

DIGITAL LEARNING

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Eric L. Adams
Brooklyn Borough President



Eric Adams



@BPEricAdams



@BPEricAdams

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INTRODUCTION

Introduction and implementation of new, more efficient technology occurs regularly in nearly every field. Public education is no exception. The question is: How do we introduce technology to our schools in the best and most seamless way possible? I am committed to expanding access to digital learning devices for our city's young people and, in 2014-2015, I launched a pilot program with Copia Interactive, LLC, which brought the Copia Class App to three New York City Department of Education (DOE) schools in Brooklyn: Eagle Academy (District 23), MS 582 The Upper Academy (District 14), and PS 196 Ten Eyck (District 14). The results of this pilot program were clear: Technology can be a powerful, additional resource in the classroom. The Copia Class App contributed positively to student engagement with reading, writing, and discussion. Other research suggests that digital learning devices can help reduce overall costs of teaching, facilitate cross-collaborative learning that young people are accustomed to, mitigate physical injury due to heavy backpack lifting, and simplify curriculum updates for educators.

However, many challenges remain, and proper planning is crucial in order to facilitate the use of digital learning devices in a way that makes the investment of time and money worthwhile. In other words, planning must ensure that digital learning devices improve educational outcomes for students without being a burden on teachers. That planning must include the actual equipment and infrastructure, as well as professional development. Without both sides of the equation being planned in concert with one another, the transition can be costly and will not produce the desired results.

Today's students learn and interact in a fast-paced, technology-driven world. Our education system has to meet them there. The Kaiser Family Foundation's national survey published in 2013, reveals that a typical eight- to 18-year-old spends more than seven and a half hours daily on entertainment media daily, seven days a week.¹ While students have made the transition to the digital world, our educational system has lagged behind. This system must catch up in order to better prepare students for the 21st century job market. In addition, this new system must recognize that learning does not stop as the students leave the building. Students will, when afforded the opportunity, continue to explore an interest in learning outside of school. Our education system needs to bridge the divide between school-based learning time, and the learning environment students engage in after school hours. The ultimate goal of technology is to make education available on demand.²

Implementing digital learning options is not easy. In 2013, the Los Angeles Unified School District introduced a pilot iPad Program, which "looked like one of the country's most ambitious rollouts of technology in the classroom."³ However, the results in Los Angeles did not match the lofty goals of the program. In fact, the United States Department of Education (ED) compiled a report after the \$1.3 billion investment did not bring the desired results. Their report identified six major challenges that prevented a successful implementation of the instructional technology:

- Lack of a district-wide instructional technology leadership strategy to support schools in case of troubleshooting and malfunction of the software or devices
- Lack of a district Educational Technology Plan, goals, or metrics to measure the success of this new educational approach
- Lack of an Instructional Technology Plan in place before receiving the devices to comprehend how the devices would be used to support learning prior to purchasing them
- Lack of specific metrics that were able to show the impact of the investment and to measure pilot practices
- Overreliance on a single type of technology provider, instead of using different brands of tablets and software that would have allowed a greater flexibility in reducing costs and in the sustainability of the program
- Lack of a formal method to identify and share best practices⁴

¹ Kaiser Family Foundation, Generation M2: Media in the lives of 8 to 18-years-olds (Jan. 2010), 1. Available at: kaiserfamilyfoundation.files.wordpress.com/2013/01/8010.pdf.

² Shirley M. Hord and James L. Roussin, *Implementing Change Through Learning: Concerns-Based Concepts, Tools, and Strategies for Guiding Change* (2013 Corwin Press), xi.

³ Issie Lapowski, What Schools Must Learn from LA's iPad Debacle, *Wired* (May 2015). Available at: www.wired.com/2015/05/los-angeles-edtech/.

