Digital Learning Anchor Schools:

Year-Two Developmental Evaluation

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

Developmental Evaluation Report
November 2017

Department of Planning, Innovation, and Accountability
Office of Research and Evaluation
Virginia Beach City Public Schools

Table of Contents

Tables

Figures

Executive Summary

On September 7, 2016, the School Board approved the 2016-2017 Program Evaluation Schedule which included a recommendation to evaluate the Digital Learning Anchor Schools (DLAS) initiative's second year of implementation. The anchor schools had been a new educational initiative during the 2015-2016 school year. This year-two 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 during 2016-2017. The evaluation was based on both quantitative and qualitative data that were collected through surveys, reviews of documents, 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 originally provided a laptop computer or other digital device to all students in selected grade levels at 11 schools. During its second year, the initiative expanded to include 15 schools - eight elementary schools, three middle schools, and four high schools.

- The initiative had 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 remained 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 initiative also informed the Five Dispositions set forth in the Transformational Learning white paper.

- 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, 30 percent of elementary school students, 62 percent of middle school students, and 59 percent of high school students reported using their device at home. Further, analysis by demographic group revealed no evidence of inequity by race or socioeconomic status.

- The original 11 anchor schools had been selected by the Department of Teaching and Learning based on expressed interest, a consideration of balance between school levels and location of schools, and on a variety of readiness and practical considerations.

- The four schools added in 2016-2017 were selected purposely. Larkspur Middle and Kellam High were chosen as sites where Chromebooks would be tested at the secondary level after the use of Chromebooks at the elementary level during the first year had been deemed successful. Diamond Springs Elementary and Williams Elementary were added to augment Newtown's participation during 2015-2016 so all of the Tri-Campus schools were part of the initiative.

- In a positive response to the year-one evaluation recommendations that were approved by the School Board, the Department of Teaching and Learning (T&L) submitted a request for nine additional instructional technology specialist (ITS) positions, six of which were approved for 2016-2017. Similarly, the Department of Technology made six itinerant technology support technicians (TST) positions available to fill the needs of TST absences in schools.

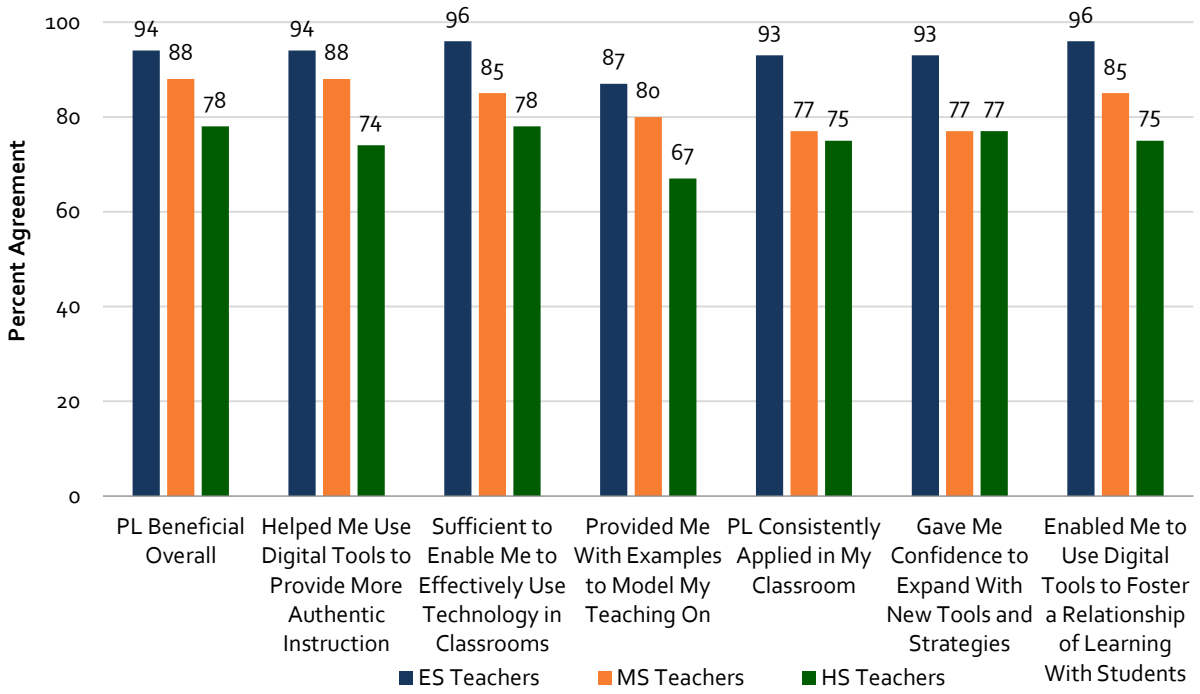
- Also as a favorable response to the year-one evaluation recommendations, DOT undertook several improvements and upgrades related to infrastructure. These included changing the division's content filtering system and doubling internet bandwidth to 8 gigabytes per second. Teaching and Learning also field tested a limited number of mobile hotspots with some students and worked to identify student-friendly businesses, as well as recreation centers and libraries to increase student access to the internet outside of school.

- Some staff members, especially teachers, noticed the aforementioned improvements. At least 65 percent of teachers, 42 percent of ITSs, and 33 percent of TSTs agreed that there were fewer problems stemming from unreliable network connections, slow download or upload speeds, and content filtering issues. However, a commonly cited problem noted in open-ended comments by 56 percent of the students involved the content filter blocking access to websites related to completing an assignment.

- 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, 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.

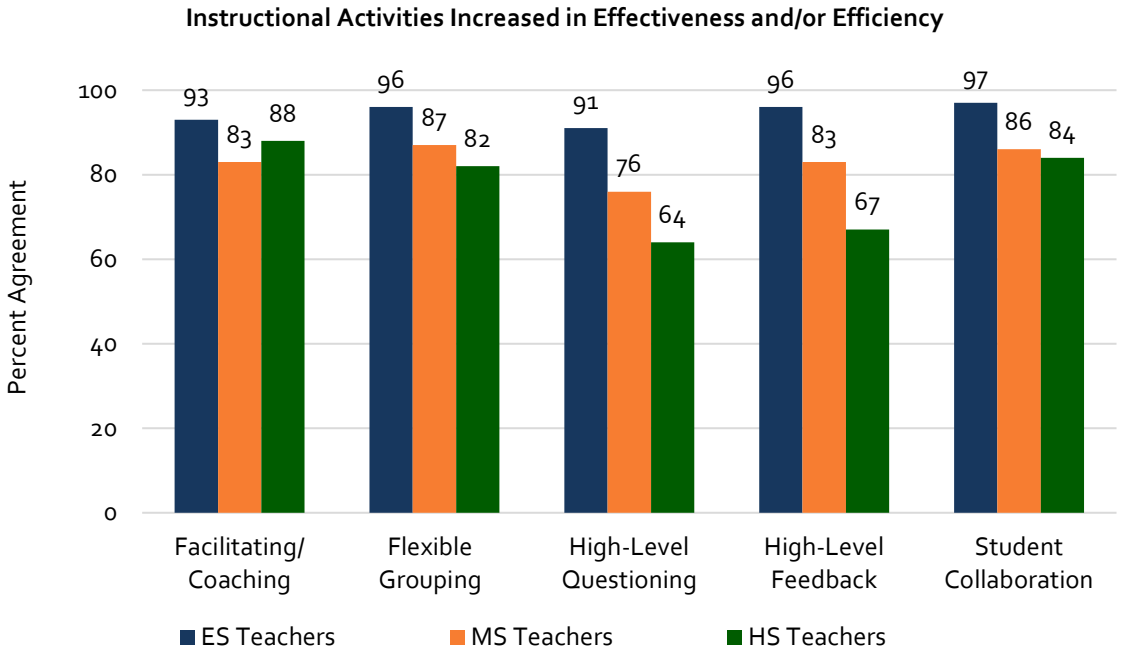
- As shown in the next figure, the general pattern of results showed that elementary school teachers were most positive about the professional learning related to the DLAS initiative, followed by middle school teachers who also were relatively positive. High school teachers' perceptions of the professional learning related to the DLAS initiative were notably lower. Their agreement rates ranged from 67 percent to 78 percent on the set of survey items regarding DLAS-related professional learning.

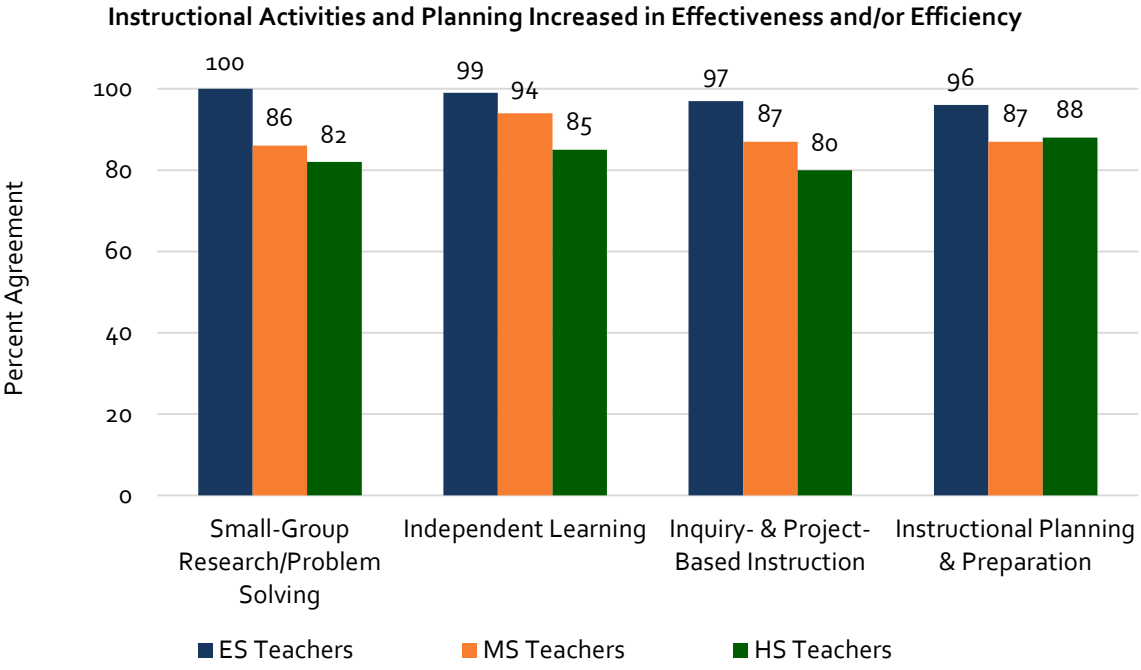
Teacher Perceptions of Professional Learning Related to DLAS Initiative by Level



