

A STRATEGY PAPER FROM

CENTER FOR
DIGITAL
EDUCATION

Printer Access in a Digital World

Why today's increasingly mobile students and teachers still need access to printers



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The transition to mobile devices and digital curricula is pervasive and ongoing. At present, at least 14 states have passed measures mandating a move to digital content in the next several years, 65 percent of school districts have a digital content strategy in place¹ and 45 percent of school districts are pursuing a pilot strategy to transition to digital textbooks.² School districts are responding by launching 1:1 device programs and increasingly allowing students to bring in their own laptops, netbooks, tablets and smartphones.

Given this widespread migration to digital curriculum, one would be excused for thinking that printers were on their way to becoming a relic of paper-based education.

But this is far from the reality. In this new digital realm, printers (including multi-function devices with scanning and copying capabilities) can be a vital ingredient in the educational process, allowing teachers and students to both create tangible copies of digital content and transform print material into a digital asset (i.e. scanning in artwork to use in a multimedia project).

As the classroom continues to evolve, the ways in which students and teachers use printers — and the access they need to them — will also change. This Center for Digital Education white paper highlights the printer's evolving role in the digital classroom and explains why it is critical in K-12 education for all students and teachers to have access to a printer.

The Transition to Digital Content in Education

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Printers: A New Perspective on an Old Staple

Several key trends that are impacting education are changing the way printers are used in today's schools, whether in classrooms or central locations, and creating a greater need for printer access. New customizable printing strategies meet this need and support the evolution of the classroom and learning.

Mobile devices, dynamic printing

According to Pew Research, about 75 percent of teenagers aged 12 to 17 have cell phones.³ Approximately 65 percent of the U.S. population is expected to have either a smartphone or tablet computer by 2015, according to research firm In-Stat.⁴ And the Center for Digital Education's 2011-2012 Digital School Districts Survey found that 56 percent of responding school districts are allowing students to use personal devices.

Both teaching and learning are being modified to accommodate and capitalize on this increase in use of digital and mobile devices, and districts are finding that printing is still critical in their mobile learning strategies.

Haysville Unified School District 261 in Haysville, Kansas, realized both students and teachers needed access to printers after tailoring its curriculum for mobile devices. According to Clint Schutte, assistant superintendent for business and finance at the district, teachers especially have plenty of need for printing — both from wireless mobile devices as well as other types of computers (laptops and desktops, for example). Teachers at his district print student progress reports, quizzes, tests and project outlines.

After trying a cumbersome solution — in which the teacher or student who had a document to be printed had to attach it to an email and send it to an email provider, where it could then be sent to print — the district realized it needed a more efficient way to meet the demand for mobile printing.

Haysville USD fortunately found a solution: using copiers that have wireless printing functionality. Now, the district's students and teachers can print directly from their mobile devices to the copiers. "This adds flexibility and convenience to mobile printing," says Clint Schutte, assistant superintendent for business and finance at the district.⁵

With mobile printing solutions, teachers and students can print from anywhere that they have access to the school's network, which could mean printing from home or a coffee shop or during a field trip, as well as in class. This truly recreates the full classroom experience for students and teachers anywhere they may be.

Personalized teaching and learning, customized printing

Personalized learning has been made easier by today's technologies, and this individualized instruction also has had an effect on the way teachers use and need access to printers.



Making Secure Wireless Printing a Reality

JSerra High School, a private school in southern California, uses a managed campus printing service, which lets students print wired or wirelessly from any laptop or PC using secure Internet printing. Teachers, students and staff access their documents from a Web server (after first signing in), then print them using the Web-enabled service, which remains behind the school's firewall. Printing can take place wirelessly from any location; a teacher or student doesn't have to be in school, nor have to install any printer drivers for printing to occur.

The Web-managed service lets the school's IT department monitor and control who is printing what and to which printer. For instance, users can only print ten pages at a time as a default; a cover page also is automatically printed, so that staff at library-based printers can identify document owners.⁶



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- Clint Schutte, Assistant Superintendent for Business and Finance, Haysville Unified School District 261

Rather than print 50 worksheets with the same content, a teacher can use learning software to easily create assignments targeted to each student’s individual needs. Some assignments might still require the printing of worksheets or other tools, but these are likely to be different for each student or small group of students; some might not need worksheets at all.