⁴ See United States Department of Education Office of Educational Technology, *LA School Report* (Feb. 2015). Available at: laschoolreport.com/wp-content/uploads/2015/01/Federal-Ipad-MiSiS-report.pdf. See United States Department of Education Office of Educational Technology, *LA School Report* (Feb. 2015). Available at: laschoolreport.com/wp-content/uploads/2015/01/Federal-Ipad-MiSiS-report.pdf.



These challenges are an excellent place to begin looking for the most effective way to integrate digital learning in public schools.

This report summarizes various practices of educational institutions in the implementation of digital technology in the classrooms. The results obtained shall serve as a learning tool in developing each school's own methods and approaches, as there is no one-size-fits-all approach. The report concludes with a series of recommendations that will help advance the implementation of digital options in New York City schools.

DEFINING A LEARNING CULTURE

Teachers can use digital devices in a variety of ways. They can be used to introduce lessons, enhance lesson materials, allow for self-directed exploration of a topic, or adapt to different learning styles. Perhaps most important is the effect on student motivation. A survey of technology in the classroom by the Public Broadcasting Service (PBS) concluded that 77 percent of teachers found technology to “increase student motivation to learn.” Digital devices, used properly, can increase collaboration as well as fulfill the specific learning needs of individual students (See Case Study #1).

CASE STUDY #1: LEARNING PROCESSES IN CANADA

During a data gathering symposium on iPads in the classroom in Alberta, Canada, participants discussed how digital learning devices were programmed to adapt to student needs. In one case, students used the multimedia features on the tablet to create an animation of the water cycle; another allowed a class to use the tablets to communicate with their peers about their work assignments; in another instance, to facilitate and assist students with writing difficulties, a word processor application was used with the audio capabilities permitting students to record their voice, or their teacher's voice, in phonic-apps, using the recording at their convenience. Moreover, educators have found that tablets improve the process of language acquisition in early childhood programs, particularly for those students who were not yet fluent in any language. Teachers were also able to use the tablets to keep track of the students' performance using e-portfolios and show the progress to their parents, which created a stronger bond between them and their children.⁷

Deciding in advance what activities are going to be implemented with the use of tablets is essential and should be customized for each school and grade. Of course “lesson introduction” aids in capturing students' attention, but there is so much more that teachers and students could do. Establishing an open forum in which an exchange of ideas among teachers, students, and principals can outline best practices and set clear methods and practices on how and what tablets are going to be used for is integral to success.

TEACHER TRAINING

Ensuring that educators are fluent in tablet education is critical to successful digital learning programs.

Georgia State University investigated the importance of teacher preparedness in the implementation of tablets in the classrooms. The data indicated that post- and one-on-one training is considered helpful in teachers' integration of technology. According to the study, educators are more likely to prepare tablet-integrated lessons if they do not find it time-consuming and challenging. Consistent follow-up training throughout the academic year is the key to teachers' empowerment in the use of digital learning.⁸ The teachers need to know that they will have continued support and training, and not just a one-off session after which they are on their own.

⁵ See generally Phu Hoang Vu, *An Inquiry into How iPads are Used in Classrooms* (Doctoral dissertation, May 2013) 50. Available from OpenSIUC database. Retrieved from opensiuc.lib.siu.edu/cgi/viewcontent.cgi?article=1708&context=dissertations.

⁶ Public Broadcasting Service Learning Media, *National PBS Survey Finds Teachers Want More Access to Classroom Tech* (2012), Press Release, available at: www.pbs.org/about/blogs/news/national-pbs-survey-finds-teachers-want-more-access-to-classroom-tech/.

⁷ Government of Alberta, Canada, *iPads: What are we Learning?: Summary Report of Provincial Data Gathering Day – October 3, 2011*. Retrieved from cached version: education.alberta.ca/media/6684652/ipad%20report%20-%20final%20version%202012-03-20.pdf.

