District Management Group

CASE STUDY

Baltimore County Public Schools (MD): Using Innovative Public-Private Partnerships to Accelerate Change

by Nicholas P. Morgan

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> *Our children actually believe that there is a future, and that they have the possibility of making a contribution to that future.*

Baltimore County Public Schools:
Using Innovative Public-Private Partnerships to Accelerate Change

During a regular breakfast meeting with industry leaders, Dr. Joe Hairston, Superintendent of the 104,000-student Baltimore County Public Schools (BCPS), had a "light bulb" moment. With leaders from Northrop Grumman, Lockheed Martin, Johns Hopkins University, University of Baltimore, Breakaway Games, and TrainingPort Strategies at the table, Hairston brainstormed about forming an innovative partnership to align the goals of industry with the goals of the district to boost STEM – science, technology, engineering and math education – in the Baltimore County Public Schools. When the breakfast was over, Hairston had a commitment for a ground-breaking partnership and aggressive one-year timeline to bring state-of-the-art simulation technology into his district. With an emerging district emphasis on 21st century skill development, the partnership would serve as an opportunity to test new pedagogical approaches. Hairston did not simply want to teach children about technology, he wanted to use technology to engage students in the curriculum.

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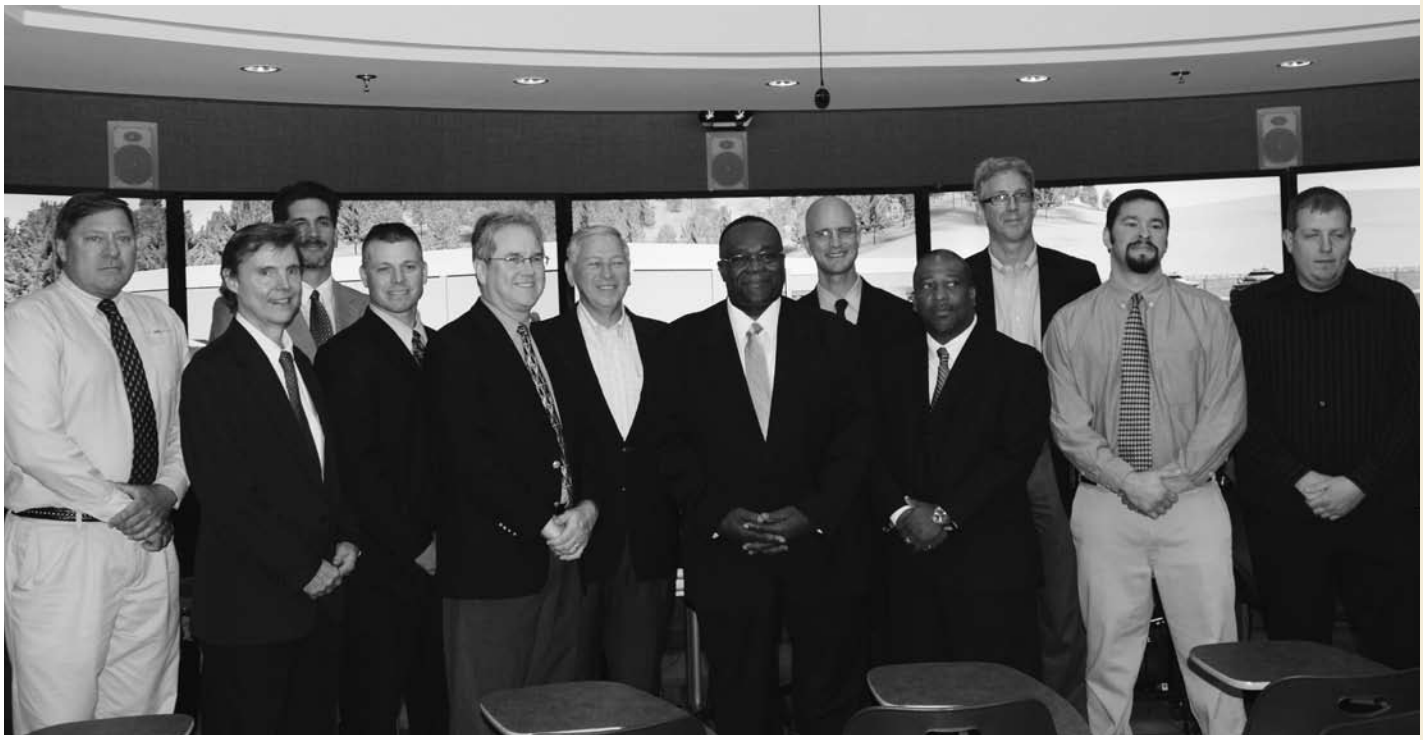
Amy Sessler Powell contributed to the research and writing of this case study.