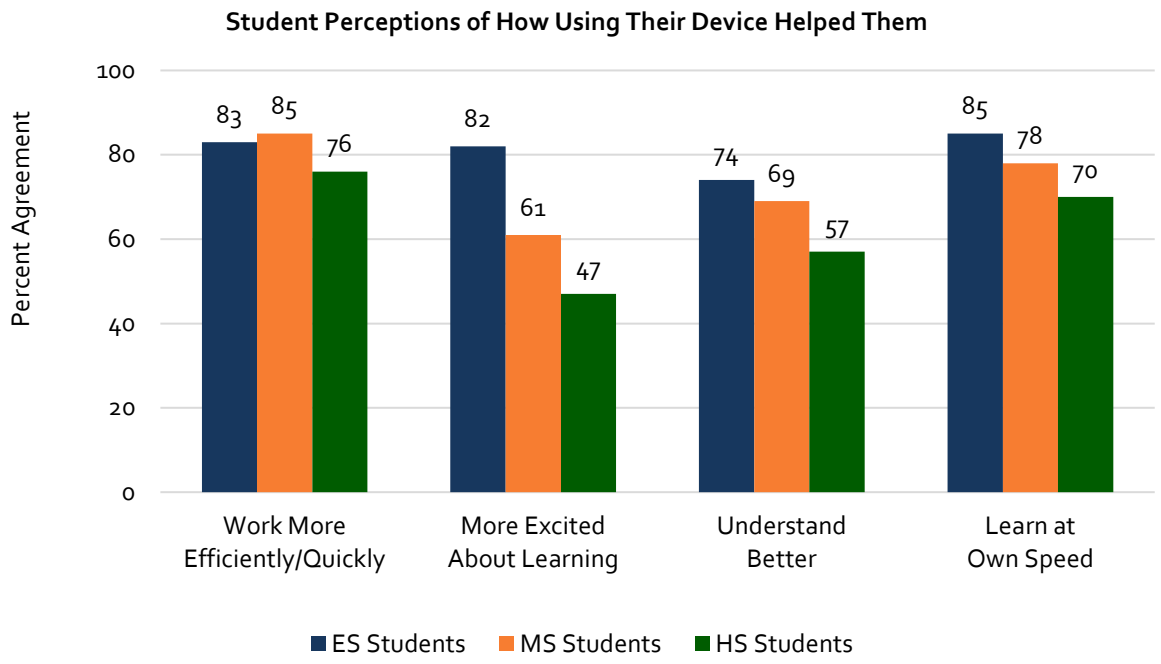
- Administrators were asked on the second year survey, "What is the greatest challenge to your school providing more frequent and/or improved professional learning for staff members participating in the Digital Learning Anchor Schools initiative?" By far, the most common response was "Lack of Time," which was selected by 55 percent of the administrators who responded to the survey item (50% at elementary, 56% at middle, and 58% at high school).

- 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 had increased in effectiveness and/or efficiency as a result of the DLAS initiative.

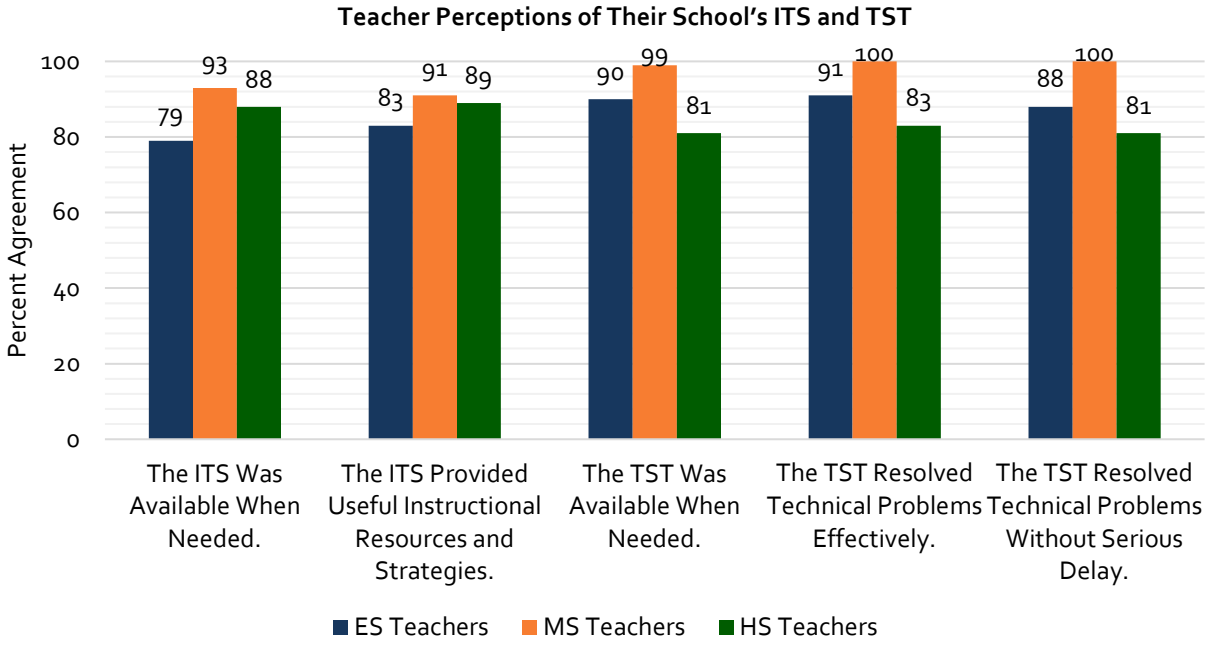




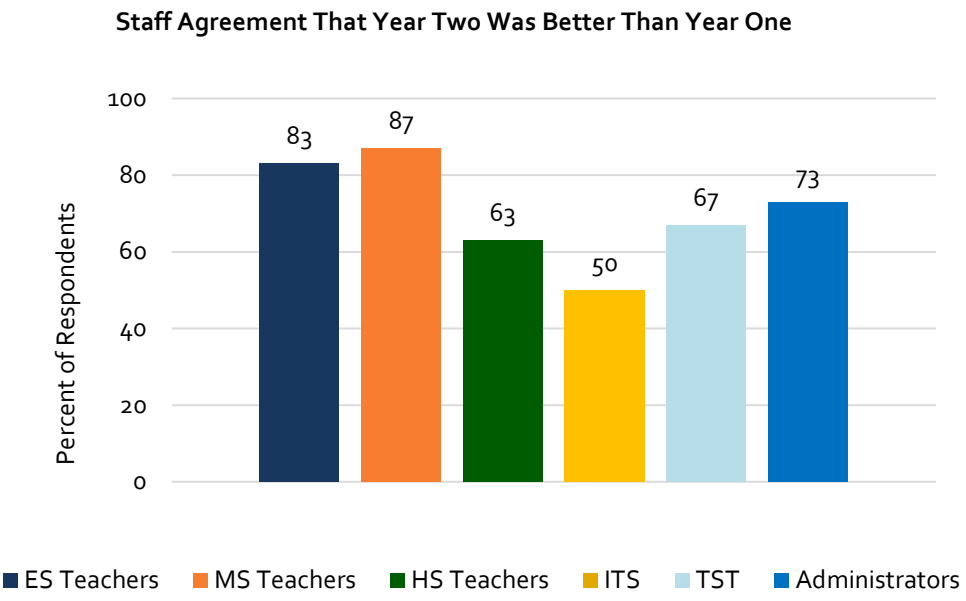
- As shown in the next figure, at least 76 percent of students at all school levels agreed that having their device helped them work more efficiently. Elementary students were most likely to agree that having their device made them more excited about learning.



- A set of items asked teachers to indicate the level of their agreement with a set of statements regarding the availability and effectiveness of their school's ITS and TST. As shown in the figure below, all school levels were positive about their school's ITS and TST, with the middle schools tending to perceive their ITS and TST most favorably.



- A summary item to compare their year-two experience with their year-one experience was administered to all stakeholder groups except parents and students. At least one-half of the respondents to each staff member survey agreed that their experience during year two was better than in year one.



- Each anchor school's Digital Learning Leadership Team completed an online survey that asked them to rate the degree to which the initiative was aligned with best practices related to student-centered learning, technology integration and immersion, professional learning, equity, effective leadership, stakeholder engagement, infrastructure, and usage policies. The response distributions indicated that the leadership teams saw the initiative as being "Somewhat Aligned" with best practices in each of the eight areas.

Characteristics of Participants

- The characteristics of the students attending the participating elementary and middle schools were generally 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. The addition of Kellam High School to the initiative during its second year did reduce these differences somewhat.

- 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.

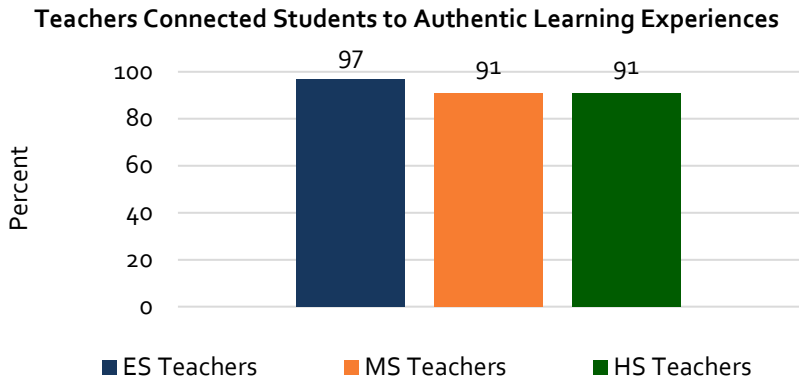
Progress Toward Meeting Goals and Objectives

- 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.

- Although 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, the evaluation used them as an organizational framework during both 2015-2016 and 2016-2017.

Teacher Goal #1: Authentic Learning Experiences

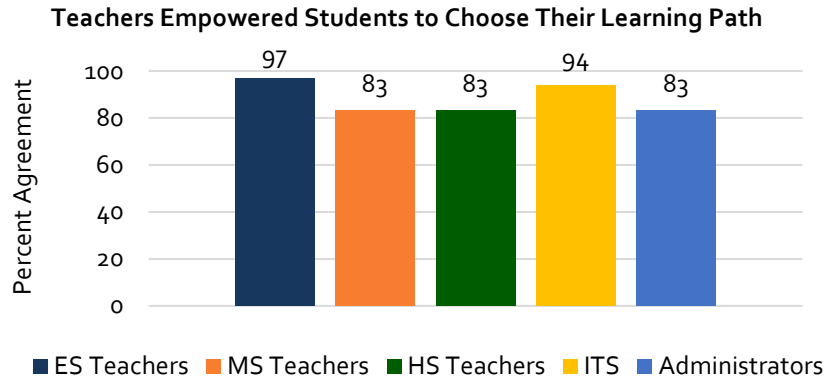
- As indicated in the next figure, more than 90 percent of the teachers at all three levels reported that they used the digital devices and resources to connect students to authentic learning experiences.



