Improving Student Performance in Unexpected Ways

NEW, ECONOMICAL PRINTING TECHNOLOGIES MEET TODAY'S STUDENT EXPECTATIONS
Behind Every Challenge Lies a Solution

Educators across the nation have been tasked with a strong edict: improve learning and boost student performance. At the same time, budget pressures keep intensifying. Budget cuts in a slow economy have become a constant, with 84 percent of U.S. school districts seeing declines in the 2011-12 year and federal stimulus spending for education expiring.

Education leaders today are faced with difficult decisions, and are turning to technology to improve student learning. Document management technologies, including color printing, can be both an affordable solution and beneficial to student learning. This thought leadership paper will discuss how bringing color to the classroom can have a big impact on the learning environment and save precious budget dollars.

Digital Content as the New Normal

Today’s K-12 students, called “digital natives” by some, see digital, full-color content as the normal way of learning about and interacting with their world:

- Preschoolers know how to use a parent’s smartphone or tablet to entertain themselves with a favorite learning game.
- Elementary school students learn how to use laptops, e-readers and tablet computers to access Web content and interact with learning software — both at school and on family devices at home.
- Middle school and high school students not only consume digital content, they are increasingly creating it — often on their tablets, laptops, PCs or smartphones.
- Interactive whiteboards have a place in classrooms across the country, increasingly allowing students to guide their learning and manipulate content.

In fact, more than 40 percent of students in grades 6-8 who responded to a 2010 Speak Up Survey said their ideal school would have smartphones and iPads. Nielsen Research also reported the Apple iPad was the most wished-for electronic device among kids ages 6-12 in the 2011 holiday season.

All of this interaction with color-filled digital content is setting a level of expectation for students on what form learning should come in. Because of this, black-and-white classroom handouts can seem less important, less interesting, and more difficult to understand and remember.

The logical conclusion to draw from these trends is that more learning materials should be in color. As textbooks and online content become more visual and colorful, it is time to consider how color printing can improve learning.

Making an Impact: Color is Critical

Color has a tremendous impact on student learning and engagement, and is especially valuable for understanding complex topics, maps, data charts and other graphics. A study conducted at the University of Massachusetts noted that “thinking visually in color promotes long-term meaningful learning and problem-solving achievement.”

An industry white paper also notes the importance of visual literacy for learning. “The proliferation of images means that visual literacy is now crucial for obtaining information, constructing knowledge and building successful educational outcomes.” The study continues, “Visual literacy involves problem-solving and critical thinking and these can be applied to all areas of learning.”

You Can’t Argue with the Facts

Learning value is reflected in student preferences for color materials. The consumer research firm Harris Interactive conducted a study for Xerox Corporation about perceptions of color in learning materials among students. The survey covered grades 3-12 in the United States and produced the following major findings:

- Paper copies are a key material used in classrooms for surveyed students, but very few or none of the copies have information such as words, numbers, pictures, and graphs or charts in color.
- The majority of students who ever received paper copies from their teacher agreed that information in color would help make paper copies more appealing, schoolwork more interesting and homework more fun to do — and this view does not vary regardless of self-reported performance in school.
- Students feel the use of color would help them better process the information presented on paper copies. This perception is especially true for lower-performing students, who are more likely to have trouble remembering information they read or see.
As shown by the graphic on the right, the surveyed students have very positive opinions about the impact of color materials on their interest and ability to learn and retain content.

The surveyed students, who receive paper copies in school, indicated that color materials are especially effective for more complex subjects, with 58 percent of students saying that they would learn more in science if materials were in color. Slightly less also believe that color materials would improve learning in history, social studies and math.

Of course, perceptions are one thing and actual learning value is another. Educators want to be confident that the investments they make in color printing will pay off in better development of student skills, knowledge and achievement.

The Goal: Improve Learning

Schools are already using digital technology and its full-color content to help students learn. Digital textbooks, learning software and websites are all experiencing increased use in the classroom. The next step is to look at color printing for student handouts, worksheets and tests.

