Digital Learning Anchor Schools: *Year-One Developmental Evaluation*

By Stephen C. Court, Program Evaluation Specialist and
Heidi L. Janicki, Ph.D., Director of Research and Evaluation

Developmental Evaluation Report
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Department of Planning, Innovation, and Accountability
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Executive Summary

On August 18, 2015, the School Board approved the 2015-2016 Program Evaluation Schedule which included a recommendation to evaluate the Digital Learning Anchor Schools (DLAS) initiative because it was a new educational initiative during the 2015-2016 school year. This evaluation report focused on the implementation of the DLAS initiative, characteristics of students, progress made toward meeting the goals and objectives developed for the initiative, stakeholders' perceptions, and the additional cost of the initiative through 2015-2016. The evaluation was based on both quantitative and qualitative data that were collected through surveys, reviews of documents and school websites, and data from the Virginia Beach City Public Schools (VBCPS) data warehouse.

Key Evaluation Findings

Implementation of DLAS Initiative

- As part of the DLAS initiative, VBCPS provided a laptop computer or other digital device to all students in selected grade levels at 11 schools – 6 elementary schools, 2 middle schools, and 3 high schools.

- The initiative has two fundamental aims:
  - To develop a cadre of schools to serve as model digital learning schools within the division.
  - To study specifics in the field with respect to pedagogy and device implementation.

- The DLAS initiative is aligned with *Compass to 2020*, the school division's strategic framework, which includes strategies focused on providing personalized learning opportunities for students and leveraging technology to increase flexible learning opportunities.

- The 1:1 digital learning initiative enabled each participating student to be assigned his or her own device for the school year. If the school's policy permitted, the student could use the device to do schoolwork at home at night, on weekends, and during vacations. Based on the student survey, 9 percent of elementary school students, 28 percent of middle school students, and 74 percent of high school students reported using their device at home.

- The participating anchor schools were selected by the Department of Teaching and Learning, which reviewed 35 applications of interest. Ultimately, 11 schools were selected based on readiness and a consideration of balance between school levels and location of schools, as well as on a variety of practical considerations.

- High schools that participated in the DLAS initiative were already participants in the Virginia Department of Education (VDOE) e-Learning Backpack initiative where schools that were less than fully accredited received digital devices for ninth graders beginning in 2014-2015.

- Although it appeared that infrastructure was in place for the first year of the DLAS initiative, multiple survey responses from stakeholders indicated that there were some infrastructure concerns during the first year.

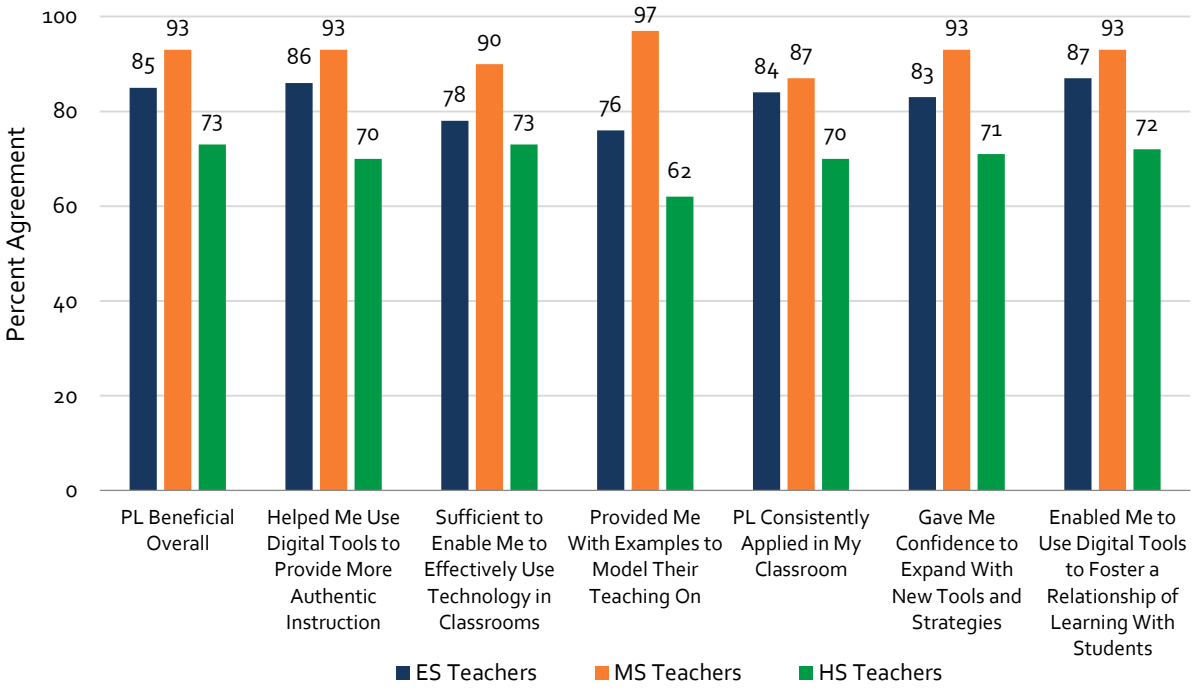
- Infrastructure concerns mainly involved problems such as unstable connectivity, inadequate numbers of wi-fi hot spots, inadequate bandwidth to handle the demands of 20-30 users at a time, issues related to the content filter blocking access to legitimate websites and those required by an assignment, and a lack of prompt and proper technical support.

- The model of professional learning for the DLAS initiative involved Department of Teaching and Learning staff providing training and professional learning through the meetings of the Digital Learning Leadership Teams. The Digital Learning Leadership Team at each participating school included the principal, instructional

technology specialist (ITS), and selected teachers and other staff as determined by the school. In turn, the ITSs provided professional learning opportunities for the teachers at their school participating in the initiative.

- As shown in the figure below, the general pattern of results showed that middle school teachers were most positive about the professional learning related to the DLAS initiative, followed by elementary teachers who also were relatively positive. High school teachers' perceptions of the professional learning related to the DLAS initiative were notably lower and agreement levels were 73 percent or less on the survey items.

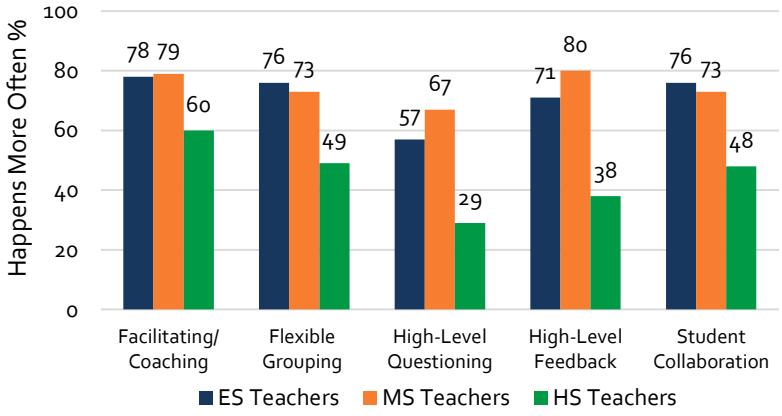
Teacher Perceptions of Professional Learning Related to DLAS Initiative by Level



- Similarly, when teachers were asked about the extent to which they agreed that the professional learning improved their ability to use the digital tools and resources to impact instruction, high school teachers were less likely to agree that the professional learning improved their abilities compared to elementary and middle school teachers.

- Teachers who participated in the DLAS initiative were asked multiple survey items about how the DLAS initiative impacted instructional practices. The next two figures show the percentage of teachers by school level who thought that a particular practice happened more often as a result of the DLAS initiative.

Teacher Perceptions of How Teaching Has Changed Since the DLAS Initiative Began by Level



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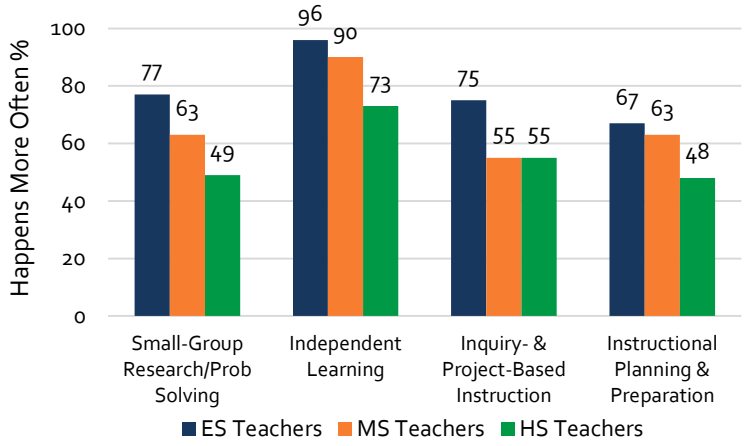
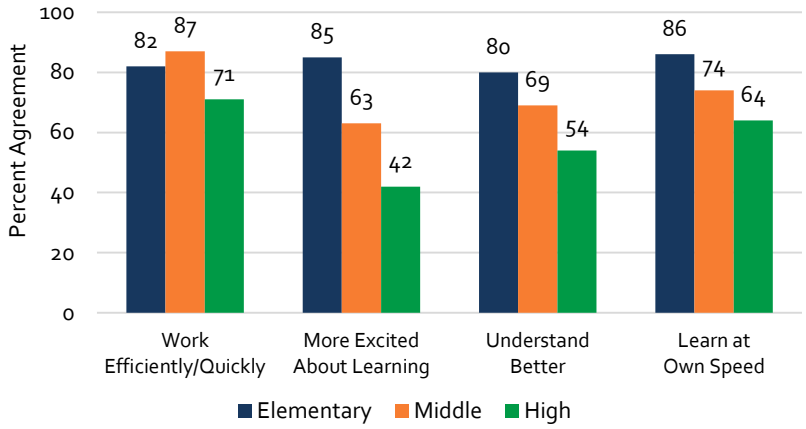


- As shown in the figure below, at least 71 percent of students at all school levels agreed that having their device helped them work more efficiently. Elementary students were most likely to agree that having their device made them more excited about learning.

Student Perceptions of How Using Their Device Helped Them



Characteristics of Participants

- The characteristics of the students attending the participating elementary and middle schools were representative of the division, in general, with some differences in race and socioeconomic status. At the high school level, there were significant differences between the DLAS and the other high schools, especially with respect to race and socioeconomic status. The DLAS schools had higher percentages of African American students and economically disadvantaged students.

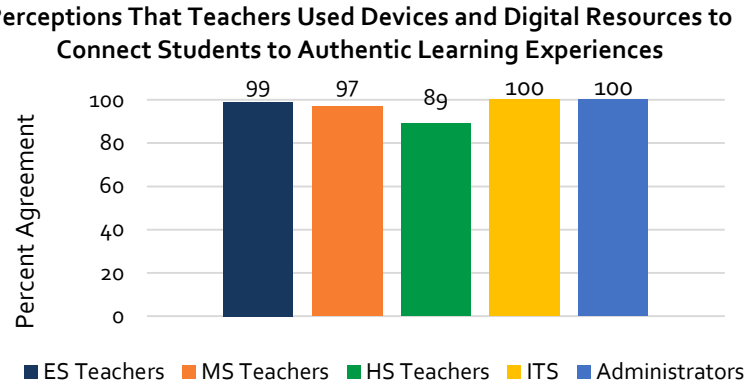
- At the elementary and middle school levels, the DLAS and matched comparison schools, as distinct groups, were relatively comparable with respect to their demographic characteristics.

- The DLAS and matched comparison schools were also relatively comparable academically and behaviorally at the elementary and middle school levels. However, there were significant differences at the high school level between the DLAS and matched comparison schools with DLAS schools having lower academic performance and higher discipline rates.

Progress Toward Meeting Goals and Objectives

Teacher Goal #1: Authentic Learning Experiences

- As indicated in the figure below, very high percentages of staff reported that teachers used the digital devices and resources to connect students to authentic learning experiences.



- When asked whether the DLAS initiative prompted teachers to incorporate authentic learning experiences more often, less often, or there was no difference, 86 percent of elementary teachers, 76 percent of middle school teachers, and 60 percent of high school teachers reported that it occurred more often.

Teacher Goal #2: Student Empowerment

- When asked whether teachers empowered students to choose their learning path through relevant and purposeful use of digital technology, the agreement rates for ITSs and administrators were 100 percent, while the teacher agreement levels were 99 percent at elementary schools, 93 percent at middle schools, and 87 percent at high schools.

Teacher Goal #3: Personalized Learning

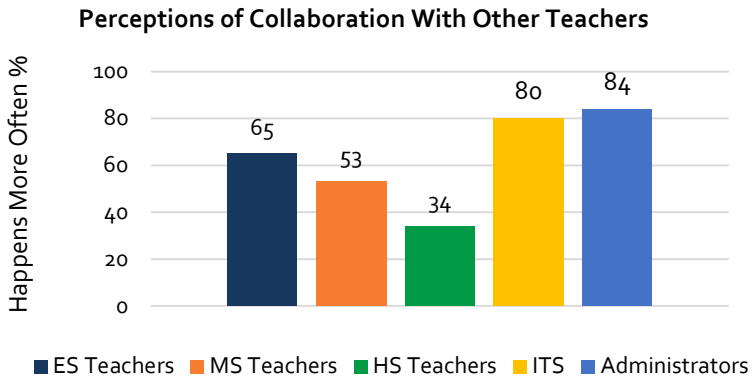
- When asked whether the initiative enabled teachers to provide students with personalized learning opportunities by having them use digital tools, 93 to 100 percent of teachers at each school level, ITSs, and administrators agreed that it did.

- In turn, when asked whether teachers in their school used the devices to collect real-time data about the students' learning activities and to provide them with quality feedback, the agreement levels among teachers were 99 percent at elementary schools, 90 percent at middle schools, and 83 percent at high schools.

Teacher Goal #4: Professional Growth

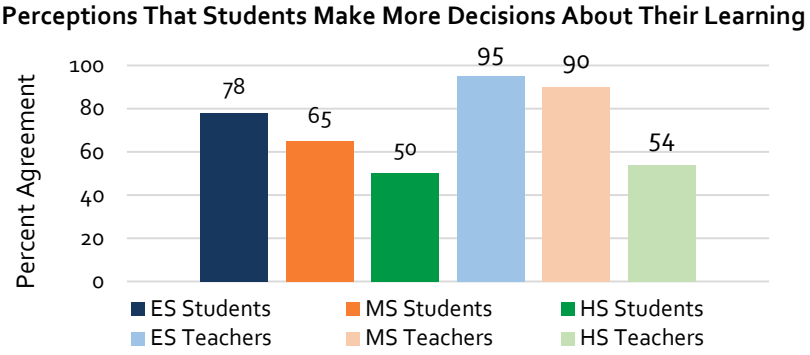
- From 93 to 100 percent of teachers at each school level, ITSs, and administrators agreed that teachers shared digital resources, content, and ideas with one another as part of fostering professional growth.

- When staff members were asked if collaboration with other teachers occurred more often, less often, or there was no difference as a result of the DLAS initiative, the majority of elementary and middle school teachers, ITSs, and administrators indicated that collaboration happened more often since the DLAS initiative (see figure on next page). However, about one-third of high school teachers indicated that collaboration happened more often.



Student Goal #1: Student Ownership of Learning

- When both students and teachers were asked if students make more decisions about their own learning since receiving their digital device, higher percentages of teachers agreed with the survey item than students, and the highest student agreement was at the elementary school level (see figure below). The percentages of parents who agreed were 66 percent at elementary schools, 71 percent at middle schools, and 60 percent at high schools.



Student Goal #2: Global Perspective

- A similar pattern emerged when students, teachers, and parents were asked to indicate whether students were gaining a broader, more global view of the world since being assigned their own digital learning device. Agreement levels were higher at elementary and middle schools compared to high schools.

Percent Agreement That Students Are Gaining a More Global View of World

Group	Students	Teachers	Parents
ES	64%	88%	71%
MS	61%	70%	75%
HS	46%	56%	60%

Student Goal #3: Collaboration

- The majority of students, teachers, and parents at each school level agreed that students used their digital devices to work together on class assignments and projects with other students within their school.

Percent Agreement That Students Collaborate With Others on Assignments

Group	Students	Teachers	Parents
ES	78%	83%	66%
MS	83%	70%	63%
HS	73%	70%	58%

Student Goal #4: Academic Mastery

- When asked if using the assigned device helped students better understand what they were learning, the majority of students, teachers, and parents agreed that the device helped. As noted previously, teachers' perceptions were more positive than students' perceptions, and agreement levels for students and teachers declined as the school level increased.

Percent Agreement That Device Helps Students Better Understand What They Are Learning

Group	Students	Teachers	Parents
ES	80%	94%	69%
MS	69%	80%	76%
HS	54%	67%	62%

- At least 82 percent of students and teachers at the elementary and middle school levels agreed that having their own device gave students greater opportunity to show their knowledge, while lower percentages of high school students and teachers agreed.

Percent Agreement That Device Gives Students Greater Opportunity To Display Knowledge

Group	Students	Teachers
ES	82%	99%
MS	84%	90%
HS	68%	77%

Student Goal #5: Digital Citizenry

- At least 88 percent of elementary teachers and parents and middle school students, teachers, and parents agreed that having their own device helped students to prepare for using technology in responsible and ethical ways. High school stakeholders' agreement levels were lower (67% to 77%).

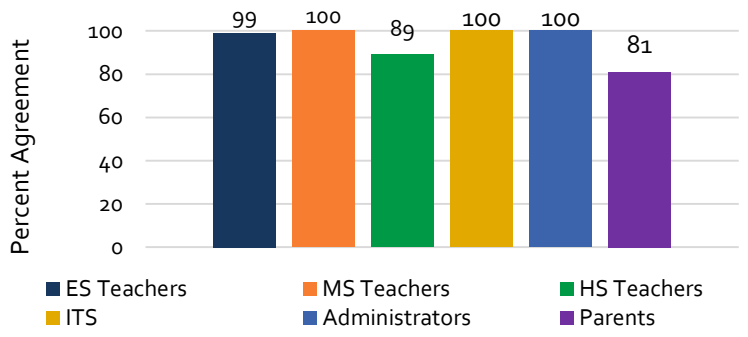
Percent Agreement That Device Helps Students Use Technology in Responsible and Ethical Ways

Group	Students	Teachers	Parents
ES	n/a	100%	92%
MS	88%	97%	90%
HS	67%	72%	77%

Overall Perceptions Related to Goals

- Stakeholders were asked to indicate their general agreement that their school made progress toward meeting the goals of the DLAS initiative during the first year. At least 81 percent of all stakeholder groups agreed that progress had been made during 2015-2016.