- When asked whether the DLAS initiative has led to learning that incorporates authentic contexts more effectively or efficiently, 99 percent of elementary school teachers, 89 percent of middle school teachers, and 83 percent of high school teachers reported that it had.

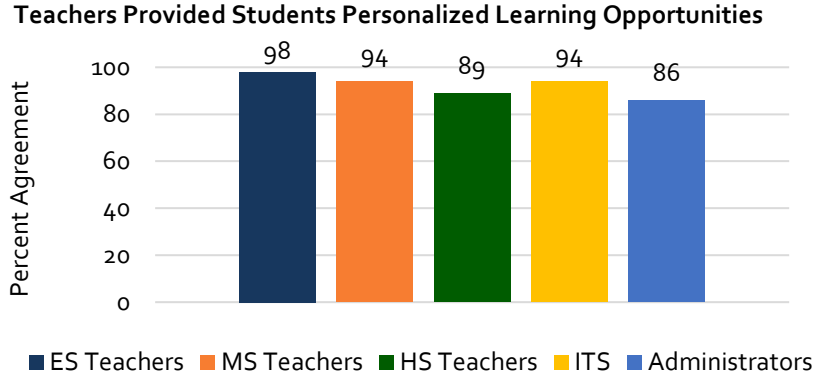
Teacher Goal #2: Student Empowerment

- At least 83 percent of staff members agreed that teachers empowered students to choose their learning path through relevant and purposeful use of digital technology.



Teacher Goal #3: Personalized Learning

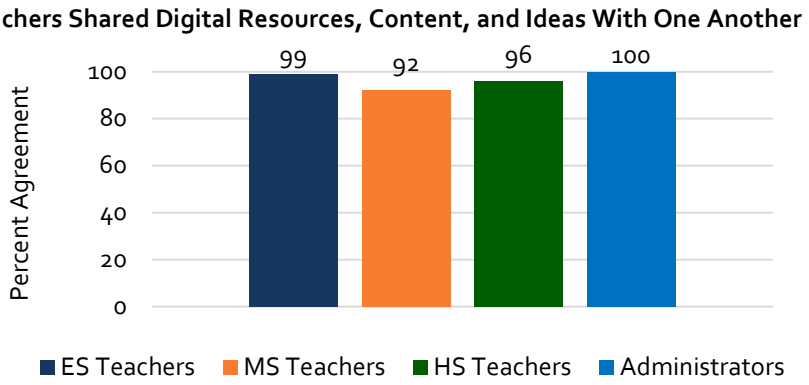
- When asked whether the initiative enabled teachers to provide students with personalized learning opportunities by having them use digital tools, at least 86 percent of the staff members agreed that it did.



- 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 97 percent at elementary schools and 88 percent both at middle schools and at high schools.

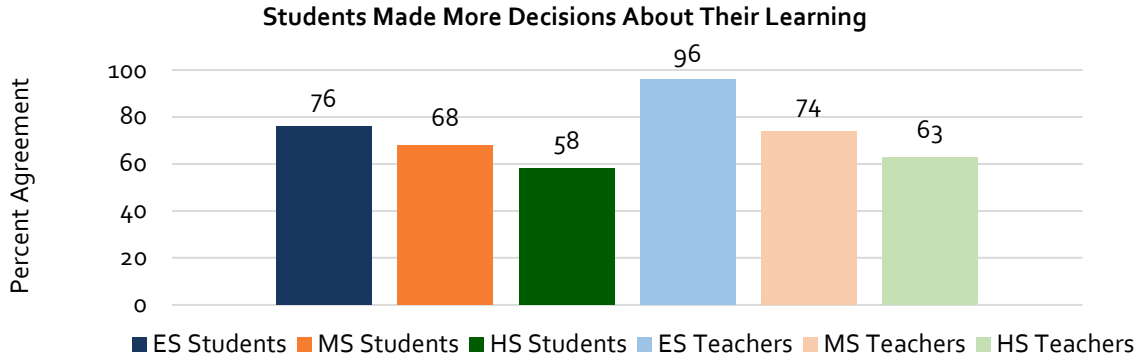
Teacher Goal #4: Professional Growth

- From 92 to 100 percent of teachers at each school level, as well as administrators, agreed that teachers shared digital resources, content, and ideas with one another as part of fostering professional growth.



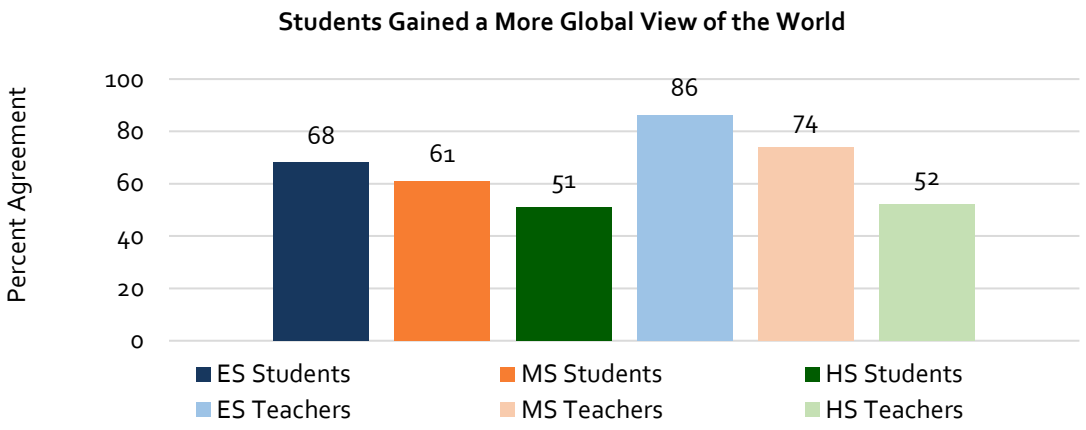
Student Goal #1: Student Ownership of Learning

- Students, teachers, and parents were asked if students make more decisions about their own learning since receiving their digital device. The agreement rates of students and teachers were higher at the elementary school level than at the middle school or high school levels. The agreement rates of parents followed the same pattern across school levels as those of the students and the teachers.



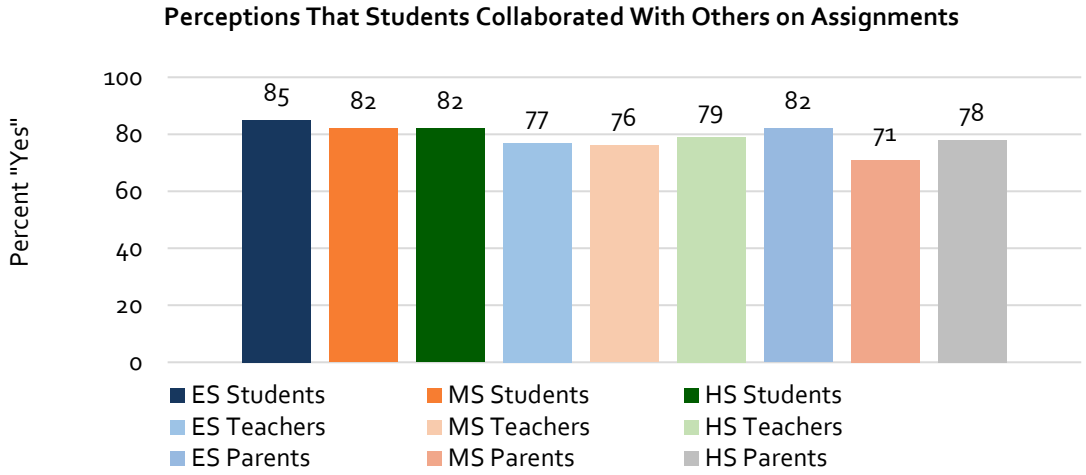
Student Goal #2: Global Perspective

- A similar pattern emerged when students and teachers 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 than at high schools.



Student Goal #3: Collaboration

- At least 71 percent 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.

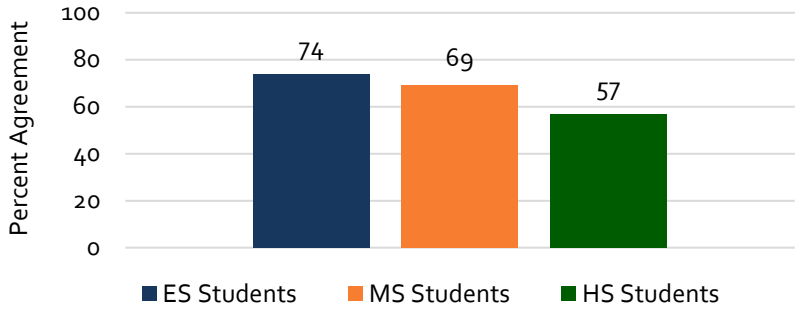


- The rates of agreement that students use their digital devices to work together on class assignments and projects increased notably from 2015-2016 to 2016-2017, particularly among parents. The agreement rates among the parents of elementary school and high school students increased by 16 and 20 percentage points, respectively. Among teachers, the agreement rates increased by 6 percentage points at middle school and by 9 percentage points at high school.

Student Goal #4: Academic Mastery

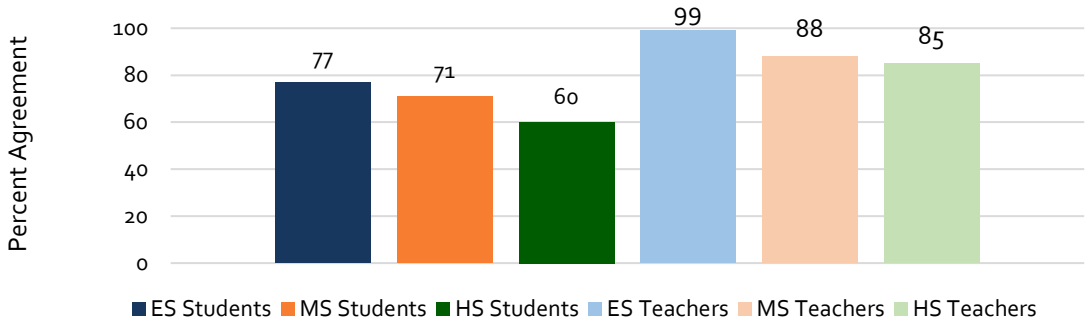
- When asked if using the assigned device helped students better understand what they were learning, the majority of students and parents in 2016-2017 agreed that the device helped.

The Device Helped Students Better Understand What They Are Learning



- At each school level, greater percentages of teachers than students agreed that having their own device gave students greater opportunity to show their knowledge.