To kick things off, Hairston decided to build a high school virtual learning lab that would run software simulations already under development at the Johns Hopkins University Center for Technology in Education (CTE). An evolution of a federal grant-driven prototype for testing the use of gaming and simulation in education at Johns Hopkins, the simulations – for environmental science, biology, and chemistry subjects – would be retooled to fit the needs of the curriculum in Baltimore County as specified by Dr. Hairston and his team. The team proceeded with strict adherence to the curriculum. "This is not about educational games," said Hairston. "It is about games that *educate*."

For Hairston, the partnership had to start with the school and the students most in need of investment from the community. He decided to pilot the virtual learning lab at Chesapeake High School, a struggling school in the district. Chesapeake, like many other failing urban high schools across the U.S., had a history plagued with problems. During Hairston's 10-year tenure, Chesapeake had seen three principals come and go. BCPS had converted Chesapeake High from a comprehensive high school to a STEM Academy with specific career paths and an infusion of high-level and advanced placement classes, but they had not yet succeeded in changing the culture. The previous year, the school lost 150 students to magnet and private schools. It was a school from which both students and staff were walking away in droves. Historically, many parents of Chesapeake students worked in manufacturing jobs, but these jobs were declining in numbers and would likely not be available to their children. Chesapeake's location on the eastern side of the county made it ideal for partnership with defense contractors, which were located and expanding in this part of the county, but the graduates of Chesapeake needed different skills to make their way in a highly competitive job market.



Left to right: Jerry Ciccone (Data Networks), Dan Scroggs (BCPS), Jim Miller (JHU Applied Physics Lab), Kevin Huber (JHU Applied Physics Lab), Jim Gring (Lockheed Martin), Joe Biglin (Training Port Strategies), Joe Hairston (BCPS), Tim Frey (JHU Applied Physics Lab), Ted Imes (Northrop Grumman), Dave Peloff (JHU Center for Technology in Education), Jon Smulyan (Baltimore Sound), Biz Shaughnessy (Baltimore Sound)

For industry leaders, the possibility of the partnership's bringing them a more skilled workforce had great appeal. Their own expansion plans called for a workforce that required a different set of skills and goals than the prior generation possessed. To deliver this workforce, Chesapeake needed more than technology. The school needed an infusion of goals and aspirations. Hairston, a staunch believer in the power of public education, believed that a partnership could deliver both the technological advances as well as the community investment required to raise expectations and aspirations at Chesapeake. He believed it would stop the flight from Chesapeake to private and district magnet schools by giving students a good reason to stay.

What Makes a True Partnership?

When Hairston speaks of a partnership, he is not talking about what he calls the typical "I beg you for stuff and you give it to me" type of partnership, or the kind where an industry engineer drops into a classroom now and then to do a special project. This partnership with Northrop Grumman, Lockheed Martin, Johns Hopkins University CTE and Applied Physics Laboratory, the University of Baltimore, Breakaway Games, and TrainingPort Strategies is predicated on collaboration and continuous improvement, with an eye towards scalability.

To Hairston, a partnership is a true, multilayered entity that aligns everyone's goals and objectives. Each of the partners had something to gain – not just the school district. Industry gains a workforce of students engaged in STEM. BCPS gains the technology to inspire student interest in these subjects. The Center for Technology in Education gained the ability to complete their study of gaming and simulation technology for teaching science, math and literacy; in the third year of a five-year grant, the Center had lost its funding and was looking for partners to help complete the work.

Goal Setting and Strategic Alignment

When he came to Baltimore County in 2000, Dr. Hairston introduced the Blueprint for Progress, the district's foundational document for continuous improvement. The 28-page document, revised annually, outlines the district's vision and strategic direction for the future as a series of nine performance goals, performance ▷

indicators, and key strategies for achieving them. The Blueprint is a key driver for all activity in the district. The first performance goal is that "all students will reach high standards, as established by the Baltimore County Public Schools and state performance level standards, in English/reading/writing, mathematics, science, and social studies." For Hairston, the partnership and the placement of the pilot at Chesapeake High was one way of meeting the performance goal of raising standards for all students regardless of geography and income level.