For teacher-created materials, color can emotionally engage students and stimulate their interest in learning. Color can also focus a student’s attention on important learning elements in a handout.

Color printouts help students develop skills in visual learning, an increasingly important skill to use in school, work and life. Color also helps enhance a learner’s content comprehension and retention as well as critical thinking. A visual literacy study sponsored by Adobe notes, “To be an effective communicator in today’s world, a person needs to be able to interpret, create and select images to convey a range of meanings. … Visual images are becoming the predominant form of communications across a range of learning and teaching resources, delivered across a range of media and formats.”

Making Color Affordable

Schools have been understandably reluctant to increase use of color printing for two main reasons: cost and potential for abuse. While the cost of color printing has actually decreased over the past several years, concerns continue because color printing has traditionally been expensive.

Schools are also concerned about supporting broader use of color printing because they are worried about abuse, i.e., that staff and students may print personal documents at the school’s expense.

New color printing technologies are available that enhance learning and allow for controlling access and costs. These technologies automatically analyze the amount of color used in a document and allow charges based on low, medium or high color usage:

- Pages with small amounts of color are billed at the same price as black-and-white pages.
- Pages with moderate amounts of color are billed at slightly more than the black-only rate.
- Pages with large amounts of color are charged the full-color rate.

With this variable pricing, there is no need to sacrifice learning impact by printing only in black and white in order to contain costs.

Access and cost-control software, either built into the printer or available from independent companies, offers
additional capabilities for managing color printing costs and potential for abuse. For example, budget limits can be set for individual teachers, staff members, students or even groups such as a department or school with rules that are enforced automatically. Color costs can be tracked in detail for chargeback to specific budgets, grants or other accounts.

Finally, instead of incurring the cost of low-quality printers in every classroom, schools can make a more cost-effective investment in high-quality, workgroup-level multifunction printers that are shared among many users. This model allows for better budget control. Plus, additional software provides the ability for cost recovery, especially for expenses related to ongoing operation, maintenance and consumable supplies.

**Conclusion**

It’s not likely that black-and-white materials will disappear from the classroom anytime soon. Yet as textbooks and online content become more visual and colorful, it is time to consider how printed materials can use more color to improve learning. With today’s color printing technologies, cost is no longer a barrier to help students learn both the content and the visual skills they will need for lifelong success.

### WHAT TO LOOK FOR IN A COLOR PRINTER

This checklist will help you find the right multifunction color printer for your school(s).

| COST CONTROL | ✓ Choice of models that meet the different needs of school users and printing requirements  
| ✓ Ability to detect and charge for only the amount of color actually printed on a page  
| ✓ Built-in software and easy integration with third-party software solutions that allow you to limit who uses the device and how much they can print, and to set color page limits by user, department, etc. |
| COLOR PRINTING QUALITY | ✓ Vibrant color printing with ink that is easy to use, and produces less waste  
| ✓ High-quality color printing on different paper types, even inexpensive office or recycled paper  
| ✓ Capabilities that allow you to bring projects such as memory books and yearbooks in-house, rather than having to outsource |
| OPERATIONAL EASE | ✓ Simple, reliable printer operation with capabilities for easy troubleshooting and problem resolution  
| ✓ Efficient printing technologies to reduce network traffic and process multiple jobs such as scanning, printing, faxing and copying, concurrently — enabling teachers to spend less time at the printer and more time in the classroom  
| ✓ Robust built-in scanning solutions  
| ✓ Option for users to submit print jobs from a mobile device  
| ✓ A vendor you can trust to respond quickly when you do need service |

### ENDNOTES:

1. Digital natives is a term coined by education consultant and author Marc Prensky: http://www.marcprensky.com
6. Harris Interactive survey commissioned by Xerox Corporation, November 2011.
7. Harris Interactive survey commissioned by Xerox Corporation, April 2011.

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