Device Gave Students Greater Opportunity to Display Knowledge

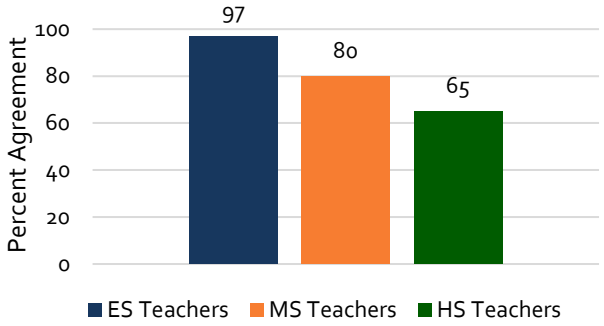


- Compared with the previous year, the agreement rates of middle school and high school students declined in 2016-2017 by 13 percentage points and 8 percentage points, respectively.

Student Goal #5: Digital Citizenry

- When presented with a statement that having their digital device helped students use technology in responsible and ethical ways, 97 percent of elementary school teachers, 80 percent of the middle school teachers, and 65 percent of the high school teachers agreed.

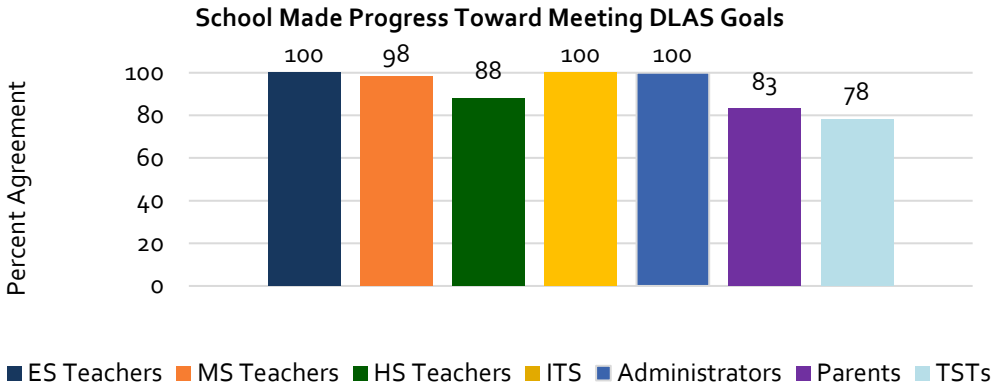
The Device Helped Students Use Technology in Responsible and Ethical Ways



- Compared with the previous year's results, agreement that the device helped students to use technology in responsible and ethical ways declined among the teachers at all three levels – most notably, at middle school (17 percentage points).

Summary 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 78 percent of each group at each school level agreed that progress had been made during 2016-2017.



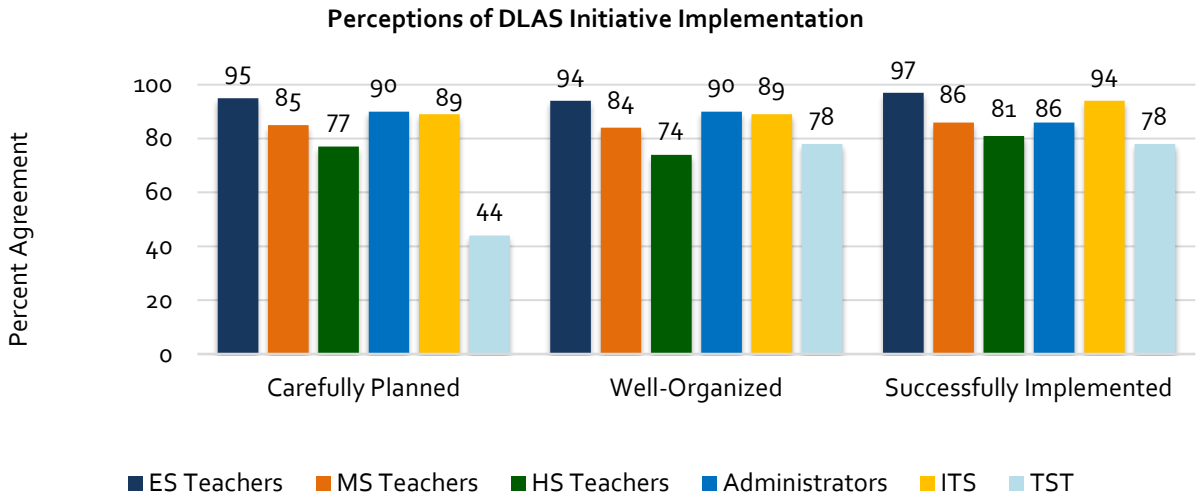
- The agreement rates were nearly identical with those obtained in 2015-2016.

Stakeholder Perceptions

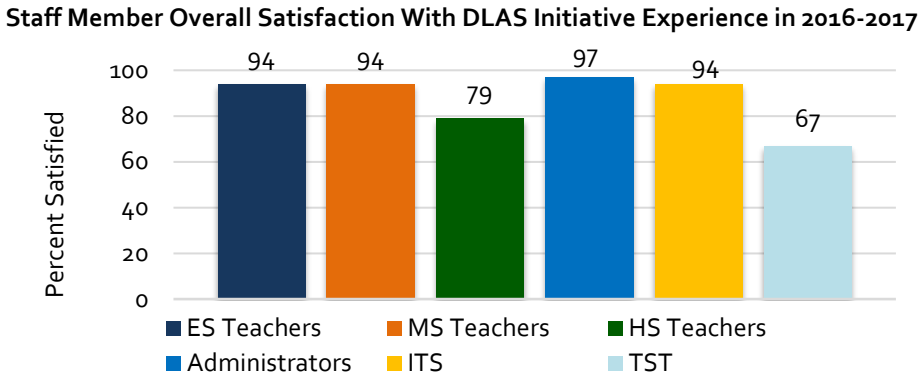
- When asked to indicate the extent to which they understood the desired student and teacher outcomes for the initiative, at least 85 percent of all staff groups agreed that they understood the outcomes. The agreement level was lowest for middle school teachers compared to the elementary school and high school teachers. Moreover, the middle school agreement rate on this survey item declined 12 percentage points from the previous year.

- High percentages of staff members (88% to 99%) agreed that the work at their school supported the outcomes identified for the DLAS initiative.

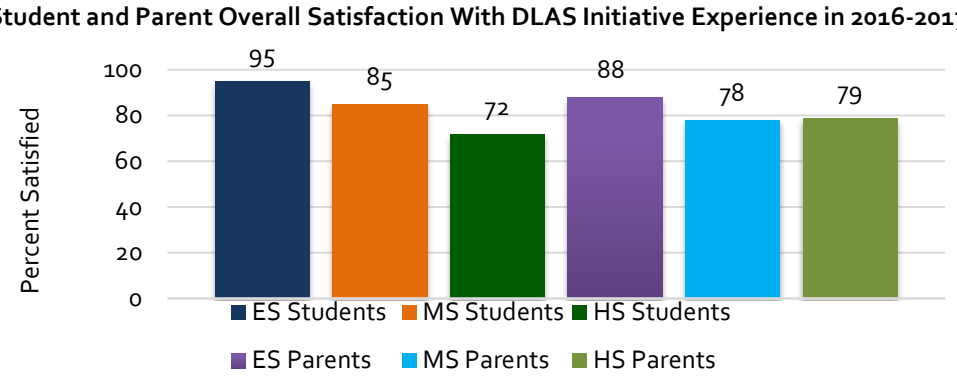
- With one exception, at least 74 percent of staff member respondent groups agreed that the initiative at their school was carefully planned, well-organized, and successfully implemented. Only 44 percent of the TSTs agreed that the initiative was carefully planned.



- When asked about their overall satisfaction with the DLAS initiative during 2016-2017, 67 to 97 percent of staff were satisfied, depending on the specific group and school level. Generally, the satisfaction levels were highest at the elementary school level and lowest at the high school level.



- The overall satisfaction levels among students and parents followed a pattern similar to that of the staff. Between 72 and 95 percent of students and between 78 and 88 percent of parents indicated their satisfaction. The percentages of elementary school respondents were higher than those of secondary school respondents.



Anchor School and Comparison School Responses on *School Climate Survey* Items

- Sets of five items were included on each form of the *School Climate Survey* in 2016-2017 completed by students, staff, and parents. Doing this enabled the perceptions of anchor schools and matched comparison schools to be compared. Given five questions administered to three respondent groups (students, parents, and staff) that were reported separately at three school levels (elementary, middle, and high), the potential for 45 significant differences existed. A total of 16 statistically significant differences were found, representing about 36 percent of the total possible.

Summary of School Climate Survey Significant Differences

Survey Statement	Group	Anchor	Comparison	Difference	Effect Size**
A laptop or other digital tools and resources are often used to do schoolwork after school or on weekends.	HS Students	78%	82%	-4%	-.08
	ES Parents	85%	74%	+11%	+.25
	MS Parents	97%	88%	+9%	+.25
	HS Parents	90%	96%	-6%	-.19
Teachers and other staff members seem to use digital tools and resources to facilitate student learning.	HS Parents	93%	98%	-5%	-.28
	ES Teachers	99%	93%	+5%	+.22
Students at my school have been taught to use digital tools and resources to facilitate their schoolwork and learning.	MS Students	91%	86%	+5%	+.12
	ES Teachers	98%	93%	+5%	+.21
Students at my school effectively use digital tools and resources to facilitate and further their own learning.	ES Teachers	97%	89%	+8%	+.26
	HS Teachers	73%	85%	-13%	-.36
In the last year or two, digital technology, tools, and resources have become a more integral part of the teaching and learning that occurs at my child's school.	ES Parents	97%	91%	+6%	+.21
	MS Parents	99%	92%	+7%	+.22
	ES Teachers	99%	89%	+10%	+.32
	HS Teachers	95%	90%	+5%	+.17
Most staff members at my school share digital tools, content, and ideas with one another to facilitate teaching and learning.	MS Students	72%	77%	-5%	-.12
	ES Teachers	96%	86%	+10%	+.29

- Of the 16 significant differences, 11 (69%) favored the anchor schools, which represents approximately 24 percent of the total possible.

Open-ended Survey Responses

- The most often cited challenges at the elementary school level involved lack of time for staff learning and planning, as well as lack of effective training (23%); issues related to network connectivity or speed, as well as issues related to websites and applications (20%); and devices that were broken or uncharged (17%). At the middle school level, the most frequently cited challenges included students being off-task or unmotivated (41%) and broken or uncharged devices (17%). At the high school level, the greatest challenge cited most frequently involved students not bringing their devices back to school (24%), students being off-task or unmotivated (22%); and devices being broken or uncharged (18%).

- In general, analysis of the "greatest challenge" item clearly demonstrated both the variability of the school cultures and the differences in how the initiative was implemented at different schools, not only across the school levels but within them, as well.

- A different open-ended survey item asked respondents to provide recommendations to other schools about to begin implementing digital learning. Each respondent group tended to comment from their own perspective. For example, administrators tended to recommend that a school focus on professional learning and growth. The ITS group tended to focus on the integration of the devices with instruction, for instance, recommending

that a school starts first with the personalized learning aspect of the endeavor and then talk about the technology which supports that. In contrast, the comments of teachers tended to emphasize the need to narrow their own choices of instructional websites and applications.