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>
> —Dr. Hairston

Hairston had always viewed technology as critical to advancing the district's objectives, both in terms of internal management efficacy as well as student learning objectives. BCPS had already laid significant groundwork to make it ready to work with industry partners. In 2000, the district invested $11 million in converting computers to a system-wide high speed, Windows-based infrastructure to connect all the schools and district offices. With this infrastructure, they also created a data warehouse to integrate data collection and reporting; all teachers and administrators had access to student performance information to use in making instructional and leadership decisions. By 2005, the district introduced wireless laptop carts in the schools. Hairston won several awards on behalf of the district for advanced use of technology including the International Society for Technology in Education Award for Outstanding Leadership, the statewide MICCA 2005 Outstanding Technology Leader in Education Award, the national ET3 Technology to Empower Community Champion Leadership Award, and the Top Ten Tech Savvy Superintendents Award from *eSchool News*. At the same time, student achievement was on the rise. The Maryland Report Card indicates that not only was overall student achievement steadily rising, but gaps identified by race and gender had narrowed. BCPS has the highest graduation rate for African-American males from among the nation's 50 largest school districts.

The partnership at Chesapeake High was always about meeting the goals laid out in the Blueprint. Dr. Hairston wanted to turn Chesapeake into the sort of high school that every child deserves. If successful, they would scale the project to other schools in the district, but first they needed to choose a model. To do this, Hairston toured many facilities at Johns Hopkins, Northrop Grumman, and Lockheed Martin. In December 2008, he found what he was looking for at the Applied Physics Lab at Johns Hopkins, where they were using simulations to train submariners and astronauts. The next step was getting teams of people into the Applied Physics Lab to begin the discussion and to plan how to replicate it at Chesapeake High by September 2009.

David Peloff, director of the Johns Hopkins University CTE, praised Hairston for taking a calculated risk by putting the software into the school and monitoring the situation continuously. The original plan at Hopkins had been to finish developing the software and test it before it went into a school, but the partnership altered the process by getting the software into the school setting and testing it there. "I did not think a principal or superintendent would be willing to take the risk of putting this into a school right away," said Peloff. "Dr. Hairston, in my opinion, was a visionary to take that step. He believed this was the future of how kids are going to learn and that the potential was so great that he did not want to wait until tons of data backed it up. We will research it as we go, while it is in the hands of the kids."

With the decision of what to build and what to teach defined, teams were assembled to bring the plans to fruition for the opening of school in September 2009. The next goal was to secure the funding for the construction and the technology. Hairston was able to redirect $2 million from the capital improvement and technology purchase areas of the BCPS budget to pay for the project. The money covered the construction, equipment purchases, and the scientists at Hopkins who were developing and adapting the software.

For the construction phase, additional teams of people were assembled for weekly meetings starting in January 2009. The teams included designers, electricians, technology purchasing agents, construction engineers, and others. At the same time, teams of educators met to plan the curriculum, the simulation software, and

the necessary training and professional development. The teams initially met at Johns Hopkins to study the room they would be emulating and to make decisions about everything from construction to hardware purchases. Ultimately, they broke into smaller subject-oriented groups to meet. Many of these groups continue to meet bi-weekly to continuously trouble-shoot and upgrade the program at Chesapeake and to begin thinking about replication at other schools in the district. When the team first started, they planned to have the room ready for training starting in May 2009 and running through the summer so it would be ready when school opened in September.

The team hit their target dates and held their first teacher trainings in May with a pilot group of teachers who were already comfortable with technology. In June, the entire staff trained in groups of 20. Additional professional development took place during the summer as some classroom teachers worked at Lockheed Martin to learn how to apply the new technology to their classes.

Going "LIVE"

Chesapeake opened in September 2009 with a new $2 million virtual laboratory, Learning in a Virtual Environment (LIVE). The high-tech lab is designed to run software that brings real world situations to students through 3-D simulations and problem-solving scenarios that develop the decision-making skills future employers might expect. Students interface with high-definition 72-inch TV monitors, arranged in two five-screen semicircles, using a custom-designed digital switch and touch-panel controller. Additionally, an adjoining lab houses 30 workstations, each outfitted with three monitors that run the same scenarios as the larger virtual facility so lessons can be applied on an individual or team basis. The software runs on standard PCs with high-end graphics cards and a lot of memory, usually sold as gaming computers.