⁸ See generally Yali Zhao and Frances LeAnna Bryant, *Can Teacher Technology Integration Training Alone Lead to High Levels of Technology Integration? A Qualitative Look at Teachers' Technology Integration after State Mandated Technology Training*, *Electronic Journal for the Integration of Technology in Education*, Vol. 5 (2006), available at: ejite.isu.edu/Volume5/Zhao.pdf.⁸



Researchers have also found that teachers are sometimes discouraged from introducing new ways of learning because they find themselves limited by conformity to a more traditional teaching style. Some district central offices offer trainings, but they are conducted either annually or as a single session with no interaction between teachers. Professional development that takes place during the workday and that is linked to specific classroom challenges could be a more effective approach in enhancing how teachers teach.⁹

The possibilities are limitless if teachers are enthusiastic adopters of digital learning devices. Technology in education could inspire teachers to create their own apps and incorporate necessary features that the average tech company perhaps doesn't see the need for implementing (See Case Study #2).

CASE STUDY #2: EDUCATORS AS APP DEVELOPERS

Brad Wilson, a fourth grade teacher from Michigan, was looking for an app that contained the right visual features, and allowed kids to inspire themselves and use their imagination to write meaningful and interesting stories or poems. In collaboration with a computer designer, he was able to produce an app that met his needs. Wilson “went from spending late nights planning lessons to now designing ways for students to interact, write and create with an app.”¹⁰

Ultimately, education departments may need to update the professional standards for new teachers to ensure more technologically prepared educators. While use of technology should not override knowledge of the subject and ability to teach effectively, it is an increasingly necessary component to any classroom, and one part of teacher training must include technology integration.

OWNERSHIP MODELS

One of the enduring questions surrounding the use of devices in schools is who will retain the physical and economic ownership of the devices. The University of London identified several methods of ownership that could be considered by the educational institutions:

1:1 TABLET DEVICES — PROVIDED FOR USE BY INDIVIDUAL STUDENTS

- Some only for use in school
- Some for use at home and school
- Some whole-school roll-outs
- Some partial/staggered roll outs (1:1 but by class, year, subject)

Funding models for 1:1 provision

- Free but school-owned
- Three-year lease, school-owned for duration of lease, then student-owned
- Outright purchase — student-owned
- BYOD (bring your own device) — student-owned
- Shared tablet devices — provided for use by multiple students
- Some only for use in school
- Some for use at home and school (on rotational basis)
- Generally partial/staggered rollouts rather than the whole school
- Sometimes class sets or year group provision, more often in primary than secondary schools
- Sometimes subject sets, more often in secondary than primary schools

Funding models for shared tablet provision

- Almost universally school-funded and school-owned¹¹

⁹ See Benjamin Herold, Why Ed Tech is not Transforming How Teachers Teach, Education Week (June 10, 2015), available at: www.edweek.org/ew/articles/2015/06/11/why-ed-tech-is-not-transforming-how.html.

¹⁰ Brad Wilson, There (Wasn't) an App for That, 21innovate.com (Feb. 16, 2013), available at: www.21innovate.com/write/there-wasnt-an-app-for-that.

¹¹ Wilma Clark and Rosemary Luckin, What the Research Says: iPads in the Classroom, London Knowledge Lab, Institute of Education, University of London (2013) pp. 17-18, available at: digitalteachingandlearning.files.wordpress.com/2013/03/ipads-in-the-classroom-report-lkl.pdf.

Perhaps the most realistic and common option is the shared tablet format. This method, despite a stereotype that would indicate less success, has shown significant gains when employed (See Case Study #3).

CASE STUDY #3: TABLET SHARING SUCCESSES

Courtney Blackwell from Northwestern University conducted a study in three Chicago elementary schools to compare the learning progress of kindergarteners who shared tablets in the classroom with those that do not have one, or have it but use it one-on-one. At the end of the 2013 – 2014 academic year, Blackwell concluded that “improvement in literacy tests was 28 percent higher for students sharing an iPad, 24 percent for those having their own iPad, and 20 percent for those not using an iPad at all compared to a baseline.”¹² The outcome of the study proves that children learn more by interacting with each other, and the use of tablets is a tool to capture their attention and enhance their learning experience as fun and interactive. Children were prone to discussion and negotiation as the device was shared, which contributed to higher scores according to the research. The findings revealed by Blackwell conclude that one-on-one tablets may not be the most effective way to use technology for all grades, especially for young children. All learners are different and require teaching and learning interactions that acknowledge these differences and provide suitable support. On the other hand, a tablet that is owned by an individual learner, which offers personalized access, could be highly motivational. The learner could save past projects, access them promptly, track individual progress, and download specific applications that meet his/her needs.