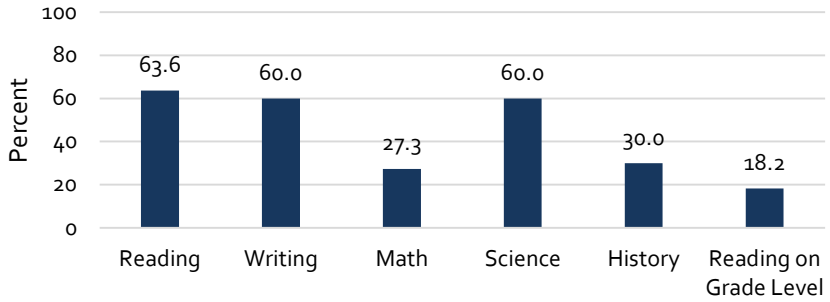
Perceptions That School Made Progress Toward Meeting DLAS Goals



- The SAMR and RATL ratings of each anchor school's public blog show that the anchor schools have begun their journey toward digital integration and personalized learning during the initiative's first year, but there remains considerable opportunity for continued growth.

- Baseline outcome data derived from each pair of DLAS and matched comparison schools indicated that the initiative generated more positive effects in reading, writing, and science in its first year than in the other subject areas. However, the magnitude or strength of the effects ranged from negligible to modest. Nonetheless, the data tended to support a contention that most of the anchor schools proceeded in the right direction during the initiative's first year.

Summary of Positive Academic Effects From Comparing Each Pair of DLAS and Matched Comparison Schools



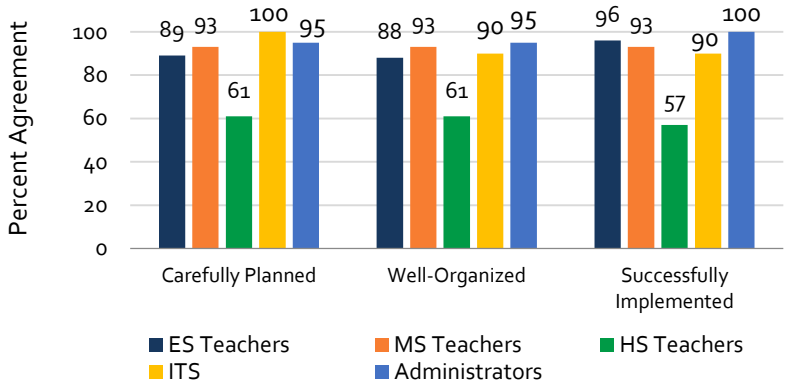
Stakeholder Perceptions

- When asked to indicate the extent to which they understood the desired student and teacher outcomes for the initiative, at least 83 percent of all staff groups agreed that they understood the outcomes. The agreement level was lowest for high school teachers compared to other groups.

- High percentages of staff members (89% to 100%) agreed that the work at their school supported the outcomes identified for the DLAS initiative.

- At least 88 percent of elementary and middle school teachers, ITSs, and administrators agreed that the initiative at their school was carefully planned, well-organized, and successfully implemented.

Perceptions of DLAS Initiative Implementation



- When asked about their overall satisfaction with the DLAS initiative during 2015-2016, 82 to 100 percent of elementary and middle school students, teachers, and parents; ITSs; and administrators were satisfied. Lower percentages of high school students (61%), teachers (70%), and parents (69%) were satisfied.

- When asked in an open-ended survey item to provide recommendations to other schools about to begin implementing digital learning, teachers, ITSs, and building administrators responded candidly. Even at the elementary and middle school levels, staff members wrote about first-year issues – for example, the cursory nature of the professional development that left many feeling overwhelmed, as well as a variety of technical and other issues that complicated implementation and impeded progress.

Additional Cost

- The total additional cost for the DLAS initiative through 2015-2016 was approximately $4.9 million with approximately $2 million coming from VDOE grants related to technology and $2.9 million coming from VBCPS funds.

- The largest cost was for hardware which included the various digital devices and related equipment ($4,724,126 including grant-funded purchases).

- The hardware category accounted for nearly 96 percent of the $4.9 million total expenditure.

- For purposes of comparative context, Houston (TX) Independent School District spent approximately $6.0 million on the first phase of its successful 1:1 rollout for 11 schools.

Recommendations and Rationale

Recommendation #1: Expand the Digital Learning Anchor Schools Initiative.

(Responsible Group: Department of Teaching and Learning)

Rationale: The central purpose of the DLAS initiative was to "develop a cadre of schools to serve as model digital learning schools within the division" and to "study the specifics in the field with respect to pedagogy and device implementation." The plan included the selection of initial digital learning anchor schools for 2015-2016 and the selection of additional digital learning anchor schools to join the initiative in 2016-2017. For 2016-2017, two elementary schools, one middle school, and one high school were added to the DLAS initiative. The schools chosen for the DLAS initiative are serving as learning laboratories to prepare for future expansion of the 1:1 digital learning initiative beyond 2016-2017, and the evaluation of the initiative as it unfolds aims to provide data regarding the implementation and outcomes to facilitate the process.

Recommendation #2: Ensure that each school has at least one full-time ITS and at least one full-time TST who work together as a digital learning support team as the digital learning initiative expands. *(Responsible Groups: Department of Teaching and Learning and Department of Human Resources)*

Rationale: According to their respective job descriptions, the Instructional Technology Specialist (ITS) supports the implementation of innovative instructional practices while the Technology Support Technician (TST) supports the care and maintenance of digital devices, as well as network and other infrastructure components to ensure that they are functioning optimally. When asked if their school's digital devices had been unable to do what the teachers and/or students had wanted them to do, 68 percent of teachers and 80 percent of the ITSs replied "Yes." Responses to an open-ended follow-up question indicated that they frequently encountered a variety of technical problems that would be a TST rather than an ITS responsibility. However, as one respondent wrote, the biggest problem is "insufficient technical support…One TST is not sufficient to maintain all of the devices in our building." Further, when a separate open-ended survey question asked teachers to identify the greatest challenges that were faced in using the digital tools to maximize student learning in their classroom, approximately 40 percent mentioned technical issues while the remainder cited issues that would be an ITS responsibility. The two most frequent complaints were that the ITS was not available when needed and that the professional development provided by the ITS did not meet their needs. One elementary teacher described the greatest challenge as being one that involved the "logistics of introducing laptops without much 'training.' This year was very much an experimental year, where we pretty much were left to decide what tools to use and how to use them. Developing a knowledge base of different tools, uses, and applications was pretty much left up to you." Therefore, as the DLAS initiative progresses, it is recommended that at least one full-time ITS and at least one full-time TST is available at each school to coordinate their efforts to support the DLAS initiative so that the needs of each classroom are addressed in a timely manner. While each school currently has one full-time TST, it is possible as the initiative progresses, this allocation may need to be reviewed to determine if it is sufficient.

Recommendation #3: Review current research regarding 1:1 best practices, including a June 2016 Hanover Research brief, to assess the degree to which the initiative's implementation reflects proven best practices. *(Responsible Groups: Department of Teaching and Learning; Digital Learning Leadership Teams; Department of Planning, Innovation, and Accountability)*

Rationale: A review of responses to several survey questions revealed that the perceptions of teachers and students, especially at the high school level, did not always align with those of building principals or program managers. Some teacher and student responses on the Likert-type survey items and the comments written in response to the open-ended questions suggested that there is room for improvement in areas noted in a June 2016 Hanover Research brief as being associated with successful 1:1 programs elsewhere, especially with respect to

planning and goal-setting, professional development, and adequate technical support both at the building and divisionwide levels. To be achieved, the goals of the DLAS initiative and *Compass to 2020* would benefit from the experience, both positive and negative, of initiatives elsewhere. Therefore, it is recommended that key leaders of the DLAS initiative collectively review the Hanover Research brief, as well as complementary studies and evaluation reports, in order to assess the degree to which the DLAS initiative's implementation reflects proven best practices and to avoid documented pitfalls.

Recommendation #4: Provide professional learning for staff before students are assigned their devices so that staff will have time to plan in informed and effective ways. *(Responsible Group: Department of Teaching and Learning)*

Rationale: Teachers indicated a need for extensive and continuous professional development to focus on student-centered and project-based learning rather than on learning how to operate a device or being cursorily introduced to an overwhelming number of websites and applications. Further, several building administrators emphasized that the professional development should be provided within a broader context of instructional reform, in accordance with *Compass to 2020,* and should include training sessions, coaching, coteaching, and one-on-one assistance. Meanwhile, numerous ITSs recommended that teachers should become comfortable with a rubric such as SAMR so that they also have a framework within which to assess their own status and growth. In addition, a 2016 Hanover Research brief provided evidence to show that "High Immersion" 1:1 programs (i.e., effective and successful) are those that make professional development a high priority, characterized by dedicated training days, training based on teachers' needs, and progressive emphasis on technology-integrated lessons. Conversely, "Low Immersion" programs were characterized by frequent changes in trainers, brief sessions, and an emphasis merely on familiarizing teachers with products and devices.

Recommendation #5: Identify and develop methods to optimize the digital device experience for students and staff by ensuring that device, network, and related infrastructure issues are promptly addressed and resolved.

(Responsible Group: Department of Technology)

Rationale: Teachers and ITSs often referenced technical issues with the digital devices and infrastructure components (e.g., connectivity, bandwidth, speed, etc.), as well as with educational websites or instructional applications that cannot be remedied by a building-level ITS or TST but only at the division level. For example, when responding to open-ended survey questions regarding technical issues, greatest challenges, or recommendations for future digital learning schools, at least one in five teachers and ITSs (about 20%) explicitly mentioned recurrent problems due to the divisionwide content filter blocking educationally legitimate sites. Similar proportions of teachers and ITSs also noted unreliable network connections, slow network access or download speeds, and a variety of other problems that would seriously interfere with the conduct of a lesson. For the goals of the initiative and *Compass to 2020* to be achieved, all of the initiative's technical components – hardware, software, network, connectivity, bandwidth, and usage policies – must be first-rate and then promptly and properly maintained.

Introduction

Background

As part of the Digital Learning Anchor School (DLAS) initiative, the Virginia Beach City Public Schools (VBCPS) provided a laptop computer, Chromebook, or other digital device to students of selected staff at the 11 schools listed in Table 1. The distribution occurred during the fall of the 2015-2016 school year on a 1:1 (one-to-one) basis.

Table 1: Digital Learning Anchor Schools

Elementary Schools	Middle Schools	High Schools
Kingston	Corporate Landing	Bayside
Newtown	Great Neck	Green Run
Rosemont		Kempsville
Strawbridge		
Tallwood		
Thoroughgood		

The initiative was aligned with *Compass to 2020*, the school division's strategic framework which includes strategies focused on "providing students with personalized learning opportunities that incorporate the use of digital resources to prepare them for employment or post-secondary educational opportunities in a globally-competitive environment."[1]

Because the 11 anchor schools will serve as models when the other Virginia Beach schools launch their own 1:1 programs, it is important to document the first-year implementation and to collect baseline outcome data for use in the future. Consequently, the DLAS initiative was added to the Program Evaluation Schedule. This occurred in accordance with School Board Policy 6-26, which stipulates that new educational programs or initiatives that operate with local resources will be evaluated for a minimum of two years. The School Board approved the schedule on August 18, 2015.

Evaluation Purpose

This evaluation provides the program managers, the School Board, and the Superintendent with information about how the Digital Learning Anchor Schools initiative operated during its first year of implementation, as well as how stakeholders perceived the first year of operation. In addition, the evaluation provides information about student characteristics, progress toward meeting goals and objectives, and the additional cost to the division. This evaluation is the first in a series of digital learning evaluations that are planned each year until the initiative is fully implemented across the division.

The evaluation of the DLAS initiative was modeled after a developmental evaluation framework. Developmental evaluation can be defined as an evaluative approach which gathers data in an ongoing manner to inform an initiative as it unfolds.[2] Developmental evaluation uses flexible methodologies and is particularly appropriate when an innovative program is in its early and formative stages, where evaluation results can inform development, necessary change, redirection, and additional exploration.[3] Thus, whereas evaluations are typically conducted "at the *end* of a program when key decisions about its future are going to be made," developmental evaluation occurs in the midst of program development and implementation.[4] One aim of developmental evaluation is the ability to facilitate and provide timely feedback which informs decision-making and program development. For example, as survey results were collected and analyzed for this evaluation in April 2016, results were provided to program managers immediately to inform ongoing discussions about devices and needs for the initiative. In addition, the results from a developmental evaluation aim to "nurture learning" and "facilitate rigorous evidence-based perspectives" rather than serving as a summative measure for accountability purposes.[5]

Program Overview

A 1:1 digital learning initiative enables each participating student to be assigned his or her own device for the school year. A student can password protect and personalize the device. If a school's policy permits, the student may use the device to do schoolwork at home at night, on weekends, and during vacations. This opens a door for students that ideally leads to emotional investment and greater engagement, as well as opportunities for highly differentiated and personalized learning.

But numerous research studies and program evaluations of 1:1 initiatives and programs elsewhere have repeatedly shown that no improvement in student learning and achievement will occur simply by providing a student with a digital device. It is not *how much* a student uses a digital device; what matters are *how* and for what purposes the device is used. To use the technology merely as virtual pencil and paper may change the mode but not the nature of the learning. Rather, concurrent with the technology infusion, an effective transition to personalized learning requires a

fundamental change in the culture of classroom teaching and learning. More specifically, traditional teacher-directed, lecture-based instruction must be replaced with differentiated, student-centered personalized learning. Table 2 compares the dominant features of the traditional classroom and the 21st century classroom. Thus, the various devices associated with the Digital Learning Anchor Schools initiative serve as a means by which to pursue and attain the elements of a 21st century classroom as well as the goals envisioned in the *Compass to 2020* strategic framework.

Table 2: 20th Century vs. 21st Century Education[6]

20th Century Classroom	21st Century Classroom
Time-based	Outcome-based
Focus on memorization of discrete facts	Focus on what students know and can do
Lessons focus on lower levels of *Bloom's Taxonomy*: knowledge, comprehension, and application	Lessons emphasize upper levels of *Bloom's Taxonomy*: synthesis, analysis, and evaluation
Textbook-driven	Research-driven
Passive learning	Active learning
Learners work in isolation	Learners work collaboratively with classmates and others around the world
Teacher-centered: teacher is center of attention and provider of information	Student-centered: teacher is facilitator/coach
Fragmented curriculum	Integrated and interdisciplinary curriculum
Teacher is judge and no one else sees student work	Work is appraised by self, peers, and global audience
Curriculum is irrelevant and meaningless to students	Curriculum is connected to students' interests, experiences, talents, and the real world
Print and the teacher's voice are the primary vehicles of learning	Performance, projects, and multiple forms of media are used for learning and assessment
Literacy is the 3 R's – Reading, 'Riting, and 'Rithmetic	Multiple literacies of the 21st century —aligned to living and working in a globalized new millennium
Assessment is mainly summative and standardized	Assessment is mainly formative, differentiated, and personalized

Program Goals and Objectives

According to the Digital Learning Anchor Schools main webpage on the Virginia Beach Public Schools website,[7] the initiative has two fundamental aims:

- To develop a cadre of schools to serve as model digital learning schools within the division;
- To study specifics in the field with respect to pedagogy and device implementation.

Information on the same page declares that the initiative's central goal is:

- To use digital learning as a pathway to personalized learning by increasing student flexibility with respect to when and how learning occurs.

In addition, program managers and representatives from each participating school's Digital Learning Leadership Team, which generally consisted of the principal, ITS, and selected teachers, formulated *Teacher Outcomes With Look Fors* and *Student Outcomes With Look Fors* at their August 18, 2015 meeting. These outcomes and "Look Fors" are presented in their entirety in Appendix A.

It is important to note that the *Outcomes* were formulated to guide the exploratory and aspirational nature of the initiative rather than to serve as specific, measurable, and time-based indicators for an evaluation. Consequently, this evaluation will not include a checklist of goals attained. Rather, the data presented regarding progress toward meeting goals and objectives will be formative and developmental in nature. The data will provide information that is more about the nature of the digital learning journey than about how close the anchor schools are to their destination.

Evaluation Design and Methodology

Evaluation Design

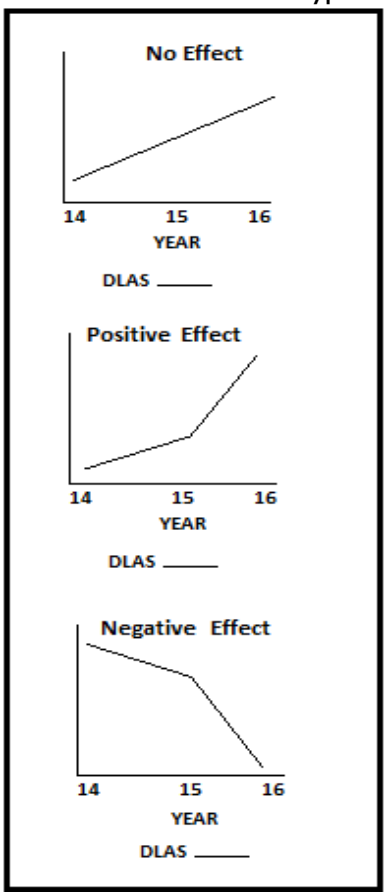
This evaluation utilized a mixed-methods approach to evaluate the DLAS initiative's implementation, as well as to establish a baseline of student outcomes. This involved both qualitative information and quantitative data. Interviews were conducted with program managers, and surveys were administered. Relevant data related to student characteristics and outcomes were analyzed. Research studies and program evaluations

were reviewed. Online artifacts of the initiative, such as blogs, were rated.