Though they emulated the Applied Physics Lab at Johns Hopkins, the lab at Chesapeake is slightly different and perhaps more modern and more suited to instruction with its virtual learning environment and sophisticated communications technology. Engineers from Lockheed Martin and Northrop Grumman can "visit" without actually leaving their own jobs, a convenience for them that will ultimately offer more expertise to the students. The engineers communicate with Chesapeake High School through the use of video conferencing. The students have two-way audio and video communications to ask the engineers questions, see demonstrations, and share documents that assist the students in their understanding of engineering and technical concepts and how certain processes function. With video conferencing, both students and engineers exchange valuable information without either party leaving the location where they work or learn.

The simulations do not substitute for the traditional learning, but rather enhance it by showing how the knowledge is applied and thus answering the recurring student question, "Why do I need to know this?" The first simulations used in class involved a rescue mission at Mount St. Helens and the investigation of a Maryland fish kill in nearby Spirit Lake. The simulations use concepts learned in environmental science, biology, and geometry, requiring student knowledge be applied to real world situations. If a student does not understand the Pythagorean Theorem or why it is important, they will soon realize – during the "Search and Rescue" – the importance of being able figure out distances for evacuation plans.

The BCPS team members say they have not figured out a way to replace learning the basics, but they have created a lush environment for applying them. "Students are creating a zone in the actual world and need to use the Pythagorean Theorem and other concepts to figure it out," said Peloff. A senior executive from Lockheed Martin has pointed out that while learning science, engineering, and math can be very abstract, if students can actually apply the skills to a real, exciting problem with real engineers, they will feel encouraged and more likely to sustain interest in engineering and technology.

Between the simulated scenarios and the remote visits from real engineers in the field, students at Chesapeake are gaining exposure to the sorts of jobs that exist in the current and future workforce and they are seeing why they need certain skills to get there. They are beginning to better understand career paths, the skills needed for them, and most importantly, they are aspiring. It is the difference between learning material for a test and learning material to apply to real world situations. To Hairston, this partnership is not just about turning out an educated and inspired workforce or saving a failing high school. This partnership is about the future of public education and what it needs to look like. It's about rolling up your sleeves and making an investment in new strategies. ▷

Early Results

The project at Chesapeake High School is showing some early and powerful results. First, flight out of Chesapeake has ceased and the school has again become an entity in high demand. In prior years, as many as 160 students zoned for Chesapeake High School were in other neighboring schools – school enrollment was 896. Today, enrollment is 1086, exceeding the state recommended number of 1041. More and more students are accepting Chesapeake as their magnet school. This year's first open house attracted 123 families as compared to 86 families last year (the first year data on open house attendance was recorded). Additionally, staff attrition has decreased. Four years ago, in her first year on the job, Principal Maria Lowry hired 52 new staff members. This year, she hired just eight; five were new positions to support enrollment increases, and other turnover was due to promotions.

Perhaps even more importantly, there has been wholesale cultural change for the better. Before they converted it to a STEM Academy, Chesapeake was the lowest performing school in the district with no advanced placement courses, the lowest SAT scores, and worst of all, no expectations of the students. Today, all of this has changed. There is a warm and welcoming environment, and a general sense of purpose from the students to the staff. Students and faculty collaborate to create the virtual learning environment. Students are included during professional development with faculty, in some cases learning with the teachers and in some cases doing the teaching. Students identify which segments are difficult or dull and suggest adjustments.

Many attribute the changes to the partnership, the investment in technology, and the halo effect created by the initiative. Students see that the community has invested in them. They are forming bonds and relationships with their teachers as well as with industry partners. With the "Chat and Choose" program, industry engineers eat lunch with students and discuss their careers and class recommendations for students interested in engineering.

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Several studies are in place to determine the project's impact on test scores and student achievement. The Johns Hopkins CTE and the BCPS Department of Research, Accountability and Assessment are looking at many indicators of success including student and teacher attendance, test scores, and other achievement indicators that make a school productive and positive. Johns Hopkins is also studying the differences in these indicators at Chesapeake versus similar schools without the virtual learning environment to determine if this sort of environment is doing all the things they designed it to do.