FUNDING

An important consideration in deploying digital learning devices is the particular challenges to advancing technological progress in schools that have low-income, minority, or learners with a disability. Use of technology in the schools should not be allowed to become a tool for widening the socioeconomic gap between students, but rather one to narrow that gap. Building a sustainable infrastructure for learning is a project that will require the participation and collaboration of individuals from all disciplines and types of institutions. It also will require a solid partnership between education, business, and government. Bottom line, sufficient funding is an important aspect, especially for public schools (See Case Study #4).¹³

CASE STUDY #4: BEST PRACTICES FOR FUNDING TECHNOLOGY

According to the Office of Educational Technology of the ED, methods to eliminate and reduce existing costs include the replacement of commercially-licensed textbooks, copy machines, and dedicated computer labs with openly licensed educational resources. Open resources refer to online courses or digital textbooks, handouts or assessment items. Partnering with local businesses and other organizations, county and local governments, and teachers to provide professional and curriculum development is another way to reduce implementation costs. In addition, schools can share technological infrastructure and technical staff and the federal government offers technology funding through the E-Rate program that provides substantial price discounts for schools and libraries to undertake technological upgrades. It is crucial to plan for a sustainable transition, and schools should understand that a technology investment is not a one-time expense. Obtaining a grant or other supplemental funding is just a catalyst, and it is important to consider the expenses that come with the replacement and upgrading of the devices.¹⁴

TECHNICAL SUPPORT, CAMPUS INFRASTRUCTURE CONSIDERATIONS, AND POLICY REFORMS

Introducing digital devices will require a strong, reliable connection to the Internet and that requires two things: solid bandwidth and reliable wireless signal distribution.

Schools must also have infrastructure to ensure that devices can be fully charged and stored. Some practices show that teachers can store the devices in a mobile cart and establish procedures for keeping the cart locked and secured, as well as

¹² Polymnia Hadjipanayiotou, Paper: Kindergarteners Learn Better with Shared iPads, Education News (May 4, 2015), available at: www.educationnews.org/technology/paper-kindergarteners-learn-better-with-shared-ipads/.

¹³ See generally United States Department of Education, Office of Educational Technology, Learning: Engage and Empower (2015), available at: tech.ed.gov/netp/learning-engage-and-empower.

¹⁴ See generally United States Department of Education, Office of Educational Technology, Future Ready Learning: Reimagining the Role of Technology in Education (2015), available at: tech.ed.gov/files/2015/12/NETP16.pdf.



for distribution and collection of the devices. It is helpful to clearly define an Acceptable Use Policy that will be established between the school, students, and parents, in order to avoid theft or damage issues. The devices will need to be synchronized and updated, and therefore it is highly recommended to have access to tech support throughout the educational cycle. Schools must also decide who will be responsible for managing the devices' arrangement of apps, wallpaper images, and more. The devices will not only need technical maintenance but physical maintenance as well. Schools will need to set a purchase and management policy for software and apps. In addition, schools will need to determine who will be permitted to install apps that they consider will add to their learning, or if their education model will simply utilize pre-installed apps that are considered to be the most helpful for a certain subject or class.