The qualitative information used in the evaluation was derived mainly from responses to surveys administered during the spring of 2016 to several stakeholder groups: students, parents, teachers, school administrators, and instructional technology specialists. The surveys included both Likert-type and open-ended questions. Where appropriate, the same questions were included on different surveys so that the responses of different stakeholder groups could be directly compared.

The quantitative information used in the evaluation was extracted from the VBCPS data warehouse. It consisted mainly of three years of test results and other demographic and behavioral data from the 2013-2014, 2014-2015, and 2015-2016 school years. The multiyear data extraction was undertaken for the purpose of assessing three-year trends to ascertain if the initiative had no effect, a positive effect, or a negative effect on the outcomes at each participating school during the first year. Examples of these potential effects are illustrated in Figure 1.

Figure 1: Illustrations of Different Types of Effects



A positive or negative effect on a particular outcome at a particular school *might be* indicated by an upward or downward change in the slope of the trend line across the three years – but only if the change was large enough to be "real" and not attributable merely to chance fluctuations due to measurement error.

Consider, for instance, a change in the slope of SOL reading scores at one particular DLAS school. Even if large enough, the change would not by itself constitute strong evidence that the technology infusion had combined with initiative-driven curricular and instructional changes to cause the slope to change. Many other factors unrelated to the initiative could have caused or at least contributed to the change.

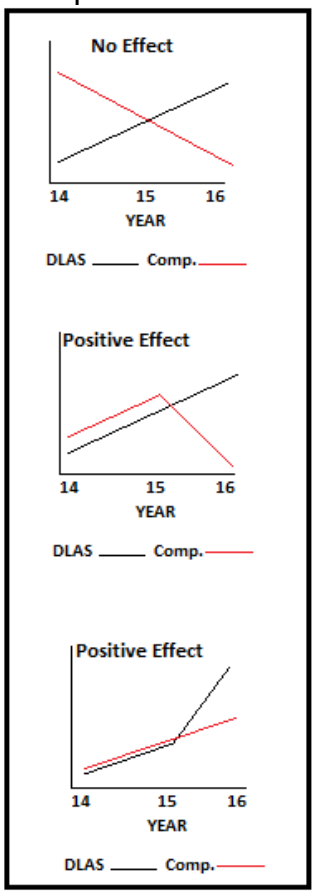
The evidence would become stronger, however, if similar changes in slope were observed either in other outcomes (e.g., SOL math or science scores) at that school or in reading scores at several other participating schools.

If similar shifts were observed both in other subject areas and at several other anchor schools, a compelling case would begin to emerge that the DLAS initiative had produced an effect. However, the evidence of the DLAS initiative's impact would be strengthened if the change in SOL trend lines in reading and other subjects were observed at the anchor schools but not at the matched comparison schools. Such a finding would indicate that the differences between the DLAS and comparison schools were likely directly attributable to the effects of the initiative with less confounding from extraneous factors.

Figure 2 provides three examples of such comparative effects, or the lack thereof. At first glance, the upward slope of the DLAS school's trend and the downward slope of the comparison school's trend in the top panel of Figure 2 do show a distinct difference between the two schools. However, the increase cannot be directly attributed to the initiative because there was no change in the trajectory of either school's trend.

In the middle panel of Figure 2, the trajectory of the DLAS trend also did not change. However, because the comparison school's trend took a negative turn between the 2014-2015 and 2015-2016 school years, the lack of a downturn in the DLAS trend may be interpreted as a positive effect. Similarly, in the bottom panel of Figure 2, while both the DLAS and the comparison schools' trends were ascendant, the initiative helped the DLAS school to increase its rate of increase and can therefore be interpreted as a positive effect.

Figure 2: Illustrations of Different Comparative Outcomes



Therefore, whenever possible, each DLAS school was carefully paired with a comparable school unaffiliated with the initiative. The matching was accomplished on the basis of demographics, behavioral characteristics such as attendance and referral rates, and academic performance indicators. The pairings are listed below in Table 3.

Table 3: Digital Learning Anchor Schools With Their Matched Comparison Schools

DLAS School	Matched School
Newtown Elementary	College Park Elementary
Tallwood Elementary	Glenwood Elementary
Kingston Elementary	Red Mill Elementary
Strawbridge Elementary	Three Oaks Elementary
Thoroughgood Elementary	John B. Dey Elementary
Rosemont Elementary	Green Run Elementary
Corporate Landing Middle	Independence Middle
Great Neck Middle	Princess Anne Middle
Bayside High	A Composite of All Other Non-DLAS high schools*
Green Run High	
Kempsville High	

* No individual DLAS high school could be matched closely enough with an individual non-DLAS high school. Therefore, each anchor school was compared with a composite of all non-DLAS high schools.

The pairings represent matches by grade level within schools based on the grade levels participating in the DLAS initiative according to a matrix provided by the Department of Teaching and Learning, as well as additional information obtained from the ITS at several schools during the survey administration.[8]

Further, the analyses between paired schools involved all the students in the included grade levels as a whole. Matching students on a one-to-one basis was impossible because all students in all schools are exposed to technology to differing degrees both in and out of school. Being unable to identify individual participating students and control for each student's overall exposure prevented students from being matched on an individual basis.

Finally, it is important to recognize that the initiative involves incremental rather than all-or-nothing changes in technology and pedagogy. That is, as part of *Compass to 2020*, all VBCPS students have access to technology to varying degrees at school and perhaps at home as well. Similarly, not only the DLAS buildings but all schools are also striving to implement effective and innovative teaching practices that maximize rigor and engagement. Concurrently, all schools are also providing students with personalized learning opportunities. Thus, when comparing DLAS and non-DLAS schools, the initiative's effects will be relative, not absolute. Because both the DLAS and non-DLAS schools are moving toward the same destination, any differences in their rates of progress will be smaller and more nuanced than if the DLAS initiative were compared with a set of comparison schools that had no technology and no 21st century curriculum and instruction. Consequently, when interpreting any differences for purposes of making decisions, expectations should be moderated and perspective maintained.

Evaluation Questions

The evaluation questions for this report, which were developed by the evaluators in consultation with the program managers of the Digital Learning Anchor Schools (DLAS) initiative, are presented below:

(1) What were the operational components of the DLAS implementation?

a. How were participating schools selected?
b. What digital devices were selected?
c. How were infrastructure issues and needs identified and addressed?

d. How were participants, especially teachers, prepared for the initiative's inception?
e. What policies did the division and individual schools enact regarding device usage and Internet access?

(2) What were the demographic and academic characteristics of the students participating in the DLAS initiative during the 2015-2016 school year?

(3) What progress was made toward meeting the DLAS goals and objectives?
a. What evidence currently exists to indicate or suggest that the initiative is making progress toward meeting its goals with respect to
   i. The *Teacher and Student Outcomes With Look Fors*
   ii. The *SAMR* and *RATL* ratings of technology integration
b. What were the initiative's initial effects on student outcomes?

(4) How was the DLAS initiative perceived by its stakeholders (i.e., building administrators, instructional technology specialists, teachers, students, and parents)?

(5) What was the additional cost of the DLAS initiative through the 2015-2016 school year?

Instruments and Data Sources

Multiple instruments and data sources were used to gather data for this developmental evaluation. The Department of Planning, Innovation, and Accountability evaluators employed the following data collection methods:

- Conducted meetings with the director and coordinator of Instructional Technology to gather implementation-related information.
- Collected academic and behavioral data from the VBCPS data warehouse from 2013-2014 through 2015-2016 for comparison purposes or to identify matched comparison schools for the data analysis.
- Administered surveys to stakeholder groups (i.e., school administrators, teachers, ITSs, students, and parents) to gather perception data.
- Collected cost information from the Department of Teaching and Learning's Office of Instructional Technology and the Department of Technology.

In addition, evaluations of 1:1 implementation in other school divisions, as well as other research literature regarding 1:1 initiatives, were reviewed to prepare for this evaluation.

Surveys

The Department of Planning, Innovation, and Accountability invited building administrators, teachers, ITSs, students, and parents at DLAS sites to complete a survey regarding their perceptions of the initiative. The surveys of all stakeholders, including parents, were conducted online. Surveys were conducted in a two-week window during the first half of April 2016.[9] Table 4 provides the response rates for each survey. Schools were asked to survey the students who were considered to be part of the DLAS initiative. Therefore, the student response rate is an estimate only due to the difficulty in determining the exact number of students who were considered by the schools as participating in the DLAS initiative.

Table 4: Survey Response Rates

Stakeholder Group	Surveys Sent	Surveys Returned	Response Rate (%)	Number of Survey Items
Building Administrators	32	19	59.4	18
Teachers	480	259	54.0	29
ITS	15	10	66.7	21
Students				
Elementary (3-5)	1,729	1,180	68.2	30
Secondary	4,156	1,766	42.5	13
Total	5,885	2,946	50.1	43
Parents	7,362	637	8.6	19

Note: The number of questions on each survey counts a multipart question as just one question.

The surveys consisted mainly of Likert-type items focused on instructional practices, personalized learning activities, the attributes of the digital devices, professional development, and the overall effectiveness of the DLAS initiative. The response options of the Likert-type item were generally on a four-point scale: (1) Strongly Disagree, (2) Disagree, (3) Agree, and (4) Strongly Agree. Where possible, comparable versions of the survey items, including the open-ended questions, were included on all or nearly all survey versions.

The open-ended survey questions mainly concerned the initiative's impact on teaching and learning. The school staff surveys also included an open-ended question that asked survey respondents "What recommendations can you offer to [your counterparts] in other schools when they begin to implement digital learning?"

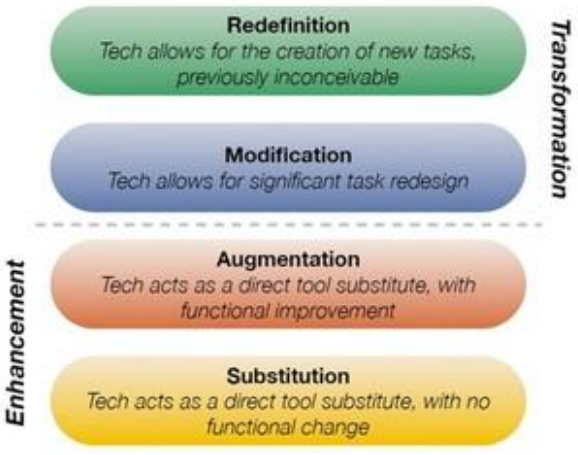
Technology Integration Ratings

As mentioned previously, most of the initiative's goals and objectives associated with the third evaluation question were exploratory and aspirational in nature. Consequently, direct measurement of the initiative's impact is very difficult, which makes straightforward causal attribution almost impossible. Therefore, the next best alternative is to view the question from multiple perspectives or with multiple methods in an attempt to draw valid inferences via a triangulation of the data.

Survey responses, which reveal teachers' and students' perceptions of the initiative's impact on their classroom activity, provide one leg of the triangle. Comparative analysis of academic trends before and after the initiative's inception adds a second leg. The third leg consists of accessing the online artifacts of classroom activity in the anchor schools and rating them according to two rubrics of technology integration and transformation.

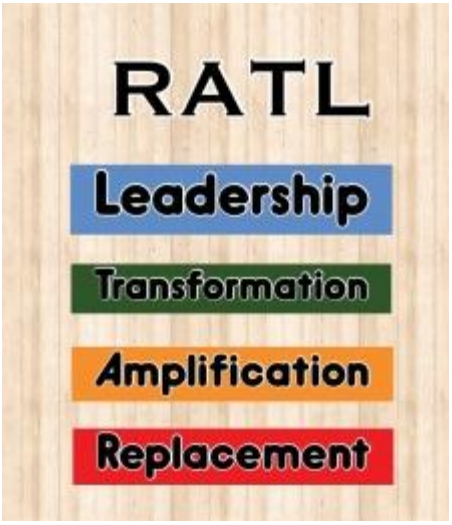
The first rubric is the SAMR Model[10], presented in Table 5, which serves as an evaluative lens through which to view aspects of the DLAS initiative – specifically, the degree to which classrooms are integrating the 1:1 technology into their daily practice. It is displayed hierarchically, with each successive level representing greater integration, sophistication, and inventiveness.

Table 5: The SAMR Model



The second rubric is the RATL Model[11], which is set forth in Table 6.

Table 6: The RATL Model



Although the two models are similar, they differ in two fundamental ways. First, the SAMR places the target, Redefinition, at the top of the hierarchy while the RATL Model places its target, Transformation, at the third of the four levels. This enables the top level, Leadership, to represent surpassing the target. Second, in the SAMR Model, the distinction between the second and third layers, Augmentation and Modification, is not clear. In practice, the two levels often overlap. When used as a rubric, the lack of clarity could lead to mislabeling and diminish reliability. In contrast, the distinctions between all four RATL levels are clear and sharp. In reality, the Amplification level of the RATL Model, in essence, simply combines the two middle levels of the SAMR Model. From another perspective, the two rubrics differ just enough from each other to warrant being used in unison for purposes of cross-validation.

Literature Review Framework

The Office of Research and Evaluation evaluators reviewed a Hanover Research review of the available research and evaluation regarding 1:1 initiatives.[12] The well-documented information in the brief provided a useful frame of reference for designing the evaluation and providing a context for interpretation of some evaluation results.

The key findings from the literature review included the following:

- Focusing on student-centered learning is key for increasing student engagement and achievement within 1:1 programs.
- Leaders at both the school and division levels must actively demonstrate concrete support for 1:1

programs in order for the programs to be successful.

- Schools and districts implementing 1:1 programs should take special care to ensure that programs do not widen achievement gaps between already low-performing and high-performing students.
- Teacher training and professional development are critical in facilitating successful 1:1 program implementation. It must be high-quality, adaptive, and sustained. It must conceive and cultivate a contextual culture of 21st century curriculum and instruction within each classroom. Digital devices serve merely to facilitate transformation; it would be woefully insufficient merely to train on how to operate a digital device and provide links to relevant websites and "cool" applications.
- When planning 1:1 programs, school and district leaders should address infrastructure issues and usage policies.

Data Analysis

The varied nature of the data and the evaluation questions led to the use of several analytic procedures and techniques. While some computations and analyses were performed in Microsoft Excel, many others were conducted with SPSS-23.

To develop descriptions, occurrences were counted and percentages or appropriate averages (means or medians) were computed for interpretation. Where appropriate, statistical tests were performed to determine whether an observed occurrence or difference was large enough to be considered real rather than attributable to chance. In turn, effect sizes were calculated to indicate whether the magnitude of an effect holds practical significance. Finally, for reporting purposes, the results were formatted either as text-based tables or graphic representations (bar charts, line graphs, etc.).

Whenever possible, comparisons were drawn to investigate the consistency or differences between and among groups. For example, including the same questions on different surveys enabled the evaluators to compare the rates of agreement among various DLAS stakeholder groups. Survey agreement percentages were based on those who answered the survey item. "Don't Know" responses were excluded from percentages where applicable.

Evaluation Results and Discussion

The evaluation of the Digital Learning Anchor Schools focused on the initiative's implementation and first-year outcomes and perceptions. The following sections of the report provide the results associated with each evaluation question and a discussion of the results. Where appropriate, additional characterizations of the initiative's operation and impact are also included.

Because the initiative is in its first year, the data analyses focused more on the implementation and perceptions of progress made in areas that were identified as desired outcomes of the initiative. This was done for two reasons. First, because other VBCPS schools will sooner or later model their own digital integration and personalized learning efforts on the anchor schools, it is important to focus on more effective and less effective implementation practices. Second, as mentioned previously, it may be premature to expect that the impact on student outcomes would yield demonstrable effects in the first year.

Implementation of the DLAS Initiative

The first evaluation question focused on the implementation of the DLAS initiative.

Selection of Participating Schools

In March 2015, all schools were invited via a Principals' Packet memorandum to indicate their interest in serving as a DLAS and to field test a digital learning initiative during 2015-2016. Interested schools were asked to complete a self-assessment using the VBCPS Technology Integration Continuum to determine their level of readiness for implementing digital learning devices in their school. The Department of Teaching and Learning reviewed 35 submitted interest forms and ultimately selected 11 schools based on readiness and a consideration of balance between school levels and location of schools. Practical considerations were also taken into account such as the amount of available funds and the total number of students who would be provided with devices. For example, if the division had a certain funding amount for devices of a particular type, the school with a corresponding number of students in selected grade levels would receive devices.

While the Department of Teaching and Learning provided devices to specified grade levels as part of the initiative, schools that already had devices for those grade levels may have provided those devices to students in other grade levels and considered those grade levels as part of the DLAS initiative as well. Because of this, it was difficult to determine the exact scope of the initiative at all schools and the individual students who participated. Appendix B provides information about the grade levels that participated in

the initiative based on information from the Department of Teaching and Learning and information obtained during the survey administration from ITSs.

It is important to note that the three high schools that were selected for participation in the DLAS initiative in 2015-2016 were already participating in the Virginia Department of Education (VDOE) e-Learning Backpack initiative where grant funds, along with a local match, provided all ninth graders in schools that were not fully accredited with a tablet or laptop computer. Because ninth graders in 2014-2015 and ninth and tenth graders in 2015-2016 were provided devices as part of the VDOE initiative, participation in the DLAS initiative was a natural extension.

Digital Device Types

Availability, cost, and other practical considerations contributed to the selection of particular device types and models for inclusion in the initiative, as well as for assigning them to specific anchor schools. For example, some Title I elementary schools already had iPads for instruction. Therefore, as the DLAS initiative provided laptops for certain grade levels, the devices that had been used by those grade levels previously were able to be used by other grade levels at the schools. For the high schools that were part of the VDOE e-Learning Backpack initiative, additional devices were provided to supplement what was already available.