Additional Cost

- The total additional cost for the DLAS initiative during 2016-2017 was approximately $1.66 million. A total of $1.64 million (99%) came from local operating funds and end-of-year reversion funds, while about $20,000 was from grant funds.

- The largest cost was for hardware, which included the various digital devices and related equipment. This amounted to $1,384,016, or about 83 percent of the total expenditure.

Recommendations and Rationale

Recommendation #1: Continue the Digital Learning Anchor Schools Initiative with modifications. *(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 served as learning laboratories to prepare for the future expansion of the 1:1 digital learning initiative beyond 2016-2017.

Recommendation #2: Continue to work toward funding at least one full-time ITS at each school and review TST allocations to support the 1:1 digital learning initiative as it expands to all schools. *(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. Among elementary teachers, 79 percent agreed that the ITS was available when needed, and 83 percent agreed that the ITS provided useful instructional resources and strategies. At two elementary schools, the agreement rates were below 55 percent for whether the ITS was available when needed. Meanwhile, when asked if their school's digital devices had been unable to do what the teachers and/or students had wanted them to do, 60 percent of teachers and 68 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 responsibility of the TST rather than the ITS. However, the year-two survey respondents echoed the comment of the respondent who wrote during year one that the biggest problem is "insufficient technical support…One TST is not sufficient to maintain all of the devices in our building." Further, although notable improvement was found, nearly 20 percent of high school teachers indicated that their TST was not available when needed and that technical problems were not resolved effectively or in a timely manner. Although the problems related to ITS allocations and TST-to-device ratio diminished between year one and year two, they have not yet been eliminated. Therefore, it again is recommended that at least one full-time ITS be available at each school to support the DLAS initiative so that the instructional technology needs of each classroom are addressed in a timely manner. While each school currently has one full-time TST, these allocations need to be reviewed as the initiative progresses to determine if they are sufficient to support schools' technical needs.

Recommendation #3: Provide professional learning, especially for high school staff, so that staff will have as much time as possible to plan in informed and effective ways. *(Responsible Group: Department of Teaching and Learning)*

Rationale: Teachers continued to express a desire and a need for extensive and continuous professional learning to focus on the instructional components of transformational learning rather than focusing on how to operate a device or being cursorily introduced to an overwhelming number of websites and applications. Although professional learning was seen as beneficial at the elementary and middle school levels, the need for professional learning was most pronounced at the high school level, where the agreement rates on all 12 survey items related to professional learning were notably lower than those at the elementary and middle school levels. The high school agreement levels ranged from 67 percent to 78 percent. The comments from several administrators in response to open-ended items regarding how the initiative has changed the teaching and learning in their school emphasized that the

professional learning should be provided within a broader context of the instructional reform associated with *Compass to 2020*.

Recommendation #4: Continue 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. In addition, policies regarding device usage at home may need clarification to ensure that students and their families understand their financial liability for devices that are damaged or lost at home or in transit after school or on weekends. For the goals of the initiative and *Compass to 2020* to be achieved, all of the initiative's technical components – hardware, software, network, connectivity, and bandwidth – must be first-rate, promptly and properly maintained, and usage policies designed and implemented in a manner that supports the basic tenets of personalized devices to facilitate transformational learning.

Recommendation #5: Conduct an evaluation update during the 2019-2020 school year to monitor the continued progress of the 1:1 initiative and its continuing alignment with evidence-based best practices. *(Responsible Group: Department of Planning, Innovation, and Accountability)*

Rationale: Although the anchor schools have shifted their focus to other facets of digital learning (e.g., the Schoology Learning Management System), a developmental evaluation update is recommended for the 2019-2020 school year to monitor the 1:1 initiative's progress as it expands by high school feeder pattern. Perception data from staff and students would be collected and analyzed to compare with data from this evaluation in order to document continued progress and improvements. Student performance data relevant to academic and behavioral outcomes would also be collected and analyzed. Attention would focus not only on the technology – that is, the devices, infrastructure, and the instructional websites – but also on how much and how well the technology is being used to support the transformational learning dispositions. By using a common hashtag across schools, examples of integrated instruction could be collected and rated with the SAMR or a similar rubric, as was done for the year-one evaluation. The need for ongoing progress monitoring is evidenced by the Digital Learning Leadership Team Alignment Study, which found that the initiative's implementation of eight general components were only "Somewhat Aligned" with research-based best practices. The rationale for an evaluation update reflects the ongoing need to guide the 1:1 initiative's implementation beyond the anchors schools.

Introduction

Background

During the 2015-2016 school year, as part of the Digital Learning Anchor Schools (DLAS) initiative, the Virginia Beach City Public Schools (VBCPS) provided a laptop computer, Chromebook, or other digital device to students of selected staff at 11 schools. For 2016-2017, the initiative continued and expanded to involve the 15 schools listed in Table 1 based on feedback from the Department of Teaching and Learning, as well as school-based instructional technology specialists.

Table 1: Digital Learning Anchor Schools

Elementary School	Grade Levels	Student Count
Diamond Springs*	K-1	592
Kingston	K-5	521
Newtown	2-3	547
Rosemont	K-5	439
Strawbridge	1-5	481
Tallwood	K-5	582
Thoroughgood	3-5	387
Williams*	4-5	473
Middle School	**Grade Levels**	**Student Count**
Corporate Landing	6-8	1,249
Great Neck	7-8	774
Larkspur*	6-8	1,550
High School	**Grade Levels**	**Student Count**
Bayside	9-11	1,421
Green Run	9-11	1,135
Kellam*	9-12	2,202
Kempsville	9-11	1,215
	Total	13,568

* Schools joined the Digital Learning Anchor School initiative in 2016-2017.

The initiative remained 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 postsecondary educational opportunities in a globally-competitive environment."[1]

During 2016-2017, the initiative was also influenced by five "transformational learning dispositions."[2]

All 15 anchor schools were intended to serve as models for other Virginia Beach schools as they launch their own 1:1 programs. Thus, it is important to document the first-year and second-year implementation and to collect baseline and follow-up outcome data for use in the future. Consequently, the DLAS initiative was added to the 2016-2017 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 evaluation schedule on September 7, 2016.

Purpose

This evaluation provides the School Board, the Superintendent, the initiative coordinators, and each school's Digital Learning Leadership Team with information about how the DLAS initiative operated during 2016-2017 and how stakeholders perceived its operation. In addition, the evaluation provides information about student characteristics, progress toward meeting goals and objectives, and the additional cost to the division.

This year's evaluation of the DLAS initiative again was modeled on 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.[3] 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.[4]

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 teaching and learning will occur simply by providing a student with a digital device.[5] It is not *how much* a student uses a digital device; what matters are *how* and

for what purposes the device is used.[6] 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. Ultimately, the various devices associated with the DLAS 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[7]

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,[8] 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, the instructional technology specialist, 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" served as the basis for the initiative's goals and objectives. They are presented in their entirety in Appendix A.

During the 2016-2017 school year, a second dimension was added to the initiative's goals and objectives in the form of five *dispositions* associated with "transformational learning," which is defined as follows:

> "Transformational learning is the active acquisition of knowledge and skills using student-centered practices that foster student agency and provide students with the opportunity to create and apply new knowledge across contexts. Personalized learning, supported through the purposeful use of technology, is the primary mechanism for achieving transformational learning."[9]

There are separate dispositions for leadership, teachers, students, the learning environment, and community. Each disposition is characterized operationally by a rubric with a four-point scale that extends from "Novice," through "Emerging" and "Proficient," to "Exemplary."[10]

It is important to note that the Outcomes and Dispositions were formulated to guide the initiative rather than to serve as specific, measurable, and time-based indicators for an evaluation. Consequently, this evaluation report includes neither a checklist of goals attained nor a set of ratings based on the rubrics associated with the five transformational learning dispositions.

Further, no indicators of academic achievement such as Standards of Learning (SOL) scores or grade averages were included in this year's evaluation report for two reasons. First, last year's evaluation found no practically significant differences between any anchor school and its matched comparison school in any content area at any school level. No effect size (i.e., the Cohen's D statistic) exceeded the .20 threshold for practical significance, and most were below .10. It was unclear if the lack of practically significant differences was attributable to a lack of an actual anchor school effect, a lack of sensitivity in the outcome measures to the emerging transformation of teaching and learning in digital classrooms, or to a combination of the two. Thus, the year-one conclusion can be summarized as: although "many of the anchor schools are progressing in the right direction," the initiative is in its "earliest stage."

Second, the decision to disregard academic indicators such as SOL results was also based, in part, on a recognition that neither the Look Fors associated with the Student Outcomes and the Teacher Outcomes nor the five Dispositions associated with Transformational Learning emphasized or even explicitly mentioned traditional academic indicators such as SOL scores or grade averages. Therefore, it seemed unfair to evaluate the initiative on goals and objectives that were not being actively pursued.

The decision to eschew academic indicators was subsequently supported by the wide variability in survey responses among individual schools, which suggested that relatively large gains and losses would tend to cancel each other out, diminishing the magnitude of elementary, middle, or high school effects. Instead, in the formative spirit of developmental evaluation, this year's evaluation focused more on implementation and perceptions of the process than on academic indicators and outcomes.

Evaluation Design and Methodology

Evaluation Design

This evaluation utilized a mixed-methods approach to evaluate the DLAS initiative's journey toward transformational learning via one-to-one technology. This involved both qualitative information and quantitative data. The qualitative information was collected mainly through surveys and interviews. The quantitative data, consisting mostly of demographic information, came mainly from the VBCPS data warehouse. To facilitate meaningful interpretation of *2017 School Climate Survey* results, 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 preinitiative 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
Diamond Springs Elementary	College Park Elementary (K-1)
Kingston Elementary	Red Mill Elementary
Newtown Elementary	College Park Elementary (2-3)
Rosemont Elementary	Green Run Elementary
Strawbridge Elementary	Three Oaks Elementary
Tallwood Elementary	Glenwood Elementary
Thoroughgood Elementary	John B. Dey Elementary
Williams Elementary	College Park Elementary (4-5)
Corporate Landing Middle	Independence Middle
Great Neck Middle	Princess Anne Middle
Larkspur Middle	Brandon Middle
Bayside High Green Run High Kellam High Kempsville High	A composite of all other Non-DLAS High Schools*

* 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.[11] For example, College Park Elementary serves as the matched comparison for the three different schools that constitute the Tri-Campus – Diamond Springs, Newtown, and Williams.

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 control for each student's overall exposure to technology prevented the matching of students on an individual basis.