As schools look to add or expand on content, they should also have a system in place that meets the needs of their particular setup. A cloud-based delivery and storage system allows students to work outside of school hours. Combined with unique addresses for each student, this allows for the most independence, but, as always, proper and thorough testing should be done to ensure privacy and security.¹⁵

INTERNET SECURITY

The ultimate goal of introducing digital devices into the classroom is to improve learning. The challenge is to prevent them from being a distraction. Firewall and filtering tools must be flexible enough to serve the various needs of students, educators, and administrators, but also strong enough to protect networks from being compromised by intrusions. The flexibility of the security setting must restrict inappropriate content and, at the same time, allow users to access social networks or web pages such as YouTube and Wikipedia, which offer educational videos or content. (See Case Study #5.)

CASE STUDY #5: STUDENT AND PARENT ENGAGED SECURITY MEASURES

A private K-12 school in Gainesville, GA worked closely with parents to set a network security filter. The school encouraged the creation of a student advisory team, which allows students to voice their concerns and have some input. The result was a policy that meets the needs of the students, the school, and the parents. The teachers have the option to direct students to specific web content via online resources listed on their website or wiki that do not require students to search the Internet themselves. Some schools' students take the laptops for use at home, and parents independently set the filter for the web access. Filters can be set to grant access only if users offer good explanations for why they need the information. The ultimate goal is to prepare "children not only to develop 21st century skills, but to give them the ability to make choices and grow into ethical people."¹⁶

CONCLUSION AND RECOMMENDATIONS

It is imperative that schools keep up with the needs of the job market and the learning methods that will have the most positive impact on students. Many students are already familiar with tablet devices and many companies use these or similar technologies on a daily basis. Our job is to ensure that all students are capable of using the devices and technologies expected in the market and to take advantage of tools that will increase student engagement. Digital learning can help us achieve both of those goals. In order to achieve these goals, school administration and policymakers must:

- Make a plan to integrate digital devices into their classrooms by consulting with device and curriculum providers and the New York City Department of Education's technology department.
- Implement a controlled, pilot program for each school, in which digital devices are introduced on a small scale and then expanded to the entire school.
- Allow for the use of textbook funding to purchase devices for the classroom in lieu of traditional textbooks.
- Develop a set of metrics to help track the success of the integration.
- Increase district level ability to support tech troubleshooting and repair services.

¹⁵ See generally Sam Gliksman, Preparing Your School for an iPad Implementation, Tennessee Board of Regents, Emerging Technologies and Mobilization (Feb 24, 2011), available at: emergingtech.tbr.edu/news/preparing-your-school-ipad-implementation.

¹⁶ Vanessa Hua, Fine-Tuning Internet Security, THE Journal (Aug. 2011) pp. 3, quoting Connie White of Lakeview Academy available at: thejournal.com/Articles/2011/08/01/Fine-Tuning-Internet-Security.aspx?Page=3.



- Develop a district level Acceptable Use Policy prior to implementation beyond the pilot stage.
- Create a definite process for approval of new apps and curricula.
- Have a clear mechanism for sharing best practices so that successful implementations are models for new implementations.
- Avoid reliance on one single manufacturer and/or curriculum provider. Allow schools some room for customizing their program to the needs of their community.
- Prepare teachers for the challenges they might encounter, by providing funding for professional development programs, organize professional learning communities/networks, and promote an effective administrator and teacher leadership approach.
- Create supportive professional development groups to help organize the curriculum across grades and subjects, as well as professional learning communities to serve as a platform that integrates the experiences of teachers and serve to develop best practices, and innovate, share, and critique ongoing practices with other teachers. These professional communities can allow teachers to connect more with each other through video-based reflections, lesson study, mentoring programs and grade-level teams.
- Principals, superintendents, and others in positions of authority in school systems who contribute to a cooperative climate, must set a vision, and stimulate teachers and students to develop rather than limit their capacities. An effective administration focuses on what can be improved, offers support and training, and cultivates leadership in staff, parents, and community partners.¹⁷

¹⁷ See generally Vanessa Vega, Teacher Development Research Review: Keys to Educator Success, Edutopia (Originally published Jan. 2013, updated Nov. 2015), available at: www.edutopia.org/teacher-development-research-keys-success.