Each student of each participating teacher was assigned his or her own laptop, Chromebook, or tablet for the remainder of the school year. The various device types that were provided are presented in Table 7.

Table 7: Digital Learning Anchor School Device Types

Brand and Type	Model
HP 14" laptop	ProBook 640 G1
HP 11" laptop	ProBook 11E
HP 11" convertible laptop	ProBook X360-310
Dell 11" laptop	Latitude 3150
Asus tablet	Transformer T100TA
Apple iPads	Various
HP Chromebook	Chromebook 11 3G

The division assigned digital devices to schools on a numbers basis. For example, if there were 350 ASUS tablets available for distribution, the school with the number of students closest to that available amount (but not more) would receive those devices. Table 8 summarizes the distribution of devices based on information provided by the Department of Teaching and Learning. The table indicates a piecemeal pattern of distribution, and no systematic comparison of devices by grade level, for instance, was possible.

Table 8: Distribution of Devices by School

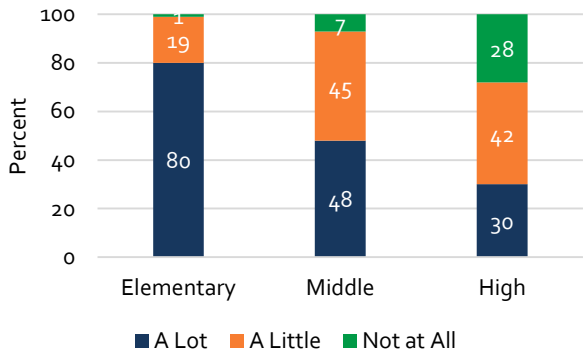
School	14" HP	11" HP	iPad	11" Dell	ASUS tablet	Chrome-book
Bayside HS			X	X	X	
Corp Landing MS		X	X			
Great Neck MS			X	X		
Green Run HS			X	X	X	
Kempsville HS			X	X	X	
Kingston ES	X		X			
Newtown ES		X	X			
Rosemont ES			X	X		
Strawbridge ES			X			X
Tallwood ES		X	X			
Thoroughgood ES		X	X			

Note: All schools had a varying number of iPads. Some grades 1 and 2 students at Kingston also had Android tablets.

The distribution of digital devices to participating schools occurred gradually during fall 2015. While some schools received their devices in early September, others did not receive theirs until after Thanksgiving. This distribution schedule has the potential to impact the strength of results related to progress towards meeting the DLAS initiative's goals as well as survey results, which will be discussed in later sections of the report.

Students at each school level were asked how much they liked using their device for schoolwork. Figure 3 shows that a notably higher percentage of elementary students liked using their devices "a lot" compared to secondary students.

Figure 3: Student Perceptions of How Much They Like Using Their Device for Schoolwork



Stakeholders were asked to select their preferred device for students if they had to choose one type of device. As shown in Table 9, the majority of middle and high school students preferred a laptop or notebook. Teachers at all levels and administrators preferred a laptop or notebook for their students as well. One half

of the ITSs preferred a laptop or notebook followed closely by the Chromebook.

Table 9: Preferred Device for Students

Group	Laptop or Notebook	Chromebook	Tablet
MS Students	**64%**	11%	25%
HS Students	**56%**	15%	29%
ES Teachers	**68%**	16%	16%
MS Teachers	**80%**	10%	10%
HS Teachers	**74%**	12%	14%
Administrators	**74%**	16%	11%
ITS	**50%**	40%	10%

Note: Elementary students were not asked this survey item.

Infrastructure Issues and Needs

Most VBCPS buildings already had wireless connections available in every classroom for use with carts of wireless devices. At one school, additional wireless connections were needed in certain classrooms. Similarly, the initiative required no major increase in bandwidth. Bandwidth was incrementally adjusted on an as-need basis. Repair or replacement of faulty or damaged equipment was handled on a routine basis. A school's ITS would attempt to fix the device or refer the device to the Department of Technology if needed.

Although it appeared that infrastructure was in place for the first year of the DLAS initiative, multiple survey responses from stakeholders indicated that there were some infrastructure concerns during the first year. In particular, students, ITSs, and especially teachers noted moderate to severe technical issues involving problems such as unstable connectivity, inadequate numbers of wi-fi hot spots, inadequate bandwidth to handle the demands of 20-30 users at a time, issues related to the content filter blocking access to legitimate websites and those required by an assignment, and a lack of prompt and proper technical support. In keeping with the focus of developmental evaluation, survey comments related to the infrastructure issues and needs were provided to the program managers near the end of the school year to allow time to address needs for the second year of the initiative.

Professional Learning to Prepare for Implementation

A 2016 Hanover Research brief provided evidence to show that "High Immersion" programs (i.e., effective and successful) are those that make professional development a high priority, characterized by dedicated training days, training based on teachers' needs, and progressive emphasis on technology-integrated lessons. Conversely, "Low Immersion" programs were characterized by frequent changes in trainers, brief sessions, and an emphasis merely on familiarizing teachers with products and devices.

The model of professional learning that was implemented for the DLAS initiative focused on Department of Teaching and Learning staff providing training and professional learning to the Digital Learning Leadership Team which included principals, ITSs, teachers, and other staff from each participating school. Professional learning was a part of each meeting which occurred every 4 to 6 weeks during the year. The intent was that the ITSs would then provide site-based professional learning opportunities for the teachers at their school who were involved in the initiative as needed.

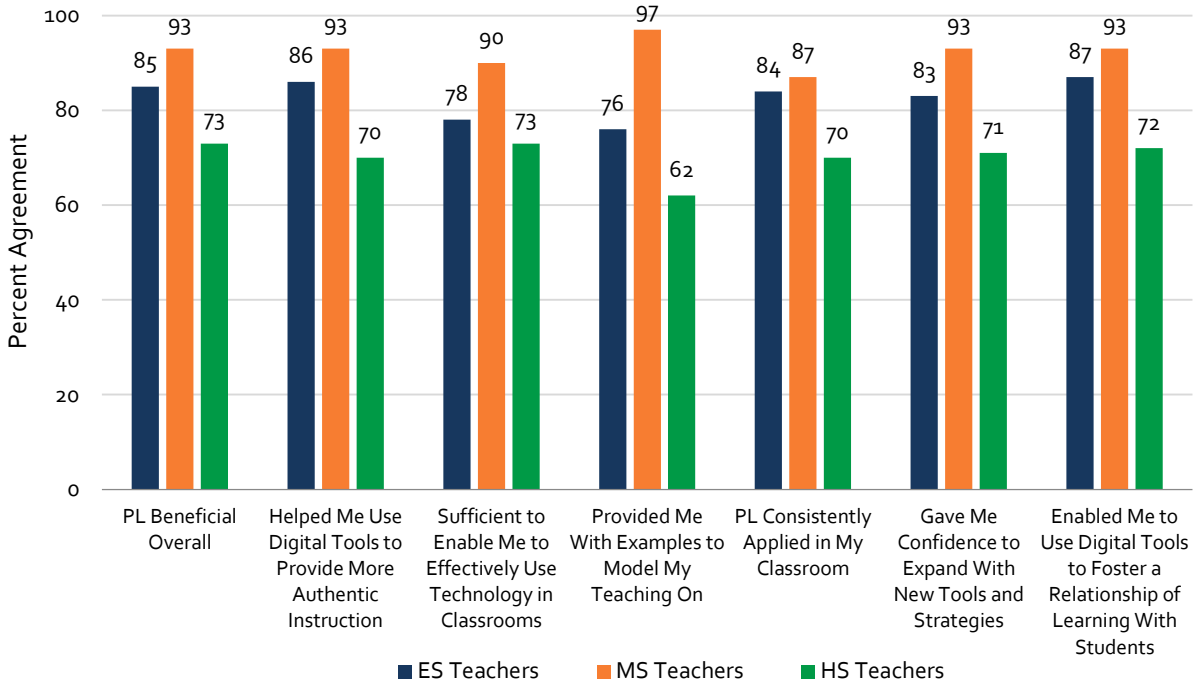
The professional development focused on becoming acquainted with various educational websites and instructional applications. Because teachers were generally familiar with how to operate the device they were assigned, program coordinators from the Department of Teaching and Learning suggested a few programs, websites, and digital applications for school staff to begin to use. The ITS and teachers in each building were also encouraged to explore and experiment for themselves. Anything promising that was found – an interesting website or a useful app – would first be shared with fellow faculty members within the school and then shared more extensively, via the initiative-wide Digital Learning Leadership Team meetings.

The ITSs and administrators at the DLAS initiative sites were asked on the survey to indicate the extent to which they agreed that the DLAS training and professional learning provided by the Department of Teaching and Learning enabled them to provide effective training and professional development to the teachers in their school. Overall, 70 percent of ITSs and 89 percent of administrators who responded to the survey agreed that the professional learning for the ITSs enabled them to provide effective professional learning to their DLAS teachers.

Teachers who participated in the DLAS initiative were asked multiple survey items regarding the professional learning that occurred. As noted, the professional learning was generally site-based. As shown in Figure 4, the general pattern of results showed that middle school teachers were most positive about the professional

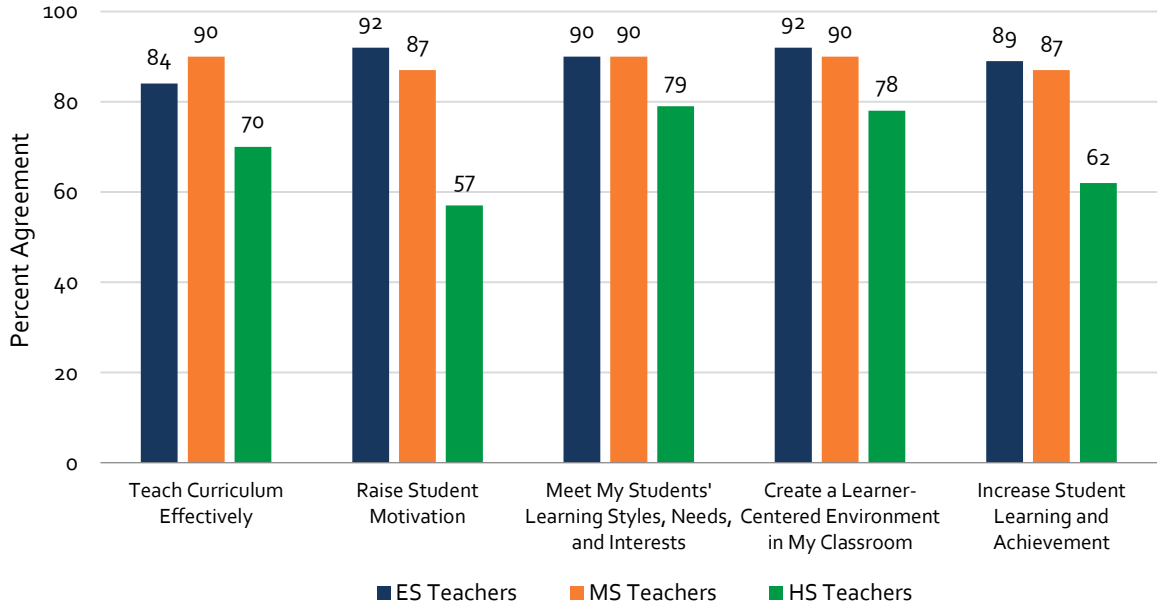
learning related to the DLAS initiative, followed by elementary teachers who also were relatively positive. High school teachers' perceptions of the professional learning related to the DLAS initiative were notably lower and agreement levels were 73 percent or less on the survey items. Although not shown in the figure, agreement levels for ITSs for the same survey items displayed in Figure 4 were all high at 88 to 90 percent.

Figure 4: Teacher Perceptions of Professional Learning Related to DLAS Initiative by Level



As would be expected based on the survey results regarding professional learning shown in Figure 4 above, when teachers were asked about the extent to which they agreed that the professional learning improved their ability to use the digital tools and resources to impact instruction, high school teachers were less likely to agree that the professional learning improved their abilities in the areas noted in Figure 5.

Figure 5: Teacher Perceptions That the DLAS-Related Professional Learning Has Improved Their Ability to Use Digital Tools and Resources



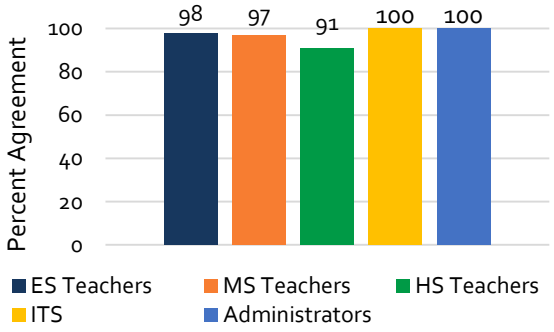
Policies Regarding Device Usage and Internet Access

Each participating school was granted the latitude to set its own policy regarding whether students would be permitted to leave school at the end of the day with their digital device. Generally, the secondary schools allowed students to bring their devices home, while the elementary schools chose to have the devices remain in the school. Based on the student survey, 9 percent of elementary students, 28 percent of middle school students, and 74 percent of high school students reported that they usually used their device at home at night or on weekends.

Access to the Internet was guided by federal and state law, as well as divisionwide policy. The task of content filtering to prevent abuse or unnecessary use of bandwidth was the responsibility of the Department of Technology. Nothing special for the initiative needed to be done, except to set each device to observe the same restrictions and protocols at home as at school.

Stakeholders were asked about their understanding of the division's policies and guidelines for using technology and social media. As shown in Figure 6, high percentages of staff members involved in the initiative agreed that they understood the policies.

Figure 6: Perceptions That Stakeholder Understood Division's Policies and Guidelines for Using Technology and Social Media



In addition to staff members' understanding of the division's policies and guidelines, secondary students were also asked the extent to which they agreed that they understood their school's rules for using technology and being on the Internet. Of the middle school student respondents, 94 percent agreed that they understood the rules, while 84 percent of high school student respondents agreed.

Stakeholders' Perceptions About Instruction in DLAS Classrooms

Teachers who participated in the DLAS initiative were asked multiple survey items about instruction that occurred and how the DLAS initiative impacted instructional practices. Figures 7 and 8 show the percentage of teachers by school level who thought that the practice happened more often as a result of the DLAS initiative. Appendix C provides graphs showing results for all teachers as a group, ITSs, and administrators.

Across all school levels, teachers were most likely to indicate that independent learning took place more often as a result of the DLAS initiative. In addition, the majority of teachers at each level indicated that facilitating/coaching and inquiry- and project-based instruction occurred more often since the DLAS initiative began.

Figure 7: Teacher Perceptions of How Teaching Has Changed Since the DLAS Initiative Began by Level

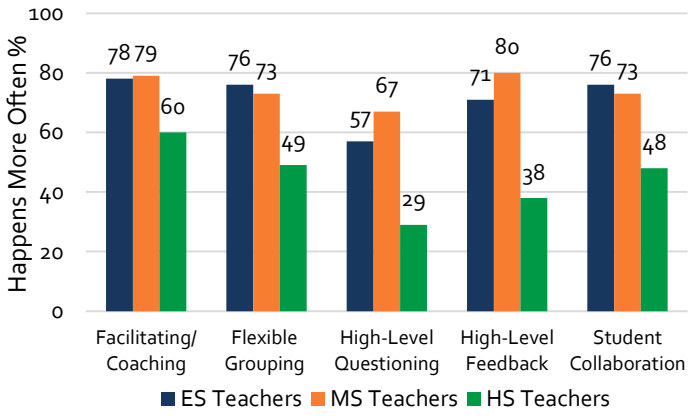
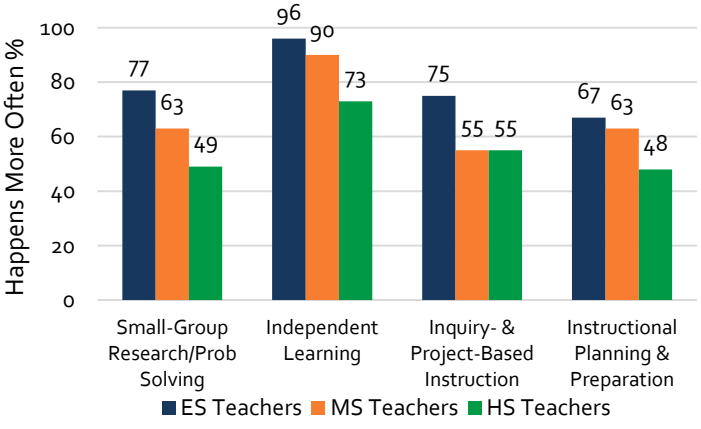


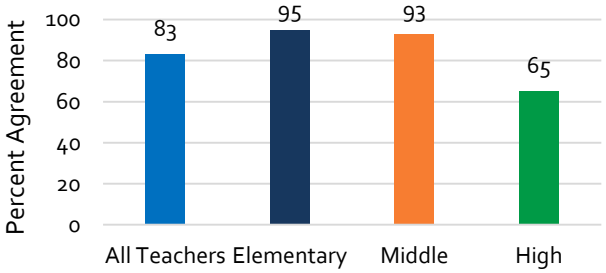
Figure 8: Teacher Perceptions of How Teaching Has Changed Since the DLAS Initiative Began by Level



Most other responses from teachers indicated that there were no differences in their teaching since the DLAS initiative began. For elementary school teachers, from 0 to 2 percent indicated that the actions happened less often after the DLAS initiative began. For middle school teachers, from 0 to 3 percent indicated that the actions happened less often after the initiative began. For high school teachers, from 0 to 4 percent indicated that the actions happened less often after the initiative began.

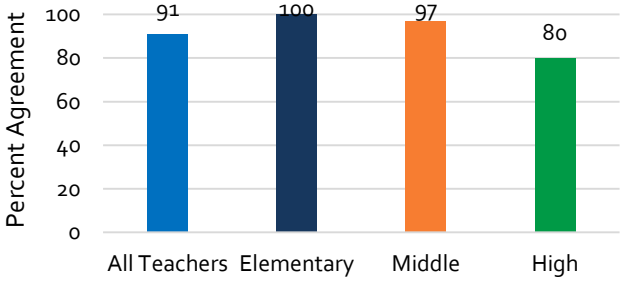
Teachers were asked about their perceptions of the students' experience. Figure 9 shows that 95 percent of elementary teachers, 93 percent of middle school teachers, and 65 percent of high school teachers agreed that students having their own digital device gave them greater opportunity to use their critical thinking skills.

