’s that creativity that attracts students in the first place. “I love the mental challenge that coding provides, and how there is almost always something new to learn,” Coad said. “Technology is only becoming more prevalent in our daily lives. To know how to wield it feels amazing.”

Greg Thompson is a freelance writer based in Fort Collins, CO.
Editor-in-Chief David Nagel
Associate Editor Richard Chang
Vice President, Art and Brand Design Scott Shultz
Art Director Chris Main
Print Production Coordinator Lee Alexander
Chief Revenue Officer Dan LaBianca
Director of Sales David Tucker
Senior Sales Account Executive Jean Dellarobba

Public Sector Media Group
Chief Operating Officer & Public Sector Media Group President
Henry Alain
Co-President and Chief Content Officer
Anne A. Armstrong
Chief Revenue Officer
Dan LaBianca
Chief Marketing Officer
Carmel McDonagh
Advertising and Sales
Chief Revenue Officer Dan LaBianca
Director of Sales David Tucker
Senior Sales Account Executive Jean Dellarobba
Media Consultants Ted Chase, Bill Cooper, Matt Lally, Mary Martin, Mary Keenan
Editorial Staff
Editorial Director, Education David Nagel
Associate Editor, THE JOURNAL Richard Chang
Web Producer Bri Ravipati
Art Staff
Vice President, Art and Brand Design Scott Shultz
Creative Director Jeffrey Langkau
Associate Creative Director Scott Rovin
Senior Art Director Deidre Hoffman
Art Director Joshua Gould
Art Director Chris Main
Art Director Michele Singh
Assistant Art Director Dragutin Cvetanovic
Senior Graphic Designer Alan Tao
Senior Web Designer Martin Peace
Print Production Staff
Print Production Coordinator Lee Alexander

Online/Digital Media (Technical)
Vice President, Digital Strategy Becky Nagel
Senior Site Administrator Shane Lee
Site Administrator Biswarup Bhattacharjee
Front-End Developer Anya Smolinski
Junior Front-End Developer Casey Rysavy
Executive Producer New Media Michael Domingo
Site Associate James Bowling

Lead Services
Vice President, Lead Services Michele Ingrund
Senior Director, Audience Development & Data
Procurement Annette Levee
Director, Audience Development & Lead Generation
Marketing Irene Fincher
Director, Custom Assets & Client Services Mallory Bundy
Custom Editorial Manager Lafe Low
Project Manager, Client Services Michelle Long
Project Manager, Client Services Olivia Urizar
Project Coordinator, Client Services David Yang
Manager, Lead Generation Marketing Andrew Spangler
Coordinators, Lead Generation Marketing Naia Bryant, Jason Pickup

Marketing
Chief Marketing Officer Carmel McDonagh
Vice President, Marketing Emily Jacobs
Director, Custom Events Nicole Szabo
Audience Development Manager Becky Fanton
General Manager, Federal Soup & Washington Technology
Annette Levee
Custom Editorial Director John Monroe
Manager, Audience Development Tracy Kerley
Senior Coordinator Casey Stankus
Event Sponsorship Consultants Alycia Morrison, Khary Wolinsky
Marketing & Editorial Assistant Megan Burpo
FedSoup and Washington Technology
General Manager Annette Levee
OTHER PSMG BRANDS
Campus Technology
Executive Editor Rhea Kelly
Defense Systems
Editor-in-Chief Kevin McCane
FCW
Editor-in-Chief Troy K. Schneider
Executive Editor Adam Masmanian
Staff Writers Sean Carberry, Alisha Chowdry, Chase Gunter, Mark Rockwell
Federal Soup
Managing Editors Phil Piamonte, Sharkiya Wedgeworth
GCN
Editor-in-Chief Troy K. Schneider
Executive Editor Susan Miller
Senior Editor Paul McLuskey
Reporters/Producers Matthew Leonard, Amanda Ziadeh
Washington Technology
Editor-in-Chief Nick Wakeman
Senior Staff Writer Mark Hoover

1105 Media
Chief Executive Officer Rajeev Kapur
Chief Operating Officer Henry Alain
Chief Financial Officer Craig Rucker
Chief Technology Officer Erik A. Lindgren
Executive Vice President Michael J. Valenti
Chairman of the Board
Jeffrey S. Klein

THE JOURNAL
SALES CONTACT INFORMATION
DIRECTOR OF SALES
David Tucker
(515) 256-0156
dtucker@1105media.com

SENIOR SALES ACCOUNT EXECUTIVE
Jean Dellarobba
(949) 265-1568
jdellarobba@1105media.com

CORPORATE HEADQUARTERS
1105 Media
9201 Oakdale Avenue, Suite 101
Chatsworth, CA 91311
1105media.com

MEDIA KITS
Direct your Media Kit requests to Jean Dellarobba,
(949) 265-1568 (phone), (949) 265-1528 (fax),
jdellarobba@1105media.com

REPRINTS
For single article reprints (in minimum quantities of 250-500), e-prints, plaques and posters contact:
PARS International
Phone: (212) 221-8595
E-mail: 1105reprints@parsintl.com
Web: mageprints.com/QuickQuote.asp

LIST RENTALS
This publication’s subscriber list, as well as other lists from 1105 Media, Inc., is available for rental. For more information, please contact our list manager, Marc Direct.
Phone: (914) 368-1000
E-mail: 1105media@marcdirect.com
Web: marcdirect.com/1105

SUBSCRIPTIONS
For questions on subscriptions or circulation, contact: (866) 410-1321

REACHING THE STAFF
Staff may be reached via e-mail, telephone, fax or mail. A list of editors and contact information is also available online at thejournal.com, or editors can be reached at editorial@thejournal.com.