To Hairston, the culture change at Chesapeake is about trust and acceptance. The Chesapeake High community is working now because everyone has a shared sense of responsibility. The teachers chose to work there, but without guarantees that anything would change. "Everyone involved has a vested interest. Working at Chesapeake is more than a job. It is a responsibility," said Hairston.

Policies and gimmicks come and go, according to Hairston, but using technology innovation to transform a school requires human effort and is ultimately about people. "Policy can establish levels of compliance, but the effort of engagement is about the human condition and human interaction. When commitment is there, good things generally happen," he says.

Scaling Up and Looking Ahead

For the present, there are still pieces of the LIVE project that need to be completed. Programmers from Johns Hopkins and the University of Baltimore as well as technology staff from BCPS continue to tweak the system. All the players hold regular biweekly meetings to ensure the system is working correctly and achieving the goals intended. The district and its partners are also facing some unintended consequences. For example, giving tours of the facility has turned into an almost full-time job as educators from other districts and states as well as industry leaders have come to observe this initiative at Chesapeake.

In the short term, Johns Hopkins wants to add additional functionality to the simulations and work with both staff and students to add new simulations. Hairston has set a goal to bring the simulations to all core content areas. There is a three-year plan in place to scale the project to other high schools and also to bring the technology into the middle schools that feed these high schools. Mike Goodhues, Chief Information Officer for the BCPS Department of Technology, compares Chesapeake to a prototype car where the prototype is always more expensive and takes longer to develop than the copies. "Our challenge will be to

make this available to all our students without building a $2 million facility in each one. We can take some of this technology and infuse it into the curriculum on the equipment we already have."

From Hairston's perspective, this partnership has unlimited opportunity. "We have proven that the private sector can help. They are not out there bashing the public schools. They are not telling us to tear it down or outsource it. They are investing in public education." From DMC's perspective, this case can be viewed as a study of success in innovation and partnership, and also as a successful school turnaround. □

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Q&A with Dr. Joe A. Hairston, Superintendent, Baltimore Public Schools

DMC: The virtual classrooms are driven by a strategy that emphasizes 21st century skills, a popular topic, but also one that districts are struggling to translate from concept to reality. How will you expand these initiatives to flesh out your 21st century skill objectives?

Dr. Hairston: The first challenge for all modern day teachers is to engage students in what they are teaching in the classroom. To meet this challenge, today's educators need to communicate with students in a way that is both familiar and appealing. They cannot rely on traditional classrooms built ten to 50 years ago, just as they cannot rely on the same teaching methods used during that time. Educators today realize that students come to them with a great sense of digital sophistication and digital learning styles that must be recognized in the instructional setting. Students spend much of their time in a virtual environment with programs like Twitter, Facebook, and Second Life, while playing Massively Multiplayer Online Games. The U.S. military spends about $4 billion a year on training equipment and programs involving simulations and has had great success; virtual reality training programs, for example, are used in instructing young Army recruits. It seemed natural and necessary that this same type of technology be used in the classroom setting. The success of the virtual classroom is in its ability to allow students to virtually travel, experiment, interact, and learn in a way that is both familiar and engaging to them. It is well-suited for collaborative learning where both teachers and students are active participants in the learning process. The 21st century skills are not delivered to students, but instead emerge from the understanding and application of concepts and techniques in this new virtual environment.

DMC: Were there any unforeseen consequences, either positive or negative, that arose?

Dr. Hairston: The Virtual Learning Environment (VLE) presents a new environment, and it requires new ways to manage the classroom with class-room management software in order to keep students focused and on track. The teachers have learned new ways to adapt their teaching style to meet the needs of the learner within this environment. Teachers have been able to transfer some of these strategies over into the traditional classroom setting when integrating the web 2.0 skills into their instructional program, which has been an unforeseen benefit.

The level of interest surrounding this project outside of the BCPS system has created an unforeseen challenge. It is becoming increasingly difficult to schedule time for students and visitors to experience the VLE. Nonetheless, the increased exposure for Chesapeake High School has helped to showcase the quality instructional program in place. There is an increased interest within the community to partner with Chesapeake. There is an increased sense of pride among students. They are excited to have the opportunity to share their school with visitors.

DMC: What tips would you offer to superintendents looking to pursue innovative partnerships with leading local institutions?

Dr. Hairston: This type of partnership is all about relationships. There must be a sense of trust and confidence among all partners that extends beyond the project at hand. □