Figure 9: Teacher Perceptions That Having Their Own Device Provided Students Greater Opportunity to Use Critical Thinking Skills



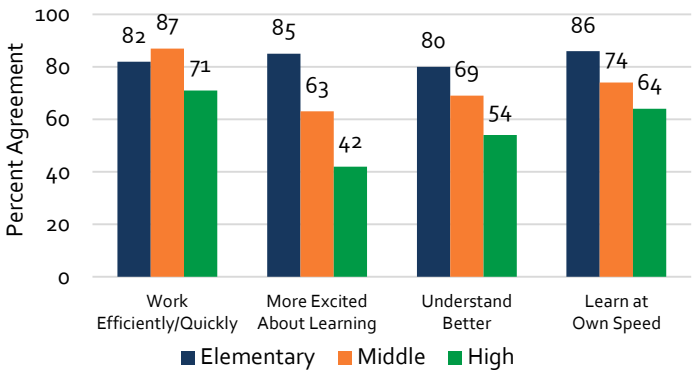
In addition, 100 percent of elementary school teachers, 97 percent of middle school teachers, and 80 percent of high school teachers agreed that having their own device gave students greater opportunities to develop new skills (see Figure 10).

Figure 10: Teacher Perceptions That Having Their Own Device Provided Students Greater Opportunity to Develop New Skills



As shown in Figure 11, at least 71 percent of students at all school levels agreed that having their device helped them work more efficiently. Elementary students were most likely to agree that having their device made them more excited about learning.

Figure 11: Student Perceptions of How Using Their Device Helped Them



Secondary students were asked about their instructional experience and activities and how they changed since receiving their assigned device. Table 10 summarizes the activities that were rated as "easier" by a majority of students at either the middle or high school level after having received their device as part of the DLAS initiative. Results for all items asked as part of this survey item are included in Appendix D.

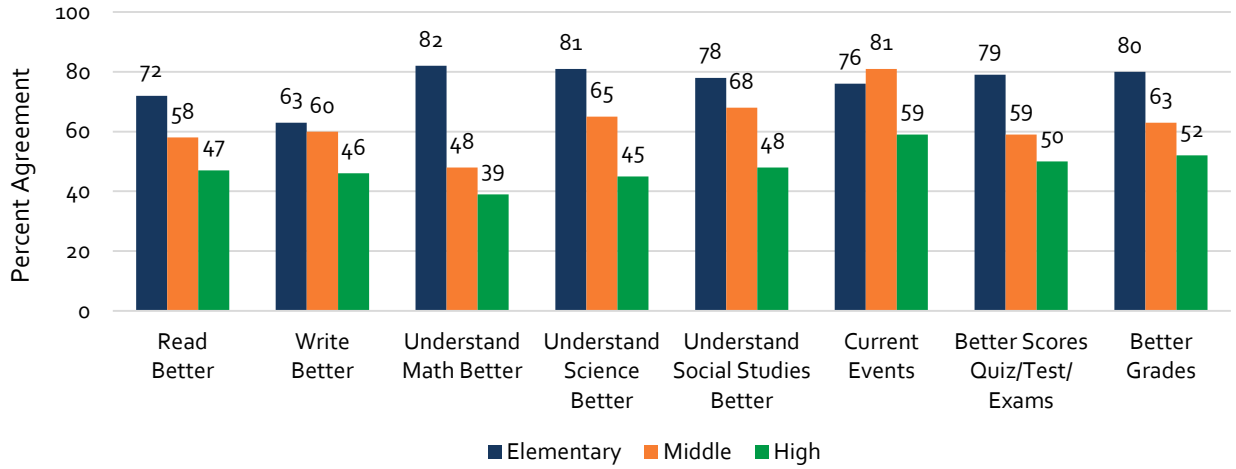
All survey items in the categories of Working With Others, Schoolwork and Projects, and Researching and Collecting Information were rated as "easier" since having their assigned device by a majority of either middle or high school students.

Table 10: Secondary Students' Perceptions of Instructional Experiences That Are Easier Since Getting Their Device

Survey Item	% Easier	
Thinking Skills	**MS**	**HS**
Spell check and grammar check class work	83	60
Working With Others		
Share files with other students online	52	47
Work with other students on the same project	58	53
Work with other students to revise or edit each other's work	56	48
Learning		
Take quizzes and tests	63	51
Schoolwork and Projects		
Write first drafts	57	39
Revise and edit work	72	50
Produce written, audio, and visual content	61	49
Create multimedia reports and presentations	74	56
Research and Collecting Information		
Find news and current events	65	41
Use online maps	53	39
Do research for school	84	60

Students responded to multiple survey items regarding the impact that having their device had on their learning and studying. As shown in Figure 12, higher percentages of elementary and middle school students agreed that having their device impacted their learning in the areas noted compared to high school students. Elementary students were notably more likely to agree that having their device helped them understand mathematics better compared to students at other levels.

Figure 12: Student Perceptions of Impact of Having Device to Learn and Study



Participant Characteristics

The second evaluation question focused on the demographic and academic characteristics of the DLAS participants. An estimated total of 7,160 students participated in the DLAS initiative at select grade levels.[13] As shown in Table 11, the characteristics of the students enrolled in the participating grade levels at elementary and middle schools were representative of the division, in general, with some differences in race and socioeconomic status. At the high school level, there were significant differences between the DLAS and the other high schools, especially with respect to race and socioeconomic status. The percentages of African Americans, as well as the percentages of economically disadvantaged students, were significantly higher at two of the three DLAS schools (i.e., Bayside High School and Green Run High School) than at the other high schools.

Table 11: Demographic Characteristics of DLAS Participants and Matched Comparison Schools (2015-2016)

Characteristic	Elementary School		Middle School		High School		
	DLAS	**MCS**	**DLAS**	**MCS**	**DLAS**	**MCS**	**District Profile (K-12)**
Gender							
Female	1,520 50.6%	1,645 50.7%	787 48.1%	885 49.7%	1,221 48.4%	3,954 48.2%	48.8%
Male	1,484 49.4%	1,602 49.3%	848 51.9%	895 50.3%	1,300 51.6%	4,253 51.8%	51.2%
Ethnicity							
African American	726 24.2%	495 15.2%	315 19.3%	286 16.1%	964 38.2%	1,654 20.2%	23.7%
American Indian	5 0.2%	5 0.2%	1 0.1%	4 0.2%	10 0.4%	22 0.3%	0.2%
Asian/Native Hawaiian/Pacific Islander	176 5.9%	219 6.7%	78 4.8%	80 4.5%	137 5.4%	583 7.1%	6.2%
Caucasian	1,581 52.6%	1,932 59.5%	937 57.3%	1,110 62.4%	969 38.4%	4,533 55.2%	50.2%

Table 11: Demographic Characteristics of DLAS Participants and Matched Comparison Schools (2015-2016) (continued)

Characteristic	Elementary School		Middle School		High School		
	DLAS	**MCS**	**DLAS**	**MCS**	**DLAS**	**MCS**	**District Profile (K-12)**
Hispanic	260 8.7%	309 9.5%	179 10.9%	177 9.9%	275 10.9%	777 9.5%	10.9%
Multiracial	256 8.5%	287 8.8%	125 7.6%	123 6.9%	166 6.6%	638 7.8%	8.8%
Economically Disadvantaged							
Yes (Free/Reduced Lunch)	1,040 34.6%	923 28.4%	657 40.2%	544 30.6%	1,279 50.7%	2,405 29.3%	37.0%
Identified Special Education							
Yes	290 9.7%	294 9.1%	219 13.4%	160 9.0%	325 12.9%	722 8.8%	10.0%
Identified Limited English Proficiency							
Yes	77 2.6%	77 2.4%	20 1.2%	31 1.7%	44 1.7%	83 1.0%	1.8%
Identified Gifted (Intellectually or Artistically)							
Yes	532 17.7%	556 17.1%	194 11.9%	260 14.6%	205 8.1%	1,550 18.9%	12.6%

Note: Percentages may not add up to 100 percent due to rounding.

Table 11 also shows that at the elementary and middle school levels, the DLAS and matched comparison schools, as distinct groups, were relatively comparable with respect to their demographic characteristics.

Table 12 shows that the anchor and matched comparison schools were also relatively comparable academically and behaviorally at the elementary and middle school levels. As with the demographics, there were significant differences at the high school level between the DLAS and matched comparison schools. The differences were most pronounced in the areas of writing scores and pass rates, as well as discipline referrals. Figures for the attendance rate, number of discipline referrals, and number of suspensions reflect the average rate or number per student per school. For example, the value 1.05 indicates that on average, each high school student who participated in the DLAS had at least one discipline referral. In actuality, some students were never referred, while others had multiple referrals.

Table 12: Academic Performance and Behavioral Characteristics of DLAS Participants and Matched Comparison Schools (Composite of 2013-2014 and 2014-2015)

Characteristic	Elementary School		Middle School		High School	
	DLAS	**MCS**	**DLAS**	**MCS**	**DLAS**	**MCS**
SOL Scale Scores						
Reading	460	457	440	443	402	437
Writing	465	459	451	445	385	500
Mathematics	470	469	433	433	429	441
Science	462	465	452	448	425	442
History	492	493	472	474	433	446
SOL Pass Rates						
Reading	84	82	80	82	58	70
Writing	80	80	78	76	39	86
Mathematics	87	84	80	80	78	85
Science	86	86	90	90	78	88
History	92	91	89	90	79	86
Attendance Rate	.97	.96	.96	.96	.94	.95
Discipline Referrals	.11	.12	.46	.79	1.05	.56
Discipline Suspensions	.06	.05	.37	.32	.56	.31

The pairings discussed in the evaluation methodology section of the report provided the best possible opportunity to determine whether or not changes in trend lines at the anchor schools represented real effects of the initiative.

Nonetheless, to ensure that the paired comparisons yielded the most accurate results possible, the DLAS and non-DLAS schools were compared only on the basis of the 2015-2016 data. This is appropriate inasmuch as the DLAS initiative would have had an effect on outcomes during that school year only. Thus, the two previous years of data were instead used as covariates to adjust the 2015-2016 outcome data to control for any initial differences between the schools in each pair.

Progress Toward Meeting Goals and Objectives

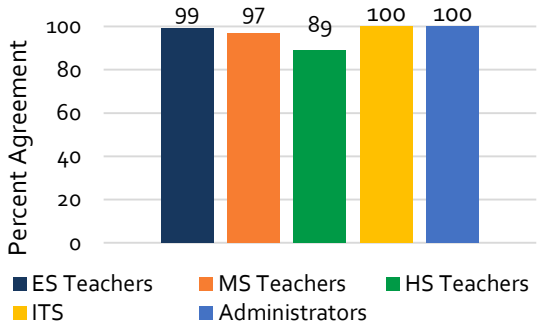
The third evaluation question focused on progress made toward meeting the goals and objectives of the initiative. Two overarching goals of the initiative were to "develop a cadre of schools to serve as model digital learning schools within the division" and "to study specifics in the field with respect to pedagogy and device implementation." These goals delineate the purpose of the initiative rather than outlining specific activities or outcomes of the initiative. Therefore, they will not be formally assessed at this time. Additional goals and objectives in the form of "Teacher Outcomes With Look Fors" and "Student Outcomes With Look Fors" will be assessed in this section of the report based on selected data that were collected through stakeholder survey items that were aligned with the "Look Fors." Survey data focuses on the overarching outcome that encompasses the "Look Fors" rather than each individual "Look For." The teacher and student outcomes with "look fors" were developed at the August 18, 2015 Digital Learning Leadership Team meeting with representatives from each DLAS. The sources of the "look fors" that were specified on the division's document included the individual Anchor School Posters from August 18, the International Society for Technology in Education, the Technology Continuum, and VIF International Education. See Appendix A for the complete document with each outcome and associated "Look Fors" with which survey items were aligned.

Teacher Outcomes

Outcome #1: Teachers will use digital technology to appropriately connect students to authentic learning experiences (outside the walls of the classroom).

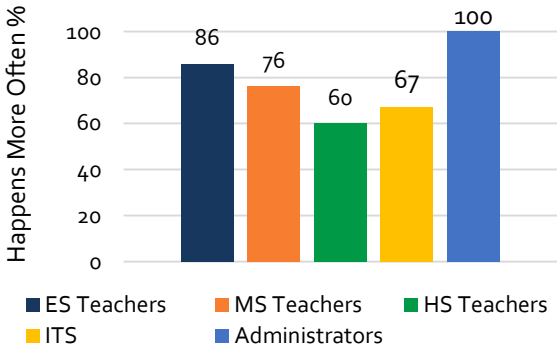
Staff members were asked to indicate their agreement to a survey item about whether the teachers in their school used the devices and digital resources to connect students to authentic learning experiences as a direct result of the Digital Learning Anchor Schools initiative. Very high percentages of staff members agreed (see Figure 13), but teachers' agreement levels declined as the school level increased.

Figure 13: Perceptions That Teachers Used Devices and Digital Resources to Connect Students to Authentic Learning Experiences



Staff members were also asked to indicate whether learning incorporated real-time/authentic contexts more often, less often, or there was no difference since the DLAS initiative began. Figure 14 presents the percentages of staff members who indicated this happened more often. Percentages were relatively high for elementary school teachers, but declined for middle and especially high school teachers.

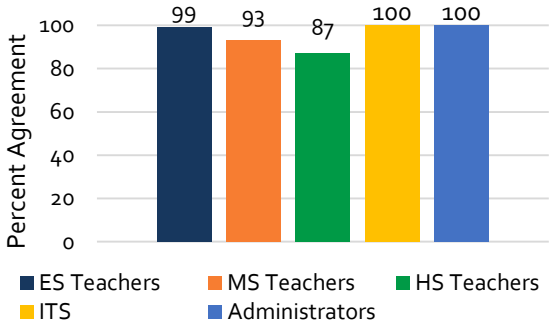
Figure 14: Perceptions That Learning Incorporates Real-Time/Authentic Contexts More Often Since Initiative Began



Outcome #2: Teachers will empower students to choose their learning path through relevant and purposeful use of digital technology.

The second teacher outcome focused on teachers empowering students to choose their learning path through relevant and purposeful use of digital technology. Figure 15 shows that high percentages of staff agreed that this occurred as a direct result of the DLAS initiative.

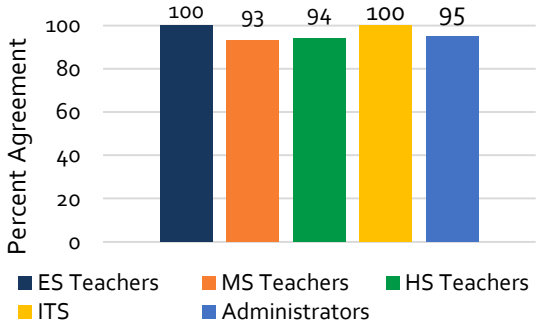
Figure 15: Perceptions That Teachers Empower Students to Choose Their Learning Path



Outcome #3: Teachers will personalize learning through real-time data collection and analysis and individualized learning experiences.

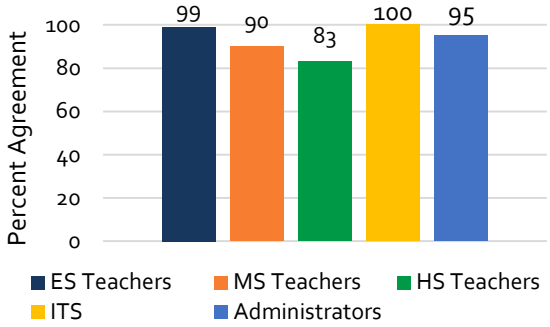
The third teacher outcome was that teachers would personalize the students' learning experience through the use of individualized learning experiences through the use of digital tools and that the personalized learning experience would be supported by real-time data collection to guide instruction. Figure 16 shows that high percentages of all staff groups agreed that the teachers in their school provided students with personalized learning opportunities by having them use digital tools.

Figure 16: Perceptions That Teachers Provide Students Personalized Learning Opportunities



Staff members were also asked about whether teachers in their school used the devices to collect real-time data about the students' learning activities and to provide them with quality feedback. Figure 17 shows that high percentages of all staff groups agreed that this occurred as a direct result of the DLAS initiative. However, teachers' agreement levels declined as the school level increased.

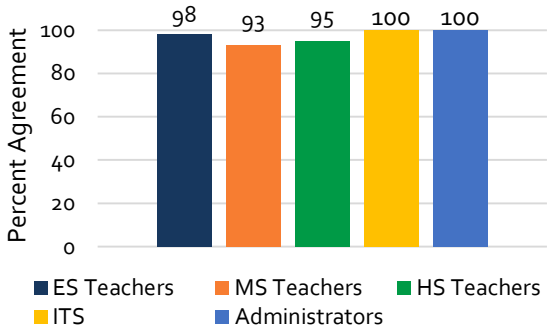
Figure 17: Perceptions That Teachers Use the Devices to Collect Real-Time Data and Provide Students High-Quality Feedback



Outcome #4: Teachers will use digital technology to collaborate, globally and locally, to foster professional growth.

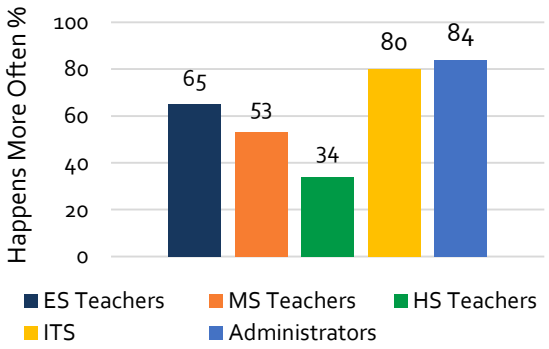
The fourth teacher outcome was that teachers would use digital technology to collaborate and foster professional growth. High percentages of staff members agreed that teachers in their school shared digital resources, content, and ideas with one another (see Figure 18).