E-mail: To e-mail any member of the staff, please use the following form: FirstInitialLastName@1105media.com.

Corporate Office
Weekdays 8:30 a.m.–5:30 p.m. PST
Telephone (918) 814-5200; fax (918) 936-0496
9201 Oakdale Avenue, Suite 101
Chatsworth, CA 91311
SCHOOL INDEX

American College of Education (IN) ........................................ 24, 26
California State University, San Marcos (CA) ........................................ 24, 26
Classical Christian Academy (ID) .............................................. 31
Congress Elementary School District (AZ) ........................................ 30
Cupertino High School (CA) ......................................................... 28
Hamilton School District (MT) .................................................. 22, 26
Illinois State University (IL) ...................................................... 18
Kankakee School District (MS) ....................................................... 24
Lawrence Public Schools (KS) .................................................. 18-20
Meriden Public Schools (CT) ..................................................... 18-20
Mountain View High School (CA) ............................................ 28
Next Evolution in Work-Based Learning (CA) ...................................... 18
Oceanside High School (CA) ..................................................... 25, 26
Roslyn High School (NY) ............................................................. 30
SPEED special education, Chicago Heights (IL) .......................... 12
Sree Brada Vidyasagar (India) ..................................................... 31
Stanford University (CA) .............................................................. 24
Tampa Preparatory School (FL) .................................................... 28, 30
University of Illinois at Chicago (IL) ........................................... 12
Windsor High School (CA) .............................................................. 19

COMPANY INDEX

Amazon ................................................................. 13
Apple ................................................................. 13, 19, 27, 28
ASCD ................................................................. 20
Christensen Institute ....................................................... 18
Code.org .............................................................. 22, 30
CodeSpark ............................................................. 30
Collaborative for Academic, Social and Emotional Learning .......... 24
Common Sense Media ..................................................... 22, 23, 24, 26, 27
Consortium for School Networking (CoSN) 23, 24, 26
Corwin ................................................................. 20
Digital Promise ........................................................ 23, 24, 26
Discovery Education ...................................................... 20
Engage NY ............................................................. 27
Forbes ................................................................. 28
Google ................................................................. 13, 19, 20, 22, 23, 27, 28, 30, 34
International Society for Technology in Education (ISTE) ............ 10, 26, 27
Khan Academy ............................................................. 18, 20
LearnZillion ............................................................ 22, 24, 26, 27
Legos ................................................................. 27, 30
Linux ................................................................. 28
McGraw-Hill .......................................................... 18
MyON ................................................................. 20
New Media Consortium .................................................. 23
Niantic ................................................................. 23
Odysseyware ........................................................... 20
Partnership for 21st Century Learning ............................................. 23, 24, 26
Pinterest ............................................................... 27
Project Tomorrow ......................................................... 4, 34
Python Software Foundation ................................................... 28
Scribner ................................................................. 20
ST Math ............................................................... 20
StudySync ............................................................. 20
Wonder Workshop .......................................................... 27, 30
Ziro ................................................................. 27

This index is provided as a service. The publisher assumes no liability for errors or omissions.
The Digital Tools That Teachers Use Now

While the use of technology in education is widespread, some of the hottest new technologies are just beginning to make an appearance in America’s classrooms.

Presentation tools and online videos are in use by more than two-thirds of educators, according to data provided to THE Journal by Project Tomorrow. Both of those are more popular even than digital teaching aids and online textbooks. Also strong are, not surprisingly, G Suite for Education (formerly Google Apps for Education) at 42 percent penetration and “game-based environments and online apps” at 48 percent.

Meanwhile, two of the hottest rising stars in technology — augmented and virtual reality — are barely making a dent, with just a 6 percent combined penetration in classrooms. (For more on AR and VR, see our “What’s Hot in 2017” feature on page 22.)

Project Tomorrow also asked those educators for their professional development wish lists. Most (55 percent) want help to use technology to differentiate instruction. Half also want PD to help them use games as a part of instruction.

Interestingly, one of the PD areas with which educators are least concerned is “understanding student data privacy requirements and strategies” — one of the hottest topics of the year. (See page 22 for more on what makes student data privacy a hot topic this year.)

The data here were compiled in a survey conducted by Project Tomorrow involving 38,613 teachers and librarians and are published here for the first time.

We’ll feature more exclusive data from this and other Project Tomorrow surveys on this page in every issue of THE Journal. For more information about the Speak Up survey, visit tomorrow.org.

David Nagel is editor-in-chief of THE Journal.
Where you need us most.

thejournal.com
Creating Engaged Learners.
Igniting Inquisitive Minds.

**BrightLink® Interactive Displays designed for the classroom.**

With big, bright, beautiful images, Epson Interactive Displays enable seeing, sharing and collaborating like never before. Designed based on educator input, they provide wireless compatibility with display devices including Chromebook™, iPad® and smartphones. What’s more, Epson Interactive Displays work with the leading classroom curriculum tools like SMART Notebook®. Epson large displays – chosen by more schools than any other.

epson.com/edu

Epson Education Solutions – helping educational institutions exceed their vision.

EPSON is a registered trademark and EPSON Exceed Your Vision is a registered logomark of Seiko Epson Corporation. BrightLink is a registered trademark of Epson America, Inc. iPad is a trademark of Apple Inc., registered in the U.S. and other countries. Chromebook is a trademark of Google Inc. All other product and brand names are trademarks and/or registered trademarks of their respective companies. Epson disclaims any and all rights in these marks. Copyright 2016 Epson America, Inc.