Additionally, just as students have unique learning styles, educators have unique teaching styles. Some teachers may find it easier to print and grade a student’s work traditionally, using paper and pen, than on a mobile or other digital device, depending upon their circumstances.

“Even if students submit their work electronically, many teachers still print it out to grade,” says Robert Curran, assistant superintendent at Colorado Springs School District 11 in Colorado Springs, Colo.⁷ “I’ll go to little league games and teachers will be in the stands watching the kids and

grading papers while they are there. Maybe they don’t own a one-to-one device, or even if they do, there’s no WiFi at the game, so the teachers can’t access the shared online space where their students’ work is stored.”

Another reason to print: Some students simply learn better with hands-on material than text on a computer or mobile device screen. For these students, teachers often print lesson notes, says Haysville’s Clint Schutte. “Even with the added advantage of using digital media, there are students whose learning style dictates the use of printed material.”

Content creation, multi-function and 3D printers

In the evolving classroom, students and teachers are being armed with tools to create their own content and build their own curriculums. Multi-function and 3D printers are meeting this need in innovative ways.

Increasingly, teachers and students are taking paper assets and turning them into digital content. As part of the digital content revolution, paper resources — such as student artwork, articles, student writing, notes and other material — need to be scanned so that they can become usable digitally and part of the curriculum. Multi-function printers allow this to occur.

A new type of printing, 3D digital fabrication, is putting a new twist on content creation and enabling students to create 3D molds of objects that they have digitally designed. These types of printers are increasingly found both at the university and K-12 level. Recent efforts are aiming to make them more available in elementary classrooms, primarily to foster STEM awareness, enthusiasm and skills among teachers and students. For example, the MacArthur Foundation is supporting a pilot program (called Fab@School) to put 3D printers in public school classrooms. The pilot is run by a group of universities, professional organizations and corporations, including the University of Virginia Curry School of Education, Cornell University and the National Council of Teachers of Mathematics.

The team has created an open source kit to allow the building of 3D printers for as low as \$1,000 each. Students will be able to use these printers in a variety of ways — perhaps creating geometric shapes to study in elementary math class, designing parts of machines in engineering classes, creating scale replicas of historic structures for students in social studies classes and even making a model of Harry Potter’s magic wand for literature students. The possibilities are endless.⁸

Bringing Printer Access to Your School District

Increasingly, price drops on color and photo multi-function printers have led to these being more affordable for even cash-crunched school districts. Classrooms can share printer services, thus spreading costs. These multi-function devices meet the needs of school districts, since they allow districts to phase out or replace free-standing scanners, copiers and fax machines, thus eliminating the need for their maintenance and supplies.

The question of where to locate printers and how many should be available, whether to have printers in each classroom or in a central location (such as a library, main office, computer lab or “pod” space shared by several classrooms on a floor), depends on the individual school and classroom needs. It is important, however, for every student and teacher to have access to a printer.

In one district in Tampa, Fla., administrators decided to remove classroom printers — many of which had been purchased by teachers — in favor of a consolidated solution. However, some teachers in the Pinellas County school district disagreed with the move, pointing out that having classroom printers gave them flexibility to print on the fly, as needed.

“We do not have the luxury to go to the main copier whenever we would like,” second-grade teacher Patricia Spears told a reporter for the *Tampa Bay Times*.⁹

Elementary classrooms may be most in need of classroom printers because teachers can’t leave students unattended and because there may be more need to print materials (such as worksheets) at that level.



With mobile printing solutions, teachers and students can print from anywhere that they have access to the school’s network, which could mean printing from home or a coffee shop or during a field trip, as well as in class.

At Vail School District in Vail, Ariz., where printing in higher grades is downplayed in favor of digital delivery, CIO Matt Federoff understands that, for younger students, printing is often surprisingly important.

“We would never in a million years be paperless at the K-5 level,” says Federoff. Even if a child does a ‘fingerpainting’ on a tablet, says Federoff, this creation should be printed. How else can it be displayed on the family fridge?¹⁰

“At the elementary level, more printing is acceptable and desirable,” says Federoff. Children are encouraged to create real objects that they can hold in their hands and share with their families — which may mean printing work they’ve done on computers or copying work they’ve done as a class.

In cases where a printer is needed in every classroom, affordable inkjet multi-function printers exist with prices typically less than \$200.