Figure 18: Perceptions That Teachers Share Digital Resources, Content, and Ideas



Staff were asked if collaboration with other teachers occurred more often, less often, or if there was no difference since the DLAS initiative began. The majority of elementary and middle school teachers, ITSs, and administrators indicted that collaboration happened more often since the DLAS initiative (see Figure 19). Most other respondents indicated that there was no difference in the collaboration levels since the initiative began.

Figure 19: Perceptions of Collaboration With Other Teachers



Student Outcomes

Outcome #1: Students will take ownership of their academic growth by being active partners in their unique learning pathway by having voice and choice.

The first student outcome was that students would take ownership of their academic growth and be active participants in their learning. Stakeholders were asked to indicate their level of agreement that since being assigned their own digital learning device, students make more decisions about their own learning. As shown in Figure 20, higher percentages of teachers agreed with the survey item than students, and the highest student agreement was at the elementary school level. Patterns of results for both students and teachers showed higher levels of agreement at the lower school levels. As shown in Table 13, 64 percent of all parent respondents agreed that students made more decisions about their learning.

Figure 20: Perceptions That Students Make More Decisions About Their Learning

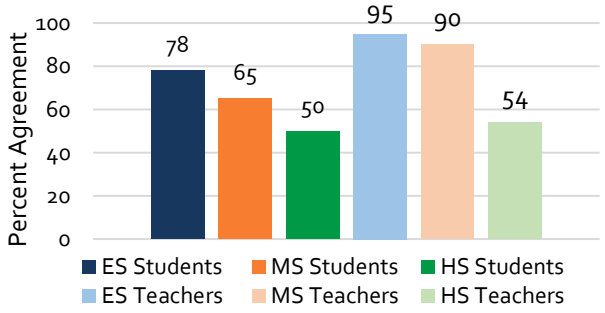


Table 13: Parent Perceptions That Students Make More Decisions About Their Learning

Parent Group	% Agreement
ES	66%
MS	71%
HS	60%
Overall	64%

Outcome #2: Students will gain a global perspective by leveraging digital tools.

The second student outcome was that students would gain a global perspective by using their digital tools. Stakeholders were asked to indicate their level of agreement that since being assigned their own digital learning device, students were gaining a broader, more global view of the world. The majority of students at elementary and middle schools and teachers agreed with this survey item. Again, teachers' perceptions were more positive than students' perceptions, and agreement levels declined as the school level increased. Overall, 67 percent of parent respondents agreed that students were gaining a more global perspective (see Table 14).

Figure 21: Perceptions That Students Are Gaining a More Global View of World

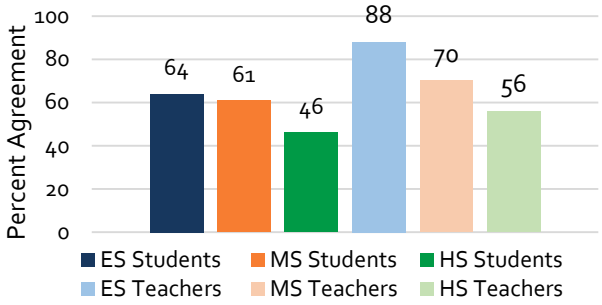


Table 14: Parent Perceptions That Students Are Gaining a More Global View of World

Parent Group	% Agreement
ES	71%
MS	75%
HS	60%
Overall	67%

Outcome #3: Students will collaborate using digital tools to support their learning and the learning of others.

The third student outcome was that students would collaborate with others using the digital tools to support learning. Stakeholders were asked to indicate whether students used their digital devices to work together on class assignments and projects with other students

within their school. As shown in Figure 22, at least 70 percent of students and teachers at each school level indicated that the digital devices were used for this purpose. As shown in Table 15, 62 percent of all parent respondents agreed that students collaborated with others using the digital devices.

Figure 22: Perceptions That Students Collaborate With Others on Assignments

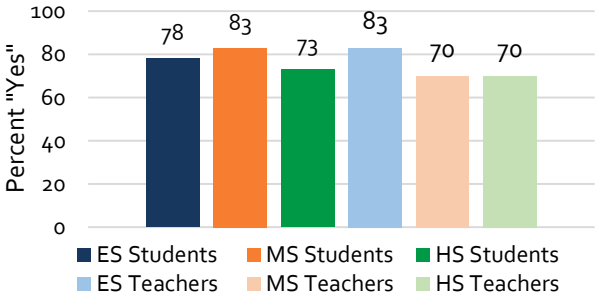


Table 15: Parent Perceptions That Students Collaborate With Others on Assignments

Parent Group	% Agreement
ES	66%
MS	63%
HS	58%
Overall	62%

Outcome #4: Students will demonstrate academic mastery and growth through creation and publication of digital work.

The fourth student outcome was that students would demonstrate academic mastery and growth through the creation and publication of digital work. Stakeholders were asked to indicate their level of agreement with items related to demonstrating academic mastery and then an item focused on the creation of digital work. First, stakeholders were asked their level of agreement that using the assigned device helped students better understand what they were learning. The majority of students and teachers agreed with this survey item. As noted previously, teachers' perceptions were more positive than students' perceptions, and agreement levels declined as the school level increased. Overall, 67 percent of parent respondents agreed that the devices helped students better understand what they were learning (see Table 16).

Figure 23: Perceptions That Device Helps Students Better Understand What They Are Learning

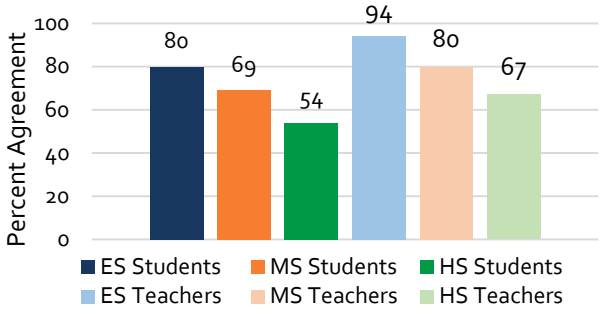
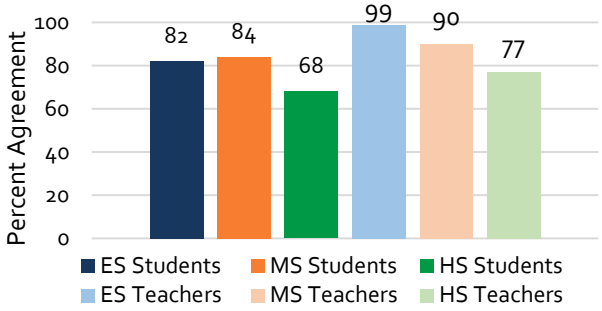


Table 16: Parent Perceptions That Device Helps Students Better Understand What They Are Learning

Parent Group	% Agreement
ES	69%
MS	76%
HS	62%
Overall	67%

Next stakeholders were asked their level of agreement that having their own device gave students greater opportunity to show their knowledge. At least 82 percent of students and teachers at the elementary and middle school levels agreed with the survey item with lower percentages of high school students and teachers agreeing. Again, teachers' perceptions were more positive than students' perceptions.

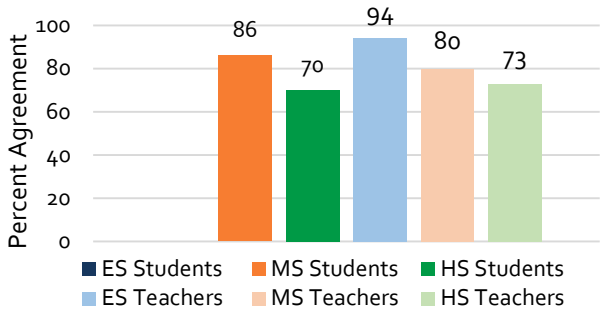
Figure 24: Perceptions That Device Gives Students Greater Opportunity to Display Knowledge



Note: Elementary students were asked if the device allows them to show what they know.

Stakeholders were also asked to indicate their level of agreement that students having their own device gave them a greater opportunity to create high-quality digital work such as blogs, reports, and presentations. At least 70 percent of students and teachers agreed with this survey item. Overall, 71 percent of parent respondents agreed that students created digital work and shared it with others (see Table 17).

Figure 25: Perceptions That Students Have Greater Opportunity to Create High-Quality Digital Work



Note: ES students were not asked this survey item.

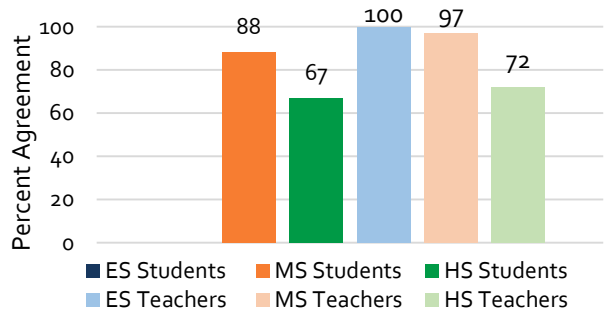
Table 17: Parent Perceptions That Students Create Digital Work and Share It With Others

Parent Group	% Agreement
ES	78%
MS	73%
HS	63%
Overall	71%

Outcome #5: Students will become responsible and ethical digital citizens.

The fifth student outcome was that students would become responsible and ethical digital citizens. Stakeholders were asked to indicate their level of agreement that students having their own device helped them prepare for using technology in responsible and ethical ways. The majority of students and teachers agreed with this survey item with lower agreement levels at high schools. Overall, 86 percent of parent respondents agreed that the devices helped students use technology in responsible and ethical ways (see Table 18).

Figure 26: Perceptions That Device Helps Students Use Technology in Responsible and Ethical Ways



Note: ES students were not asked this survey item.

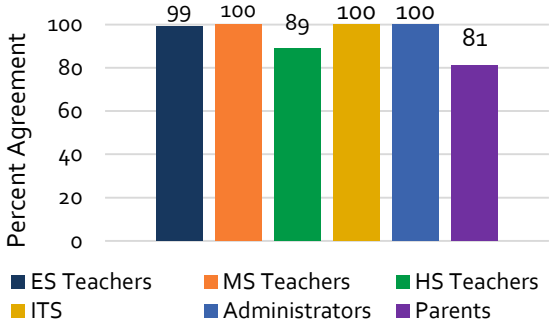
Table 18: Parent Perceptions That Device Helps Students Use Technology in Responsible and Ethical Ways

Parent Group	% Agreement
ES	92%
MS	90%
HS	77%
Overall	86%

Overall Perceptions Related to Goals

Stakeholders were asked an overall survey item related to the DLAS goals, specifically the extent to which they agreed that the school made progress toward meeting the goals of the DLAS initiative during the first year. As shown in Figure 27, at least 81 percent of all stakeholder groups agreed that progress had been made during 2015-2016.

Figure 27: Perceptions That School Made Progress Toward Meeting DLAS Goals



SAMR and RATL Ratings

As noted previously, schools received the devices at varying times during the fall semester of the school year, and this should be noted as data related to the initiative's progress are assessed. The first-year evaluation of the DLAS initiative is based to varying degrees on less than a full school year of activity and experience which would tend to diminish the strength or scope of the initiative's effects.

Nonetheless, an overarching implicit goal of the initiative involves integrating technology into classrooms as a means to transition them to more personalized learning environments that are student-centered and flexible with respect to how and where learning occurs. Although terms such as "personalized" and "student-centered" can be difficult to measure, classifying the products of such environments hierarchically can allow inferences to be drawn regarding how the digital devices are being used.

As described earlier, the SAMR and RATL models were employed as rubrics to rate the degree of technology integration that the anchor schools attained. The two rubrics were applied to the various blog entries that each school posts on the Digital Learning Anchor Schools page of the vbschools.com website. All blog entries about distinct activities were reviewed and rated using the rubrics. Each school's blog is linked in Table 19.

Table 19: Links to the Digital Learning Anchor Schools Blogs

School		
Bayside High School	Green Run High School	Rosemont Elementary School
Corporate Landing Middle School	Kempsville High School	Strawbridge Elementary School
Great Neck Middle School	Kingston Elementary School	Tallwood Elementary School
	Newtown Elementary School	Thoroughgood Elementary School

One assumption that underlies the validity of the ratings is that the blog entries are representative of the school's optimal performance and progress toward transformative technology integration. In addition, the ratings of the 2015-2016 DLAS blogs were completed by one evaluator familiar with the SAMR and RATL models rather than multiple raters. In future evaluations, multiple raters will evaluate the blogs so that the ratings will reflect multiple perspectives and so that the reliability of the ratings can be established.

Based on reviews of the blogs using the SAMR and RATL rubrics, ratings were very similar (see Appendix E). They showed that the anchor schools have begun their journey toward digital integration and personalized learning during the initiative's first year. However, there is considerable opportunity for continued growth.

At nearly all the anchor schools, the classroom activities were confined to the two lowest levels of the two hierarchies: Substitution and Augmentation for the SAMR Model and Replacement and Amplification for the RATL Model. However, for purposes of the ratings for this first-year evaluation, the posted blogs served as the only source of information regarding progress toward digital integration. No direct, systematic observation of classroom activity was undertaken during the first year. Consequently, the degree to which the blogs accurately portrayed the breadth, depth, and richness of the classroom activity remains unknown. If possible, in future evaluations, a random sample of classroom activities will be observed and rated. Further, schools will be invited to submit their best work products for rating as well.

In addition, blog entries from October through December 2015 described activities that involved performing the same types of tasks with the DLAS digital devices that were already being done with textbooks or paper and pencil, desktops in a computer lab, or portable carts of laptops. As the school year progressed, the sophistication of a school's device usage increased, as did the degree to which activities involved differentiated instruction, individualized formative assessment and feedback, collaboration, and personalized learning. As would be expected, some anchor schools progressed more quickly than others.

Finally, although all the anchor schools made progress toward digital integration, preliminary evidence of a "plateau effect" was noticed in some blogs. The extent to which this continues in the initiative's second year will be discussed in the continued evaluation in 2016-2017.

Early Effects on Outcomes

In addition to the SAMR and RATL ratings of digital integration, standard outcome data (SOL scores, attendance, discipline referrals, etc.) were analyzed to identify patterns of the initial effects of the initiative. Examples of how effects were categorized were provided earlier in the report in Figures 1 and 2, and those example figures are applicable to this section of the report. More specifically, the three-year trend lines for each matched pair of schools were compared and classified as a positive effect, no effect, or a negative effect based on the general trend of the anchor schools' results. The anchor schools' pattern of results was then interpreted in the context of the comparison schools' results. The ANCOVA analysis was used to adjust the 2015-2016 school-level results based on the initial differences in the 2013-2014 and 2014-2015 results. Cases where no data were available were labeled n/a (e.g., SOL Writing scores at certain elementary schools).

Table 20 provides a summary of the initiative's effects on academic performance measures and Table 21 summarizes the pattern of effects on behavioral data. The percentages in the "% Total" columns and rows indicate the percent of positive effects among all observed effects, without counting the n/a rating.

Table 20: Summary of Effects on Matched School Pairings and Subject Area Tests

Matched Pair	Reading	RI OGL	Writing	Math	Science	History	% Total
1	P	P	n/a	N	N	N	40.0
2	P	P	n/a	N	n/a	n/a	66.7
3	O	O	n/a	N	P	P	40.0
4	N	O	n/a	O	P	N	20.0
5	P	N	n/a	N	P	O	40.0
6	P	N	n/a	P	P	P	80.0
7	P	O	P	N	P	O	50.0
8	N	O	N	P	N	O	16.7
9	P	N	P	O	O	P	50.0
10	P	N	P	P	P	N	66.7
11	N	N	N	N	N	N	0.0
% Total	63.6	18.2	60.0	27.3	60.0	30.0	41.4

Note: P=Positive Effect, O=No Effect, N=Negative Effect, n/a=Not Applicable

Table 21: Summary of Effects on Matched School Pairings and Behavioral Outcomes

Matched Pair	Attendance	Discipline Referrals	Suspensions	% Total
1	P	O	P	66.7
2	N	N	N	0.0
3	P	P	P	100.0
4	N	P	N	33.3
5	O	P	P	66.7
6	O	N	N	0.0
7	P	O	O	33.3
8	P	P	P	100.0
9	N	N	N	0.0
10	N	P	P	66.7
11	P	P	P	100.0
% Total	45.5	54.5	54.5	51.5

Note: P=Positive Effect, O=No Effect, N=Negative Effect, n/a=Not Applicable

Table 20 provides two important findings. First, the variability pattern in the row-wise totals (i.e., the last column to the right) indicates that the initiative was site-specific and the totals did not correspond to school level (i.e., elementary, middle, and high). Second, the column-wise totals (i.e., the bottom row) demonstrate that the initiative had induced more positive effects in reading, writing, and science and fewer effects in the other subject areas.

Similarly, Table 21 shows that the initiative had site-specific effects only (i.e., row-wise totals in the last column), having impacts on the behavioral outcomes at roughly half the schools that participated in the initiative (i.e., column-wise totals shown in the bottom row).

It also is important to emphasize that the magnitude of these effects were ranged from negligible to modest. Cohen's D statistic was computed to appraise the size of each effect, and none exceeded .20, which is the rule-of-thumb benchmark that denotes practical, meaningful significance. Most of the effect sizes were below .10. At the same time, it is important to remember that the magnitude of these outcome effects reflects that the initiative was in its earliest stage. Based on the analysis of academic and behavioral data, it seems clear that many of the anchor schools are progressing in the desired direction.