In addition, it is important to recognize that the initiative involved incremental rather than all-or-nothing changes in technology and pedagogy. Not only did VBCPS students have varying degrees of access to technology at school and at home, but all VBCPS schools are striving as part of *Compass to 2020* to implement effective and innovative teaching practices that maximize rigor, personalization, and engagement. Thus, when comparing each anchor and comparison school pair, it was expected that the initiative's effects would be relative, not absolute. Differences in rates of progress would be smaller and more subtle, nuanced, and incremental than if the anchor schools were compared with a set of comparison schools that had no technology and no 21st century curriculum and instruction whatsoever.

Evaluation Questions

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

1. **What were the operational components of the DLAS implementation?**
   a. What actions were taken as a result of the first-year evaluation?
   b. What occurred operationally during the initiative's second year?
      i. Selection of Participating Schools
      ii. Digital Device Types
      iii. Infrastructure Issues and Needs
      iv. Device-Related Issues
      v. Professional Learning to Prepare for Implementation
      vi. Issues Regarding Device Usage and Internet Access
      vii. Stakeholders' Perceptions About Instruction in DLAS Classrooms
      viii. Stakeholders' Perceptions About Learning in DLAS Classrooms
      ix. Stakeholders' Perceptions About ITS and TST Support
      x. DLAS Alignment With Best Practices
2. **What were the demographic and academic characteristics of the students participating in the DLAS initiative during the 2016-2017 school year?**
3. **What progress was made toward meeting the DLAS goals and objectives as articulated in the Teacher and Student Outcomes With Look Fors?**
4. **How was the DLAS initiative perceived by its stakeholders (i.e., building administrators, instructional technology specialists, technology support technicians, teachers, students, and parents)?**
5. **What was the additional cost of the DLAS initiative during the 2016-2017 school year?**

Literature Review Framework

Two documents served as the primary influences on this year's evaluation. The first document was the *Digital Learning Anchor Schools: Year-One Developmental Evaluation* of November 2016. It provided both a methodological model and a set of baseline results for the conduct of this year's evaluation. In addition to the previously mentioned *Teacher and Student Outcomes With Look Fors*, the evaluation report also included recommendations, approved by the School Board, that were to be addressed during the initiative's second year of implementation.

The third of the five recommendations in the first year evaluation report called for key leaders of the DLAS initiative to collectively review current research literature regarding 1:1 best practices. Foremost in the literature was a report prepared by Hanover Research that reviewed the available research and evaluation regarding 1:1 initiatives.[12] The well-documented information in the Hanover report provided a useful frame of reference for designing the evaluation and providing a context for interpretation of some evaluation results.

Some of 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 learning 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 division leaders should address infrastructure issues and usage policies.

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 2016-2017 for comparison purposes or to identify matched comparison schools for the data analysis.

- Administered surveys to stakeholder groups (i.e., school administrators, teachers, ITSs, TSTs, 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.

DLAS Surveys

The Department of Planning, Innovation, and Accountability invited building administrators, teachers, ITSs, TSTs, 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 May 2017. 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 merely an estimate due to the difficulty of determining the exact number of students who actually participated in the DLAS initiative.

Table 4: DLAS Survey Response Rates

Stakeholder Group	Surveys Sent	Surveys Returned	Response Rate
Administrators	43	29	67%
Teachers	914	349	38%
ITS	22	19	86%
TST	15	9	60%
Students			
Elementary (3-5)	2,257	1,301	58%
Middle (6-8)	3,573	1,801	50%
High (9-12)	5,973	2,243	38%
Student Total*	11,803	5,345	45%
Parents	16,042	1,348	8%

* Note: Due to irresolvable inconsistencies between grade level and school, the responses from 24 students were excluded from subsequent analyses involving 2016-2017 DLAS student survey responses.

The surveys consisted mainly of Likert-type items focused on instructional practices, personalized learning activities, the effects of the digital devices, professional learning, and the overall effectiveness of the DLAS initiative. The response options of the Likert-type items 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?"

School Climate Survey

Different sets of five survey items were included on the staff, parent, and student versions of the *2017 School Climate Survey*, which is administered divisionwide. All five questions on each survey were related to the use of digital tools and resources.

The inclusion of these questions on the *2017 School Climate Survey* enabled the perceptions of anchor school respondents at the elementary, middle, and high school levels to be compared with those of their counterparts in the matched comparison schools. For example, the agreement rates of elementary anchor school staff were compared with the agreement rates of staff members at elementary comparison schools. This was the only opportunity available to administer DLAS-related survey items to stakeholders at each anchor school and its matched comparison school. Table 5 provides the *2017 School Climate Survey* response rates by school.

Table 5 shows that the schoolwise response rates for each pair of stakeholder groups tended generally to be similar.

Table 5: School Climate Survey Response Rates for DLAS and Matched Comparison Schools

DLAS School	Staff	Students	Parents	Matched School	Staff	Students	Parents
Diamond Springs Elementary	39%	n/a	n/a	College Park Elementary (K-1)	36%	83%	9%
Kingston Elementary	68%	90%	21%	Red Mill Elementary	52%	90%	15%
Newtown Elementary	42%	-	-	College Park Elementary (2-3)	36%	83%	9%
Rosemont Elementary	64%	92%	14%	Green Run Elementary	67%	95%	14%
Strawbridge Elementary	64%	92%	17%	Three Oaks Elementary	56%	95%	17%
Tallwood Elementary	62%	63%	17%	Glenwood Elementary	55%	65%	13%
Thoroughgood Elementary	54%	68%	15%	John B. Dey Elementary	54%	86%	18%
Williams Elementary	45%	70%	17%	College Park Elementary (4-5)	36%	83%	9%
Corporate Landing Middle	54%	73%	14%	Independence Middle	60%	80%	14%
Great Neck Middle	80%	88%	13%	Princess Anne Middle	75%	91%	16%
Larkspur Middle	64%	80%	10%	Brandon Middle	50%	76%	10%
Bayside High Green Run High Kellam High Kempsville High	57% 53% 57% 90%	77% 56% 67% 37%	9% 6% 15% 12%	A composite of All Other Non-DLAS High Schools	n/a	n/a	n/a

DLAS Leadership Survey

A third survey was developed as an adjunct to the third recommendation of the year-one DLAS evaluation, which called for initiative leaders to review current research literature regarding 1:1 best practices. The online survey provided links directly to relevant portions of the June 2016 report prepared by Hanover Research, as well as to other studies. The survey respondents, consisting of the members of each anchor school's DLAS Leadership Team, rated the degree to which they felt the initiative in 2016-2017 was aligned with research-based best practices associated with eight different best practices. Table 6 provides the response rate to the survey.

Table 6: DLAS Leadership Team Survey Response Rate

Stakeholder Group	Surveys Sent	Surveys Returned	Response Rate
DLAS Leadership Teams	104	51	49%

In addition, an open-ended questionnaire was completed both by the DLAS program managers and by the Department of Technology. The questionnaire presented the five recommendations from the first year

evaluation report and asked the respondents to document the actions that were taken in response to the recommendations. Both of the invited respondents completed the survey. The results of both the leadership team survey and the questionnaire will be presented in the Evaluation Results and Discussion section of this report.

Technology Integration Ratings

The initial design for this year's evaluation involved repeating the ratings on this year's blog posts, except that the rating would be performed by three separate raters rather than one rater in order to establish the reliability of the ratings. However, as the time to perform the ratings approached and the evaluators began the process of identifying which blog entries would be rated, it was discovered that many of the anchor schools had evolved beyond blog entries. Instead, activities were tweeted in real time. Unfortunately, attempts to retrieve old tweets failed because the tweets had not purposely been associated to just one or a few common hashtags. Consequently, no ratings of technology-instruction integration were performed for this second-year evaluation.

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 and SPSS-24.

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 held practical significance. Finally, for reporting purposes, the results were formatted either as text-based tables or graphic representations (bar charts, line graphs, etc.).

When relevant and appropriate, comparisons were drawn to investigate the consistency or differences between and among stakeholder groups, between and among anchor schools and their matched comparison schools, and between the 2015-2016 and 2016-2017 results.

Evaluation Results and Discussion

The evaluation of the Digital Learning Anchor Schools focused on the initiative's implementation and second-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 only in its second year, the data analyses continued to focus 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 so soon. There are two related reasons for this. First, research indicates that it takes time for schools to develop the expertise to implement digital learning effectively.[13] Second, few if any of the commonly used achievement or accountability tests are sufficiently sensitive to changes in curricula and instruction to register the incremental effects of a digital learning initiative even if they actually were present.[14]

Implementation of the DLAS Initiative

The first evaluation question focused on the implementation of the DLAS initiative during 2016-2017.

Actions Taken After Year One

The year-one evaluation of the DLAS initiative included five recommendations. Each one is listed below and accompanied by a brief description of how each one was addressed during 2016-2017. More detailed descriptions of each action are included in the remainder of this evaluation report.

1. Expand the Digital Learning Anchor Schools initiative. (*Responsible Group: Department of Teaching and Learning)*

- ✓ As planned, four schools were added to the initiative – two elementary schools, one middle school, and one high school.

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)*

   - ✓ A request for nine additional ITS positions was submitted. Six positions were approved for 2016-2017.

   - ✓ Six itinerant TST positions were made available to fill the needs of TST absences in schools.

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; and Department of Planning, Innovation, and Accountability)*

   - ✓ The Digital Learning Leadership Team at each school had access to the year-one DLAS report and the Hanover Research brief.

   - ✓ Members of the Digital Learning Leadership Teams were invited to complete a survey that asked them to rate the degree to which the initiative was aligned with the best practices. Links to the Hanover Research brief and other sources of proven best practices were provided in the survey.

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)*

   - ✓ The anchor schools continued to provide program-related professional learning, which focused during 2016-2017 on the five dispositions associated with transformational learning.

   - ✓ Although no distinction in professional learning was made between the newly added anchor schools and those that had been part of the initiative during its first year, time for the Digital Learning Leadership Teams to share their work was provided during the monthly anchor school meetings.

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)*

   - ✓ Internet bandwidth was doubled to 8 gigabytes per second (gbps).

   - ✓ Much of the activity that occurred during 2016-2017 involved planning and preparation for expanding the 1:1 initiative beyond the anchor schools during the 2017-2018 school year.

Selection of Participating Schools

For the initiative's first year, a two-step approach was taken to select participating schools. First, the schools indicated their interest and completed a readiness assessment. 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, as well as the practical matter of matching the number of available devices with the number of students within classrooms, grade levels, and particular schools.

For 2016-2017, four additional schools joined the initiative. They were purposely selected. Larkspur Middle School and Kellam High School were chosen as sites where Chromebooks would be tested at the secondary level after the use of Chromebooks at the elementary school level during the first year had been deemed successful. Diamond Springs Elementary School and Williams Elementary School were also added to augment Newtown's participation during 2015-2016 so that all of the Tri-Campus would be anchor schools.