Questions to ask while considering which printer is best for your school district:

- Can it print wirelessly from your network?
- Can it print directly and easily from all of the various types of mobile devices that access your network?
- Does it require the installation of print drivers on networked devices?

If so, this could open the door to headaches, especially if you have a bring-your-own-device policy in your school and you allow students to print from their devices, which could have varied operating systems and printer driver specifications.

- What security features does it offer?
- What type of service plan does it offer?
Some vendors offer service plans for a small additional fee that offer full coverage with technical support and replacement programs.
- How long does it take to boot up?
New printer models boot up nearly instantly, so there is never a disruption in learning.
- Look for energy efficiency:
Is it ENERGY STAR qualified?
Does it offer automatic, two-sided printing?

Some Best Practices to Consider

New trends in education such as mobility, personalized learning and content creation are creating a greater need for access to printers. Affordable, customizable printer options are making it so that districts can offer all students and teachers access to a printer with the capabilities needed to support the evolving classroom. The following best practices will help districts build an effective print strategy and make the most out of their printer investment.

Keep costs in check

At Vail School District in Arizona, printing is de-emphasized at the middle schools and high schools, but is still available for students who need it. However, students are charged per page: black and white copies are 3 cents and color copies are 15 cents. Students who want to go over the quota can do so — but at their cost. “Self-regulation is always the best mechanism,” says Matt Federoff, Vail’s chief information officer.

Other software solutions that help reduce costs include the ability to cut Web ads from printed Web pages, saving color ink as well as paper. Additionally, some software features allow you to gather selected portions of Web pages onto a single page for printing or to set your printers to automatically use two-sided printing.

Some final ways to save on ink, paper and maintenance costs include using outsourced managed print services that handle maintenance and repairs, while conducting efficiency analyses to help identify other ways to save money; having clear classroom policies and strategies (rules that tell students when they can print and when they can use colored inks, for instance); and uniformity in type of printer, so that districts can bulk-purchase ink and other supplies.

Support educational goals

Westbury School District in New York found that color used in student worksheets and charts helped students

better comprehend and retain the material, resulting in higher test scores. Because of this, the district sought an economical way to increase color printing. It settled on a managed system of networked, standardized color printers, plus worked to improve efficiencies. For example, color printers were set to default to black and white printing, so that color was an “opt in” item — only those students and teachers who really needed color printing received it. Also, non-color printers were placed in classrooms with a lot of plain text printing (such as literature courses). Color printers, on the other hand, were placed in shared computer labs or other individual classrooms. An added benefit: As a result of these and other changes, the 4,000-student district began saving about \$200,000 each year on printed document costs.¹¹

Scanner capabilities create efficiencies for teachers and allow them to focus more time on students through the automating of testing. When paired with certain software programs, teachers can create tests (such as “bubble sheet” multiple choice exams) along with bar-coded answer sheets. Scanners can be programmed to recognize student answers, then compare them against the answer sheet, thus saving teachers grading time. Results can be printed instantly as well as sent to a district’s student information

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system, classroom grade book, or other location so that a student’s records can be updated, again without the teacher having to record a grade in a gradebook.

Conclusion

Digital learning and digital content are taking root and growing in K-12 school systems, yet despite the fact that teachers and students are increasingly producing content on digital devices, there are still many instances where printers are needed to assist and support this work. Looking forward, today’s burgeoning mobile digital technologies have in some ways increased the ongoing and future need for teachers and students to have easy, reliable and secure access to printers and print-based services in the classroom. And printers and their capabilities are evolving right alongside education to fulfill these teaching and learning needs.

Endnotes

1. The 2011-2012 Center for Digital Education Digital School Districts Survey
2. Converge 2012 Connecting the Dots Events
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4. http://news.cnet.com/8301-13506_3-20095949-17/in-stat-majority-in-u.s-to-have-smartphones-tablets-by-2015/
5. CDE email interview with Clint Schutte, June 19 and 21, 2012
6. www.printeron.net/customer_service/docs/case_study.pdf
7. CDE interview with Robert Curran, May 30, 2012
8. Learn more about 3D fabrication via this video: http://www.youtube.com/watch?v=_qAOHkNSR1s
9. <http://www.tampabay.com/news/education/k12/pinellas-school-district-printer-contract-sparks-teacher-outcry/1228679>
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