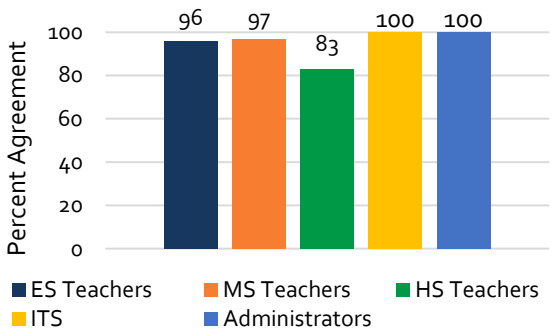
Stakeholder Perceptions

This section of the report provides a summary of the general survey items that were asked of multiple stakeholder groups and the most common themes from the open-ended survey item asking staff to provide recommendations for other schools as they join the DLAS initiative. Other survey results regarding the implementation of the DLAS initiative were presented previously in the applicable sections of the report.

Overall Perceptions

Staff members who participated in the DLAS initiative were asked to indicate the extent to which they understood the desired student and teacher outcomes for the initiative. As shown in Figure 28, at least 83 percent of all staff groups agreed that they understood the outcomes, although agreement was lower for high school teachers compared to other groups.

Figure 28: Perceptions That Stakeholders Understood Desired Student and Teacher Outcomes for the DLAS Initiative



In addition, although parents were not asked about their understanding of the specific student and teacher outcomes ("look fors"), 71 percent of all parent respondents agreed that they understood the school's goals for digital learning.

As shown in Figure 29, high percentages of staff members (89 to 100 percent) agreed that the work at their school supported the outcomes identified for the DLAS initiative.

Figure 29: Perceptions That Work at School Supports Outcomes Identified for DLAS Initiative

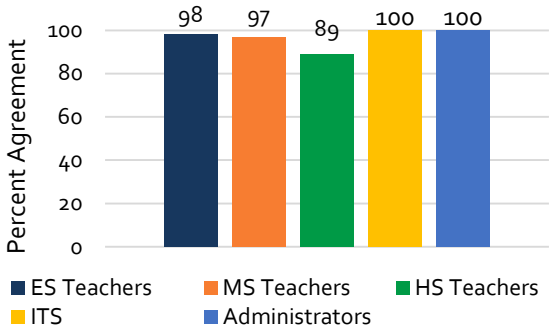
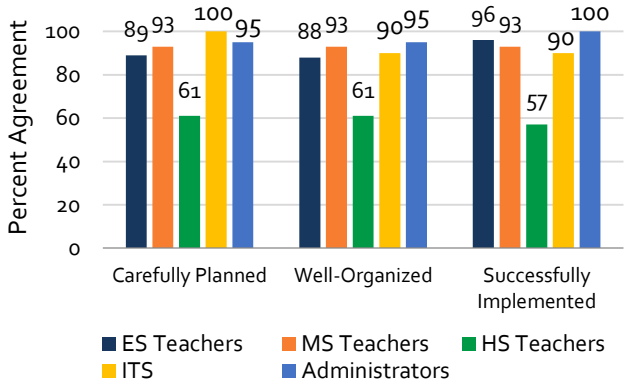


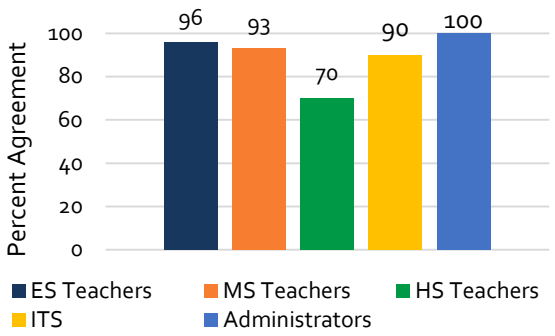
Figure 30 displays perceptions of staff members with regards to implementation of the initiative. At least 88 percent of elementary and middle school teachers, ITSs, and administrators agreed that the implementation of the initiative at their school was carefully planned, well-organized, and successfully implemented. In contrast, 57 to 61 percent of high school teachers agreed with these implementation survey items.

Figure 30: Perceptions of DLAS Initiative Implementation



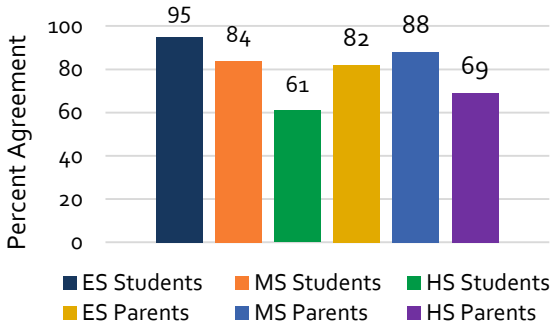
A similar pattern was found with staff members' overall satisfaction with the DLAS initiative in 2015-2016. At least 90 percent of elementary and middle school teachers, ITSs, and administrators were satisfied with their DLAS experience compared to 70 percent of high school teachers (see Figure 31).

Figure 31: Staff Member Overall Satisfaction With DLAS Initiative Experience in 2015-2016



Results from students and parents mirrored the staff members' perceptions. At least 84 percent of elementary and middle school students and at least 82 percent of elementary and middle school parents were satisfied. In contrast, 61 percent of high school students and 69 percent of high school parents were satisfied with their DLAS experience during the first year.

Figure 32: Student and Parent Overall Satisfaction With DLAS Initiative Experience in 2015-2016



Note: Elementary students were asked how they felt about having a digital device to use during the school year.

Recommendations to Other Schools Based on Survey Comments

Teachers, ITSs, and building administrators were asked to provide recommendations to other schools when they begin to implement digital learning. This was an open-ended survey item where staff members could provide their comments. Each group's responses were examined separately by school level--elementary, middle, and high. Several common themes emerged across groups and school levels. The most common themes and representative comments are summarized in this section. Direct comments from stakeholders are included in quotes and italicized while paraphrasing of multiple comments by the first author are not.

Initial Frustration

- This journey is a trial-and-error process. Expect that some things you try will not succeed as much as you'd prefer. Remain courageous, confident, and committed. Because there's no road map available, be your own trailblazer.
- We are introduced to too many apps and websites without sufficient support in how to use them effectively to support our instructional goals. It can be overwhelming. We need clarity from our leaders and more close support from our ITC.
- *"Collaborate. Collaborate. Collaborate – not only with other teachers but also with the students themselves. The traditional dynamic of a one-way transfer of knowledge from teacher to students is so not 21st Century. Failing to make the adjustment dooms everyone to failure and frustration."*
  – Elementary School Teacher

Prerequisites

- Make sure before you start that your classroom has a sufficient number of electrical outlets or charging stations so that every device can be kept in proper working order. Similarly, try to maximize your connection and download speed.
- Set up usage policies and penalties from the start, and enforce them.
- *"The school should decide as a whole what websites and apps to use during instruction. Over the summer, some teachers should receive adequate training and then properly train all other teachers before school begins or during in-service week."*
  – Elementary School Teacher

Successes

- Use it as a tool to support and personalize whatever instructional goals you would pursue anyway. Do not teach the technology as a separate subject.
- Everything works best when you have a helpful ITS and TST who are available when needed.
- *"Plan ahead. Set attainable goals and clear expectations. Plan everything ahead of time, as well as a Plan B and Plan C. If the rules are unclear, it is very difficult to go back and change them."*
  – Middle School Teacher

High School Differences

Perceptions and attitudes at the high school level were generally less favorable than at elementary and middle school levels. Comments from the high school teachers, ITSs, and building administrators tend to indicate that a variety of factors contribute to the differences.

- When students have a different teacher for each class, the lack of coordination and clarity creates too much confusion, conflict, and chaos. This is especially true inasmuch as each teacher has a classload of not 20 to 30 students but more like 150 to 180. Trying to foster and monitor digital integration and personalized learning becomes overwhelming.

- *"It's different when you have 180 different students whom you see only one period per day or less. It would be better to just provide each classroom with a class set rather than giving them to the kids. This way, there will be enough devices when you need them and charged ahead of time."*
  – High School Teacher

- *"We need to update the school so we have more outlets to let the kids charge them. If the kids used their devices in both 1st and 2nd blocks, they are not able to use them in the afternoon because the batteries are dead. Our school is old and often has only 1-3 outlets total in the room."*
  – High School Teacher

- *"My students are not disciplined enough to handle technological devices. I feel as though the use of technology in school should be a privilege, not a right. Students should need to earn that privilege, and should have it revoked if they abuse it."*
  – High School Teacher

Solutions

- At least one full-time ITS and TST for each elementary and middle school, and probably one per grade at high school. They must be proven experts, and they must work well together.

- *"Ensure extensive professional development before and during implementation. Not all teachers are at the same place and will move forward at different speeds, but all will move forward. Provide time for observations/learning walks of staff into classrooms where digital integration is seamless."*
  – Middle School Administrator

- *"Provide training on the SAMR Model and the Technology Integration Continuum the year before implementation begins, so teachers can learn to assess themselves and their level of technology integration as the year progresses."*
  - ITS

- *"It is important to determine what you want to teach and then find the technology that will help you instead of finding the technology you like and finding a use for it."*
  – Elementary School Administrator

- *"Provide opportunities for the ITS to be available to assist teachers implement the various strategies in the classroom. If spread too thin, the ITS will not able to help the teachers with implementation in a timely manner."*
  – Elementary School Administrator

- *"It all starts with the principal. The principal must buy in and be the digital leader in the building. It cannot be left up to a few teachers. Begin with whole staff PD on teaching the 21st century learner so the staff knows WHY this is important. Shaping the culture of the staff to have a strong desire to shift to a digital learning environment is the most important thing. Schools that have not put in the work up front to shift the culture, or that lack a principal who can lead this change, will struggle to make progress."*
  – High School Administrator

- *"Departments must work as a team, collaborating and coordinating as appropriate. In turn, the two most proficiently innovative teachers from each department should be part of a school-wide leadership committee, along with the principal, ITS and TST to identify issues, overcome challenges, and celebrate successes. Ultimately, the initiative must transform the entire culture and climate of the school – especially the curricular priorities and instructional processes."*
  - ITS

Additional Cost

The final evaluation question addressed the additional costs of the Digital Learning Anchor School initiative to the school division through the 2015-2016 school year. These involved initial start-up expenses (e.g., devices) and recurring expenditures from the 2014-2015 and 2015-2016 fiscal years that would not have been incurred if the DLAS had not been implemented. The funding for the DLAS initiative came from four sources: the Capital Improvement Program (CIP), end-of-year (EOY) funds, the operating budget, and grant funds from two Virginia Department of Education (VDOE) grants (e-Learning Backpack and SOL Technology Initiative grants). The cost information was provided by the Department of Teaching and Learning and the Department of Technology.

Table 22 displays the various cost categories for implementing the initiative at the anchor schools. As shown, VBCPS expenditures for the DLAS initiative through 2015-2016 totaled approximately $2.9 million due to substantial funds from VDOE grants allocated to the initiative.

The largest cost was for hardware, which included the various digital devices and related equipment ($4,724,126 including grant-funded purchases). The hardware category accounted for nearly 96 percent of the $4.9 million total expenditure. Replacement costs were not delineated because the initiative is in its early stages, and devices are generally under warranty and have not reached the end of their useful life. It should be noted that some of the expenses for hardware in fiscal year 2015-2016, especially from the end-of-year funds, were for devices that were deployed in fall 2016 for the DLAS initiative's second year of implementation. For purposes of comparative context, Houston (TX) Independent School District spent approximately $6.0 million on the first phase of its successful 1:1 rollout for eleven schools.[14]

While Table 22 indicated that an additional $85,135 was spent on professional development related to the initiative, the actual investment in professional development would have been greater if at least some of the expenses of the ITS position were included. The ITS at each participating school worked with the participating teachers and provided site-based professional learning throughout the year. However, because the ITS position was created for the purpose of providing instructional support for technology integration in all schools and was not specifically created for the DLAS initiative, the costs of that position were not included as *additional* costs for the 1:1 initiative.

Providing funding or mechanisms for professional development is a key consideration for digital learning initiatives. Research that led to the creation of a 1:1 implementation model by Project RED[15] indicated that successful digital learning initiatives allocate 10.6 percent of their total budget to professional development.

Table 22: Additional DLAS Costs Through 2015-2016

Category	Item	Cost	Type and Source of Cost (Initial Start-Up vs. Recurring; CIP, Operating, EOY, or Grant)
Hardware	Devices	$803,640.65	Initial Start-Up FY15 (Operating and EOY)
	Devices	$632,341.00	Initial Start-Up FY15 (Grant)*
	Devices	$462,375.26	Initial Start-Up FY16 (CIP)
	Devices	$106,000.00	Initial Start-Up FY16 (EOY)
	Devices	$1,433,938.70	Initial Start-Up FY16 (Operating)
	Devices	$1,285,830.30	Initial Start-Up FY16 (Grants)
Network	Internet Access	$64,411.68	Initial Start-Up (Operating)
	Network Infrastructure	$21,373.62	Initial Start-Up (Operating)
	Servers, Routers, Firewall, and	$6,545.00	Initial Start-Up (Operating)
	Maintenance and Support	$2,076.80	Recurring (Operating)
Tech Support Personnel	Technical Consulting	$21,150.00	Recurring (Operating)
	Personnel Hired Specifically for DLAS Initiative	$2,429.00	Recurring (Operating)
Instructional Resources	Educational Software/Licenses	None reported	N/A
	Other DLAS Instructional Resources	None reported	N/A
Professional Development	Professional Conferences with Travel and Accommodations	$85,135.40	(Grant)
TOTALS	Initial Start-Up	$2,898,284.91	
	Recurring	$ 25,655.80	
	Grants	$2,003,306.70	
	Total Expenditures	**$4,927,247.41**	
	Total VBCPS Expenditures	**$2,923,940.71**	

Note: FY15=2014-2015; FY16=2015-2016.

* This expense occurred before the DLAS initiative as part of the e-Learning Backpack initiative grant but is included here because the devices funded by this grant ultimately became part of the DLAS initiative when the school joined the initiative in 2015-2016.

Recommendations and Rationale

Recommendation #1: Expand the Digital Learning Anchor Schools Initiative.

(Responsible Group: Department of Teaching and Learning)

Rationale: The central purpose of the DLAS initiative was to "develop a cadre of schools to serve as model digital learning schools within the division" and to "study the specifics in the field with respect to pedagogy and device implementation." The plan included the selection of initial digital learning anchor schools for 2015-2016 and the selection of additional digital learning anchor schools to join the initiative in 2016-2017. For 2016-2017, two elementary schools, one middle school, and one high school were added to the DLAS initiative. The schools chosen for the DLAS initiative are serving as learning laboratories to prepare for future expansion of the 1:1 digital learning initiative beyond 2016-2017, and the evaluation of the initiative as it unfolds aims to provide data regarding the implementation and outcomes to facilitate the process.

Recommendation #2: Ensure that each school has at least one full-time ITS and at least one full-time TST who work together as a digital learning support team as the digital learning initiative expands. *(Responsible Groups: Department of Teaching and Learning and Department of Human Resources)*

Rationale: According to their respective job descriptions, the Instructional Technology Specialist (ITS) supports the implementation of innovative instructional practices while the Technology Support Technician (TST) supports the care and maintenance of digital devices, as well as network and other infrastructure components to ensure that they are functioning optimally. When asked if their school's digital devices had been unable to do what the teachers and/or students had wanted them to do, 68 percent of teachers and 80 percent of the ITSs replied "Yes." Responses to an open-ended follow-up question indicated that they frequently encountered a variety of technical problems that would be a TST rather than an ITS responsibility. However, as one respondent wrote, the biggest problem is "insufficient technical support…One TST is not sufficient to maintain all of the devices in our building." Further, when a separate open-ended survey question asked teachers to identify the greatest challenges that were faced in using the digital tools to maximize student learning in their classroom, approximately 40 percent mentioned technical issues while the remainder cited issues that would be an ITS responsibility. The two most frequent complaints were that the ITS was not available when needed and that the professional development provided by the ITS did not meet their needs. One elementary teacher described the greatest challenge as being one that involved the "logistics of introducing laptops without much 'training.' This year was very much an experimental year, where we pretty much were left to decide what tools to use and how to use them. Developing a knowledge base of different tools, uses, and applications was pretty much left up to you." Therefore, as the DLAS initiative progresses, it is recommended that at least one full-time ITS and at least one full-time TST is available at each school to coordinate their efforts to support the DLAS initiative so that the needs of each classroom are addressed in a timely manner. While each school currently has one full-time TST, it is possible as the initiative progresses, this allocation may need to be reviewed to determine if it is sufficient.

Recommendation #3: Review current research regarding 1:1 best practices, including a June 2016 Hanover Research brief, to assess the degree to which the initiative's implementation reflects proven best practices. *(Responsible Groups: Department of Teaching and Learning; Digital Learning Leadership Teams; Department of Planning, Innovation, and Accountability)*

Rationale: A review of responses to several survey questions revealed that the perceptions of teachers and students, especially at the high school level, did not always align with those of building principals or program managers. Some teacher and student responses on the Likert-type survey items and the comments written in response to the open-ended questions suggested that there is room for improvement in areas noted in a June 2016 Hanover Research brief as being associated with successful 1:1 programs elsewhere, especially with respect to

planning and goal-setting, professional development, and adequate technical support both at the building and divisionwide levels. To be achieved, the goals of the DLAS initiative and *Compass to 2020* would benefit from the experience, both positive and negative, of initiatives elsewhere. Therefore, it is recommended that key leaders of the DLAS initiative collectively review the Hanover Research brief, as well as complementary studies and evaluation reports, in order to assess the degree to which the DLAS initiative's implementation reflects proven best practices and to avoid documented pitfalls.

Recommendation #4: Provide professional learning for staff before students are assigned their devices so that staff will have time to plan in informed and effective ways. *(Responsible Group: Department of Teaching and Learning)*

Rationale: Teachers indicated a need for extensive and continuous professional development to focus on student-centered and project-based learning rather than on learning how to operate a device or being cursorily introduced to an overwhelming number of websites and applications. Further, several building administrators emphasized that the professional development should be provided within a broader context of instructional reform, in accordance with *Compass to 2020,* and should include training sessions, coaching, coteaching, and one-on-one assistance. Meanwhile, numerous ITSs recommended that teachers should become comfortable with a rubric such as SAMR so that they also have a framework within which to assess their own status and growth. In addition, a 2016 Hanover Research brief provided evidence to show that "High Immersion" 1:1 programs (i.e., effective and successful) are those that make professional development a high priority, characterized by dedicated training days, training based on teachers' needs, and progressive emphasis on technology-integrated lessons. Conversely, "Low Immersion" programs were characterized by frequent changes in trainers, brief sessions, and an emphasis merely on familiarizing teachers with products and devices.