Further, the initiative also expanded within some of the original anchor schools. Devices were provided during the initiative's second year to additional students and grade levels at some of the initial anchor schools, as well.[15]

Digital Device Types

During the initiative's first year, 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) received those devices.

During the initiative's second year, availability, cost, and other practical considerations continued to dominate the selection of device types and models not only for the anchor school initiative but also for the division's plan "to phase in the provisioning of Chromebooks for every student and teacher in grades 1-12" by high school feeder pattern. The goal of the expansion is "to fully deploy Chromebooks to each school in the division by the 2020 school year or sooner as funding permits."[16]

Table 7 summarizes the distribution of devices for 2016-2017 based on information from the Department of Teaching and Learning, from information obtained during the survey administration from ITSs, and from follow-up telephone conversations with the ITSs.

Table 7: Distribution of Devices by School

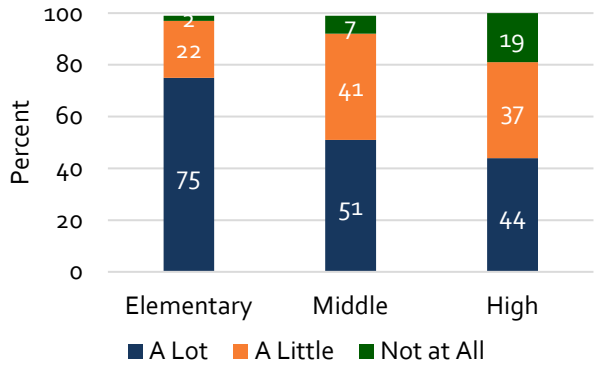
Level	School	14" HP	11" HP	iPad	11" Dell	ASUS Tablet	Chromebook
ES	Diamond Springs			X			
	Kingston	X		X			
	Newtown		X				
	Rosemont			X	X		
	Strawbridge			X			X
	Tallwood		X	X			
	Thoroughgood		X				
	Williams		X				X
MS	Corporate Landing		X				
	Great Neck	X			X		
	Larkspur						X
HS	Bayside		X		X	X	
	Green Run	X	X				
	Kellam						X
	Kempsville	X	X		X		X

Note: Some students at Kingston in grades 1 and 2 also had Android tablets.

Based on responses in both years to open-ended survey questions regarding what they like and dislike about the devices, students and teachers similarly cited differences among the devices in durability, reliability, storage, speed, battery life, accessibility to particular applications, and ease of printing.

Students at each school level were asked how much they liked using their device for schoolwork. Figure 1 shows that a notably higher percentage of elementary students liked using their devices "a lot" compared to secondary students.

Figure 1: Student Perceptions of How Much They Like Using Their Device for Schoolwork



Except at the high school level, these results were similar to the percentages from the initiative's first year, as shown in Table 8.

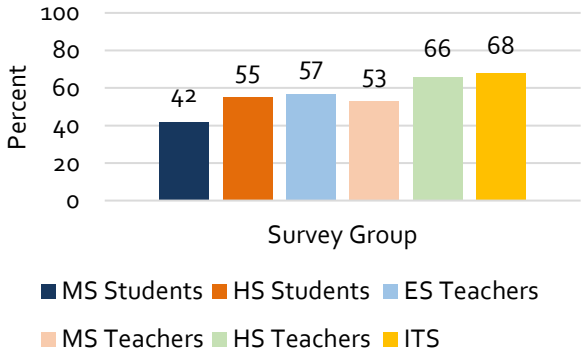
Table 8: Change in Percent of Students Who Like Using Their Device for Schoolwork "A Lot"

School Level	2015-2016	2016-2017	Change
Elementary	80%	75%	-5%
Middle	48%	51%	+3%
High	30%	44%	+14%

Device-Related Issues

In the year-one evaluation report, the rationale for Recommendation #2 regarding the ITS and TST working together as a digital learning support team mentioned that 68 percent of teachers and 80 percent of the ITSs replied "Yes" when asked if their school's digital devices had been unable to do what the teachers and/or students had wanted them to do. For the year-two evaluation, the same question was posed again to students and staff. Figure 2 displays the results.

Figure 2: Perceptions of Device Reliability



Note: This item was not included on the elementary student survey.

Although these results are better than those in year one, more than 40 percent of the students and staff reported experiencing problems with their digital device during 2016-2017. Further, in response to an open-ended follow-up item that asked respondents to explain their "Yes" answer, the three most commonly cited reasons were related to incompatibility between the device and a website or application, damage or malfunction to the device (about 20%), and a lack of functionality such as touch screens for younger elementary students or the more sophisticated word processing capabilities of Microsoft Word compared to Google Docs for secondary students.

Further, on their survey, 56 percent of the TSTs indicated that they devote more than 50 percent of their time to the DLAS initiative. Further, 100 percent of the TSTs indicated that between 1 and 10 percent of the devices are out of commission on any given day. In turn, 89 percent reported that a device is typically out of commission for more than a week.

Relatedly, Table 9 displays the percentages of teachers at each school level who agreed with two statements regarding support from their TST.

Table 9: Teachers' Agreement With Statements Regarding Their TST

Statement	Level	Percentage Agree
The TST was available when needed.	ES MS HS	90% 99% 81%
Compared with last year (2015-16), my students and I experienced fewer problems this year related to inadequate technical support.	ES MS HS	79% 91% 67%

Table 9 shows that nearly one of every five teachers in DLAS high schools felt that their TST was unavailable when needed and that nearly one of every three teachers in DLAS high schools felt that they had experienced as many or more problems related to inadequate technical support.

Infrastructure Issues and Needs

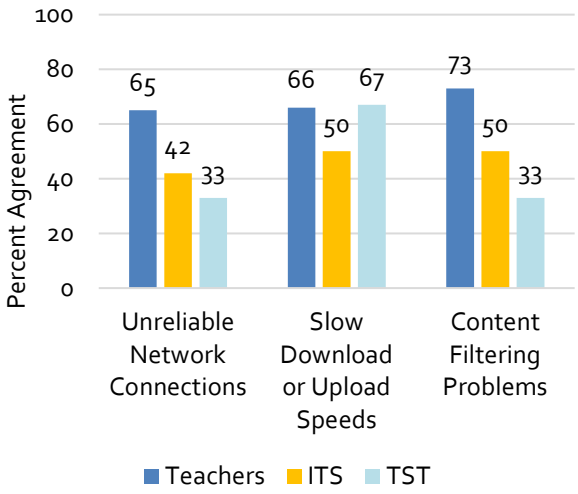
Although it appeared that infrastructure had been in place for the first year of the DLAS initiative, multiple survey responses collected in the spring from stakeholders indicated that there were some infrastructure concerns during the first year. In particular, students, ITSs, and especially teachers 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 as early as possible to allow time to address needs for the second year of the initiative.

Consequently, during the initiative's second year, several improvements were initiated, according to the questionnaire responses collected from the program manager in the Department of Teaching and Learning, as well as the respondent from the Department of Technology.

- The Department of Technology added six itinerant TST positions to cover an absence of the TST at a particular school.
- The collaborative work in the schools began to consolidate around the use of the G Suite platform, which includes applications for email, chat, calendar, and document sharing, among others. The consolidation to G Suite was a factor that contributed to the decision to continue with Chromebooks rather than laptops or tablets as the initiative continues to expand to the Phase I schools and beyond.[17]
- The Department of Technology implemented different applications during 2016-2017 for filtering content both in school and at home.
- To increase internet access out of school, the Department of Teaching and Learning field tested a limited number of mobile hotspots with some students and worked to identify student-friendly businesses, as well as recreation centers and libraries.
- The Department of Technology doubled internet bandwidth to 8 gigabytes per second.

The degree to which these improvements were perceived as effective is presented in Figure 3. Depending upon the issue, between one-third and two-thirds of each respondent group agreed that improvements had occurred. Room for further improvement remained.

Figure 3: Perceptions of Network-Related Improvements



Further, secondary students were asked, "Has your device ever been unable to do something for school that you wanted it to do?" Of the 3,813 students who responded to the survey item, 49 percent selected "Yes." Of these, 883 students provided brief explanations of why they had selected "Yes." To analyze these open-ended responses, two subsets of 100 students were randomly selected, and their comments were coded. Table 10 presents the distribution of responses.

Table 10: Secondary Students' Perceptions of Technology-Related Issues

Issue	Count (N=200)	Percent
Inadequate Bandwidth	6	10%
Content Blocked	35	56%
Device Problems	10	16%
Network/Connectivity Issues	11	18%
Total	62	100%

The table shows that of the 200 randomly selected students, 62 students wrote a comment. The most commonly cited issue among the students involved content being blocked by the filter.

A random selection of 100 elementary, middle, and high school teachers yielded a somewhat different distribution of digital learning issues.

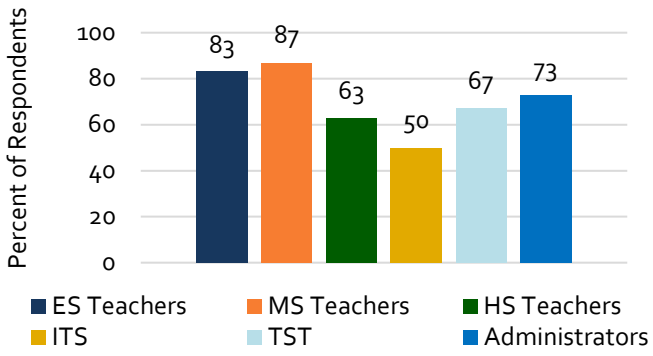
Table 11: Teachers' Perceptions of Technology-Related Issues

Issue	Count (N=100)	Percent
Application-Related Issues	14	25%
Inadequate Bandwidth	6	11%
Content Blocked	7	12%
Device Problems	13	23%
Network/Connectivity Issues	16	29%
Total	56	100%

Issues related to content filtering were cited much less frequently by the teachers (12%) than by the students (56%). Instead, the three most common issues cited by the teachers involved issues related to network connectivity (29%), problems with the design or compatibility of digital applications (25%), and issues with the devices themselves (23%), including device batteries not holding charges.

Another survey item asked a more global question: "How does your experience with the Digital Learning initiative during 2016-2017 compare with your experience last year?" The percentages of staff members who selected either "Somewhat Better" or "Much Better" are displayed in Figure 4.

Figure 4: Staff Agreement That Year Two Was Better Than Year One



The same question was also asked of secondary students, whose response pattern is set forth in Table 12.