Recommendation #5: Identify and develop methods to optimize the digital device experience for students and staff by ensuring that device, network, and related infrastructure issues are promptly addressed and resolved.

(Responsible Group: Department of Technology)

Rationale: Teachers and ITSs often referenced technical issues with the digital devices and infrastructure components (e.g., connectivity, bandwidth, speed, etc.), as well as with educational websites or instructional applications that cannot be remedied by a building-level ITS or TST but only at the division level. For example, when responding to open-ended survey questions regarding technical issues, greatest challenges, or recommendations for future digital learning schools, at least one in five teachers and ITSs (about 20%) explicitly mentioned recurrent problems due to the divisionwide content filter blocking educationally legitimate sites. Similar proportions of teachers and ITSs also noted unreliable network connections, slow network access or download speeds, and a variety of other problems that would seriously interfere with the conduct of a lesson. For the goals of the initiative and *Compass to 2020* to be achieved, all of the initiative's technical components – hardware, software, network, connectivity, bandwidth, and usage policies – must be first-rate and then promptly and properly maintained.

Appendices

Appendix A: Teacher and Student Outcomes With Look Fors

Teacher Outcomes With Look Fors

1. **Teachers will use digital technology to appropriately connect students to authentic learning experiences (outside the walls of the classroom).**
   - Teachers provide students with opportunities to extend learning experiences outside the school walls through the use of digital. (P)
   - Teacher extensively uses technology for communication, shares student work digitally, and is globally connected. (TC)

2. **Teachers will empower students to choose their learning path through relevant and purposeful use of digital technology.**
   - Teachers collaborate with students to determine which digital technology to use. (P)
   - Teacher frequently provides digital opportunities and options with a variety of technology for intentional learning, publishing, and creating. (TC)

3. **Teachers will personalize learning through real-time data collection and analysis and individualized learning experiences.**
   - Teachers provide students multiple opportunities for personalized learning and incorporate the use of real-time data. (P)
   - Teachers take risk to try new tools, strategies, methods to reach students where they are at and foster a relationship of learning. (P)
   - Teacher creates a digitally rich environment where technology is an essential and seamless part of learning. (TC)

4. **Teachers will use digital technology to collaborate, globally and locally, to foster professional growth.**
   - Teacher participates with his/her professional learning network and actively seeks cutting-edge teaching and learning with technology including conferences and webinars. (TC)
   - Teacher reflects on practice and actively seeks additional professional development and collaboration with ITS/LMS. (TC)

(P) = Anchor School Posters from 8/18
(TC) = Technology Continuum
(ISTE) = International Society for Technology in Education
(VIF) = VIF International Education

Student Outcomes With Look Fors

1. **Students will take ownership of their academic growth by being active partners in their unique learning pathway by having voice and choice.**
   - Students will self-assess their learning and reflect on this to drive their education. (P)
   - Students are guided to use an inquiry-based process that requires the development of questions, identification and evaluation of a range of digital and other sources, analysis of information and point of view. (TC)
   - Students are given many options and are included in the decision making process to share what has been learned. (TC)
2. **Students will gain a global perspective by leveraging digital tools.**
   - Students will identify and solve problems using a variety of tools. (P)
   - Students are provided with regular opportunities to utilize technology for collaboration and communication inside and outside of the classroom. (TC)
   - Students can ask questions that spark global research projects that highlight the relationship between products, practices, and perspectives. (VIF2-3)
   - Students interact with individuals and/or groups in their local and global communities to further analyze different cultural traditions, as well as the effects of stereotypes. (VIF6)
3. **Students will collaborate using digital tools to support their learning and the learning of others.**
   - Evidence of students collaborating with others using digital tools inside and outside of the classroom. (P)
   - Students are provided with regular opportunities to utilize technology for collaboration and communication inside and outside of the classroom. (TC)
   - Students and collaborative teams utilize technology to present information and to engage audience. (TC)
   - Students can publish what they have learned online using blogs and other technology tools. (VIF2-3)
   - Students can collaborate effectively with other students within and outside of their school on projects about their local community, and countries in their region, using multiple technology tools and formats.(VIF2-3)
   - Students evaluate and analyze relevant, credible sources to create high-quality print and/or digital learning products. (VIF6)
4. **Students will demonstrate academic mastery and growth through creation and publication of digital work.**
   - Evidence of students creating digital content by viewing websites, movies, etc. (P)
   - Students frequently create and publish digital learning tasks that require higher level and critical thinking skills (TC)
   - Students can present their research findings and projects to other students, teachers, administrators and people from their community using multiple technology tools and formats. (VIF2-3)
   - Students can communicate what they have learned to diverse audiences, and craft specific presentations tailored to those audiences (in face-to-face settings and through online publishing). (VIF4-5)
5. **Students will become responsible and ethical digital citizens.**
   - Advocate and practice safe, legal, and responsible use of information and technology. (ISTE S5.a)
   - Exhibit a positive attitude toward using technology that supports collaboration, learning and productivity. (ISTE S5.b)
   - Demonstrate personal responsibility for lifelong learning. (ISTE S5.c)
   - Exhibit leadership for digital citizenship. (ISTE S5.d)

(P) = Anchor School Posters from 8/18 (TC) = Technology Continuum
(ISTE) = International Society for Technology in Education (VIF) = VIF International Education

Appendix B: DLAS Grade Levels Participating in Year One

This table provides the grade levels at each school that participated to some extent in the DLAS initiative during its first year. The information is based on a matrix provided by the Department of Teaching and Learning and additional information from the ITSs at select schools who provided information during the survey administration in April 2016.

Table 1: DLAS Participation by Grade Level and School

School	Grade Levels Participating	Notes
Bayside High School	9 and 10	Some students from other grades may be included if enrolled in ninth- and tenth-grade classes.
Corporate Landing Middle School	6, 7, and 8	Selected teachers at each grade level participated.
Great Neck Middle School	8	
Green Run High School	9 and 10	Some students from other grades may be included if enrolled in ninth- and tenth-grade classes.
Kempsville High School	9 and 10	Some students from other grades may be included if enrolled in ninth- and tenth-grade classes.
Kingston Elementary School	1 through 5	School was provided with new devices for grades 3 through 5, but they also had devices for most of grades 1 and 2.
Newtown Elementary School	2 and 3	School was provided with new devices for grade 3, but they also had devices for most of grade 2.
Rosemont Elementary School	K through 5	Grades K through 4 already had iPads as part of Title I. New devices were provided for grade 5.
Strawbridge Elementary School	1 through 5	
Tallwood Elementary School	K through 5	School was provided with new devices for grades 3 through 5, but they also had devices for most of grades K through 2.
Thoroughgood Elementary School	1 through 5	School was provided with new devices for grades 3 through 5, but they also had devices for most of grades 1 and 2.

Note: Schools with enough existing devices to include other grade levels may or may not have done so in a systematic manner.

Appendix C: Teacher, ITS, and Administrator Perceptions of How Teaching Has Changed Since the DLAS Initiative Began

Figure 1: Perceptions of How Teaching Has Changed Since the DLAS Initiative Began

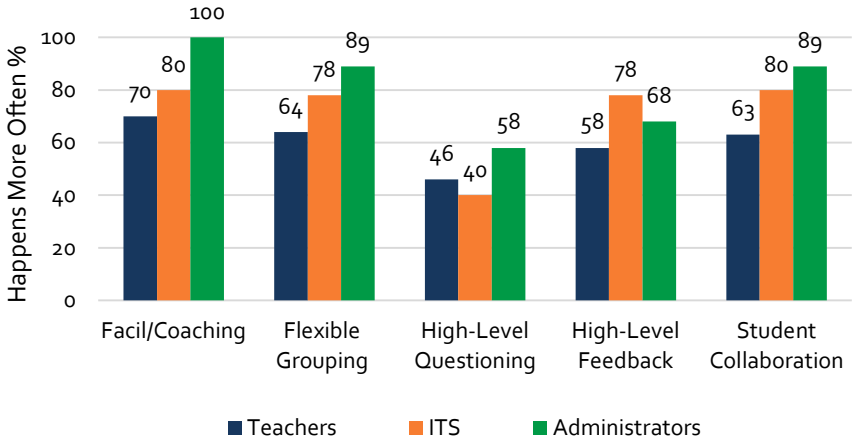
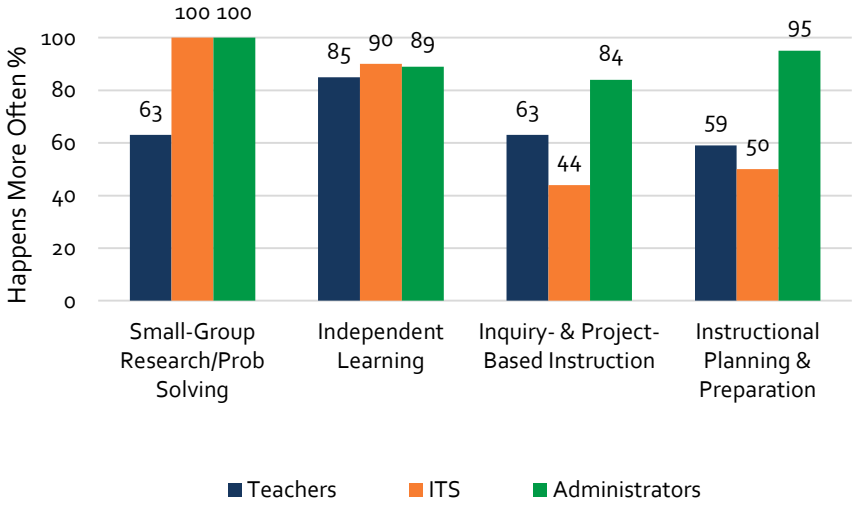


Figure 2: Perceptions of How Teaching Has Changed Since the DLAS Initiative Began



Appendix D: Secondary Student Perceptions of How Having Their Assigned Device Changed Their Instructional Experience

Table 1: Secondary Students Assess How Getting Their Assigned Device Changed Thinking Skills for Them

Survey Statement	% Did Not Use Device		% No Difference		% Harder		% Easier	
	MS	HS	MS	HS	MS	HS	MS	HS
Analyze data and other types of information	14	27	32	33	4	6	50	33
Solve problems in math and other subjects	21	32	37	32	16	11	26	25
Spell check and grammar check class work	7	19	8	17	2	4	**83**	**60**
Ask my teacher questions at night or on weekends	43	35	21	24	5	7	32	34

Table 2: Secondary Students Assess How Getting Their Assigned Device Changed Working With Others for Them

Survey Statement	% Did Not Use Device		% No Difference		% Harder		% Easier	
	MS	HS	MS	HS	MS	HS	MS	HS
Share files with other students online	31	30	12	16	5	6	**52**	47
Work with other students on the same project	15	20	20	19	7	8	**58**	**53**
Work with other students to revise or edit each other's work	19	27	19	18	5	7	**56**	48

Table 3: Secondary Students Assess How Getting Their Assigned Device Changed Learning for Them

Survey Statement	% Did Not Use Device		% No Difference		% Harder		% Easier	
	MS	HS	MS	HS	MS	HS	MS	HS
Take notes in class	26	45	21	21	9	7	44	28
Do homework	13	21	27	22	13	14	47	43
Organize and review class notes	21	37	24	23	9	9	46	30
Study for tests	24	32	27	24	10	9	39	35
Take quizzes and tests	2	13	22	24	13	13	**63**	**51**
Get helpful feedback from my teacher	18	29	33	26	4	8	46	36

Table 4: Secondary Students Assess How Getting Their Assigned Device Changed Schoolwork/Projects for Them

Survey Statement	% Did Not Use Device		% No Difference		% Harder		% Easier	
	MS	HS	MS	HS	MS	HS	MS	HS
Write first drafts	17	29	20	26	6	6	**57**	39
Revise and edit work	9	22	15	22	4	6	**72**	50
Produce written, audio, and visual content	19	27	12	18	7	6	**61**	49
Create multimedia reports and presentations	12	21	10	17	4	6	**74**	**56**

Table 5: Secondary Students Assess How Getting Their Assigned Device Changed Research and Collecting Information for Them

Survey Statement	% Did Not Use Device		% No Difference		% Harder		% Easier	
	MS	HS	MS	HS	MS	HS	MS	HS
Find news and current events	20	35	13	19	2	5	**65**	41
Use online maps	31	37	13	19	4	5	**53**	39
Do research for school	5	15	9	19	2	6	**84**	**60**

Note: Percentages over 50 percent are in bold.

Appendix E: SAMR and RATL Ratings of DLAS Blog Entries

Table 1: SAMR Ratings of DLAS Blog Entries

Digital Learning Anchor School	Number Rated	Substitution	Augmentation	Modification	Redefinition	Weighted Score
Elementary						
Kingston	22	63.6	36.4	0.0	0.0	12.12
Newtown	26	76.9	23.1	0.0	0.0	7.69
Rosemont	6	100.0	0.0	0.0	0.0	0.0
Strawbridge	46	69.6	28.3	2.1	0.0	10.87
Tallwood	6	100.0	0.0	0.0	0.0	0.0
Thoroughgood	18	55.6	44.4	0.0	0.0	14.82
Middle						
Corporate Landing	27	70.4	29.6	0.0	0.0	9.88
Great Neck	14	85.7	14.3	0.0	0.0	4.76
High						
Bayside	8	87.5	0.0	12.5	0.0	8.33
Green Run	18	72.2	27.8	0.0	0.0	9.26
Kempsville	20	60.0	25.0	15.0	0.0	19.99
Total	211	76.5	20.8	2.7	0.0	8.9

Note: Total percentages may not equal 100 percent due to rounding.

Table 2: RATL Ratings of DLAS Blog Entries

Digital Learning Anchor School	Number Rated	Replacement	Amplification	Transformation	Leadership	Weighted Score
Elementary						
Kingston	22	63.6	36.4	0.0	0.0	18.18
Newtown	26	76.9	23.1	0.0	0.0	11.54
Rosemont	6	100.0	0.0	0.0	0.0	0.0
Strawbridge	46	69.6	28.3	0.0	0.0	16.30
Tallwood	6	100	0.0	0.0	0.0	0.0
Thoroughgood	18	55.6	44.4	0.0	0.0	22.22
Middle						
Corporate Landing	27	70.4	29.6	0.0	0.0	14.81
Great Neck	14	85.7	14.3	0.0	0.0	7.14
High						
Bayside	8	87.5	12.5	0.0	0.0	12.50
Green Run	18	72.2	27.8	0.0	0.0	13.88
Kempsville	20	60.0	40.0	0.0	0.0	20.00
Total	211	76.5	23.5	0.0	0.0	12.40

Note: Total percentages may not equal 100 percent due to rounding.

Note: The weighted scores were calculated by weighting the percentages in the following manner: Substitution = 0, Augmentation = 33.3333, Modification = 66.6666, and Redefinition = 100.0. The weighted percentages were then summed. For example, Kingston's weighted score in Table 1 was computed as (0 x 63.63) + (1/3 x 36.36) + (2/3 x 0) + (1.0 x 0) = 12.12. The higher the weighted average, the more advanced on the continuum the school was found to be based on the blog ratings.

Endnotes

[1] Source: http://www.vbschools.com/curriculum/digitallearning/

[2] In scholarly circles, developmental evaluation is supported by many researchers, including former president of the American Evaluation Association Michael Quinn Patton, who is often credited with the establishment of the technique.

[3] Developmental Evaluation retrieved from http://betterevaluation.org/en/plan/approach/developmental_evaluation.

[4] Gamble, J. A. (2008). A Developmental Evaluation Primer. McDonnell Family Foundation. Retrieved from http://www.mcconnellfoundation.ca/assets/Media%20Library/Publications/A%20Developmental%20Evaluation%20Primer%20-%20EN.pdf

[5] Developmental Evaluation retrieved from http://betterevaluation.org/en/plan/approach/developmental_evaluation.

[6] Shaw, A. (2009). Education in the 21st Century. *Journal of Social Education Victoria, 17*, 11–17.

[7] Source: http://www.vbschools.com/curriculum/digitallearning/

[8] Kindergarten students at two schools who potentially could have participated in the initiative if the school had sufficient numbers of devices were not included in analyses of outcome data.

[9] Because the survey occurred in April and the distribution of the devices occurred through November, results for some schools were based on their experience over approximately five months of use.

[10] Puentedura, R. (2006). Transformation, Technology, and Education. Retrieved from http://hippasus.com/resources/tte/puentedura_tte.pdf

[11] Source: http://igniteducation.com/tag/ratl/

[12] Hanover Research, "One-To-One Implementation Best Practices," June 2016.

[13] DLAS initiative participants included in the table were in grade levels noted as participating in the initiative with the exception of kindergarteners at only two of the six elementary schools.

[14] Hanover Research, "One-To-One Implementation Best Practices," June 2016, pg. 41.

[15] In 2010, Project RED conducted the first large-scale national study to identify and prioritize the factors that make some U.S. K-12 technology implementations perform dramatically better than others. Researchers merged the findings from nearly 1,000 schools to identify a replicable design for technology integration and to create implementation tools based on this research. Source: http://one-to-oneinstitute.org/introducing-project-red

2512 George Mason Drive
Virginia Beach, VA 23456
www.vbschools.com
Phone: 757-263-1199
Fax: 757-263-1131

Aaron C. Spence, Ed.D., Superintendent
Virginia Beach City Public Schools
2512 George Mason Drive, Virginia Beach, Virginia 23456-0038

Produced by the Department of Planning, Innovation, and Accountability
For Further information, please call (757) 263-1199

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