Table 12: Student Agreement That Year Two Was Better Than Year One

Response Option	Middle School	High School	Total
Much/Somewhat Worse	10%	20%	17%
About the Same	33%	40%	38%
Somewhat/Much Better	57%	40%	45%

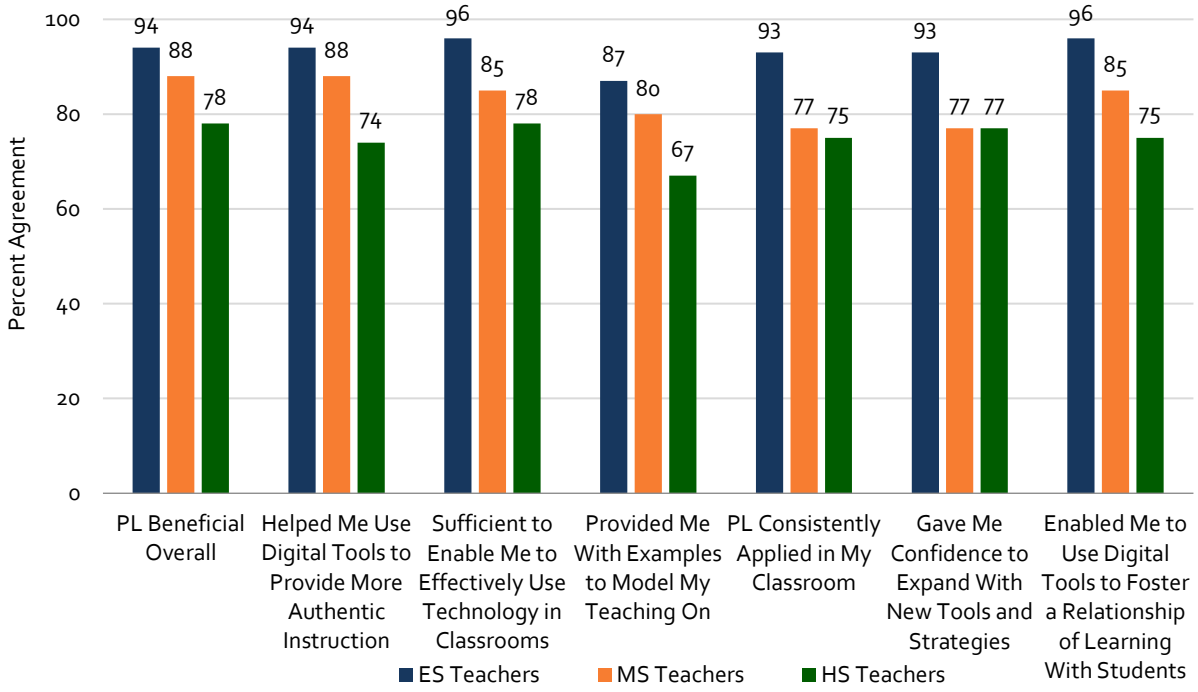
Both the student and teacher surveys requested respondents to explain why they had answered the question as they had answered. Whether they had selected a response toward the more positive or more negative end of the scale, most of the explanations addressed issues related to infrastructure, noting some but not nearly enough improvement in connectivity, content filtering, and prompt and proper technical support. In addition, both the elementary and secondary teachers also mentioned issues related to more students leaving their devices at home or bringing them to school either uncharged or damaged. Particularly at the high school level, several teachers mentioned that some students in mixed-grade classes had not been assigned a digital device, thus necessitating that wireless carts be reserved, which limited the mobility of those students within the classroom and required that their in-class and homework assignments be handled differently than those of students who had an individual device.

Professional Learning to Prepare for Implementation

The model of professional learning that was implemented for the DLAS initiative during 2015-2016 and 2016-2017 involved a train-the-trainer model. Department of Teaching and Learning staff provided 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 four to six weeks during the year. The intent was that the ITSs would then provide site-based professional learning opportunities as needed for the teachers at their school who were involved in the initiative.

The professional learning during the initiative's first year focused on becoming acquainted with various educational websites and instructional applications. During 2016-2017, the focus transitioned to the five transformational learning dispositions related to leadership, teachers, students, learning environment, and community.[18] Nonetheless, teachers who participated in the DLAS initiative responded to the same set of survey items as in 2015-2016 regarding how the professional learning affected their instruction. The results in Figure 5 indicate that the teachers at the elementary school level tended to be more positive about the professional learning than the teachers at the secondary level, where the middle school teachers tended to be more positive than their high school counterparts.

Figure 5: Teacher Perceptions of Professional Learning Related to DLAS Initiative by Level



These results in Figure 5 differed from the first year results on these same items. For example, as is shown in Table 13, agreement that professional learning was beneficial overall increased from year one to year two among elementary and high school teachers but declined among middle school teachers.

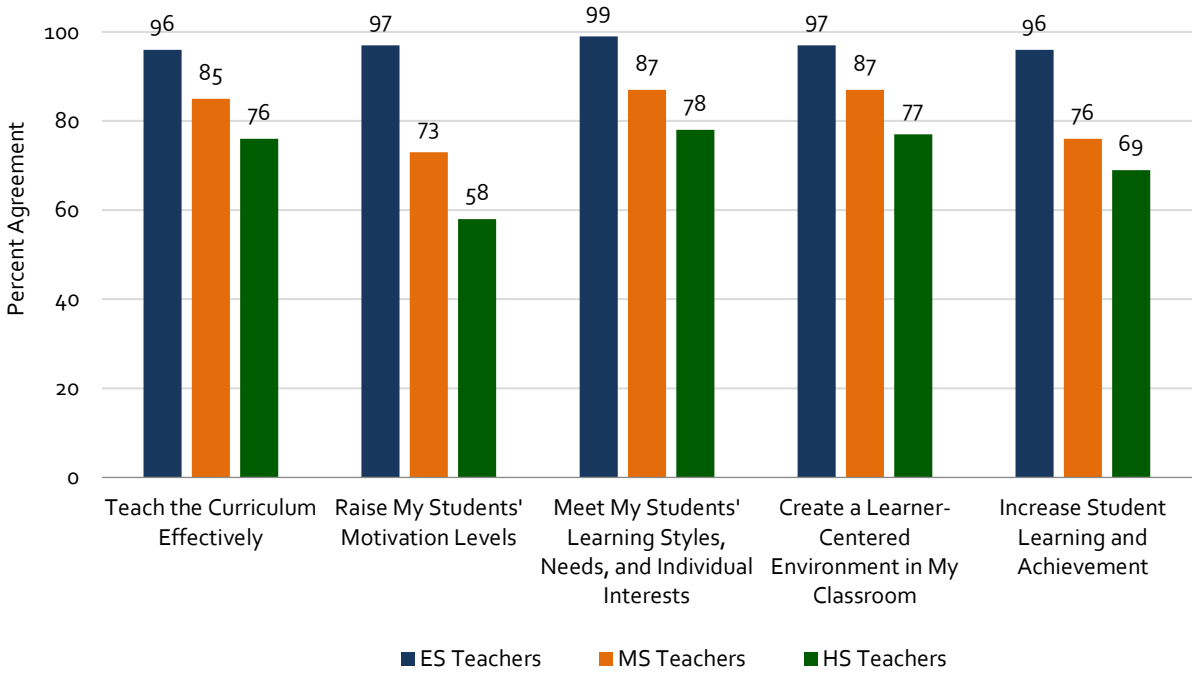
Table 13: Changes in Teacher Perceptions That Professional Learning Was Beneficial Overall

School Level	2015-2016	2016-2017	Change
Elementary	85%	94%	+9%
Middle	93%	88%	-5%
High	73%	78%	+5%

It should be noted that the decline at middle school was attributable to just one school. If that school had been excluded from the analysis, the middle school agreement rate would have been 93 percent in both 2015-2016 and 2016-2017. Overall, of the 21 possible changes (seven items by three school levels), 14 increased from year one to year two while 7 declined. Six of the changes were greater than 10 percentage points.

A second set of survey items addressed additional aspects of the professional learning, including its effect on enabling the teachers to increase student learning and achievement. This set of items was new this year. The pattern of responses mirrored those from the previous item set. The elementary teachers were the most positive, and the high school teachers were the least positive.

Figure 6: Teacher Perceptions That the DLAS-Related Professional Learning Has Improved Their Ability to Use Digital Tools and Resources

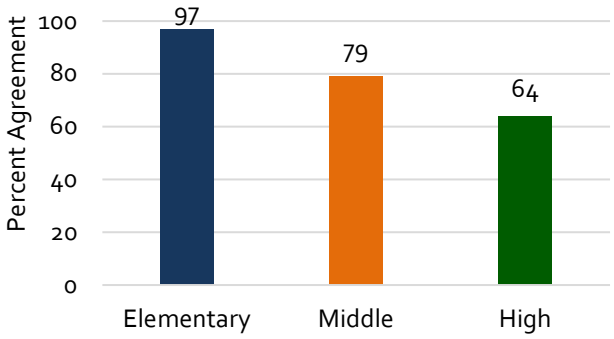


Also, it should be noted that the ITSs and administrators at the DLAS initiative sites were asked in both years to indicate the extent to which they agreed with a statement that the DLAS training and professional learning provided by the Department of Teaching and Learning enabled them to provide effective training and professional learning to the teachers in their school. In the first year, 70 percent of ITSs and 89 percent of administrators agreed with the statement. When asked in 2016-2017, the ITS agreement increased by eight points to 78 percent. Conversely, the agreement rate among the administrators declined by six points to 83 percent.

In addition, on the second year survey, administrators were asked, "What is the greatest challenge to your school providing more frequent and/or improved professional learning for staff members participating in the Digital Learning Anchor Schools initiative?" By far, the most common response was "Lack of Time," which was selected by 55 percent of the administrators who responded to the survey item (50% at elementary school, 56% at middle school, and 58% at high school).

Further, students were asked to indicate their level of agreement with the statement, "My teachers know how to use digital tools and resources to help me learn." Their agreement rates are displayed in Figure 7.

Figure 7: Student Perceptions of DLAS Professional Learning



In turn, Table 14 displays a comparison of the year-two results with those from 2015-2016.

Table 14: Changes in Student Perceptions of DLAS Professional Learning

School Level	2015-2016	2016-2017	Change
Elementary	n/a	97%	n/a
Middle	85%	79%	-6%
High	66%	64%	-2%

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. However, as Table 15 shows, the agreement rates of teachers and administrators differed with respect to whether students were allowed to take their device home.

Table 15: Staff Perceptions That Students Are Allowed to Bring Their Digital Devices Home

Group	Elementary	Middle	High
Administrators	38%	100%	100%
Teachers	10%	88%	99%

Table 15 indicates that smaller percentages of teachers than of administrators agreed at all three school levels that students were allowed to bring their devices home.

As shown in Table 16, notably lower percentages of middle school and high school students, compared to the teachers and administrators, reported that they actually use their devices at home. An open-ended, follow-up item on the staff surveys revealed that most elementary students are viewed as being too young to handle the responsibility of transporting a device between school and home and of returning it to school each day fully charged. Fifth-grade students at two of the six elementary schools that have grade 5 classrooms seemed to be the exception. Nonetheless, many staff members also noted that elementary school students were at greater risk than older students of having their devices stolen.

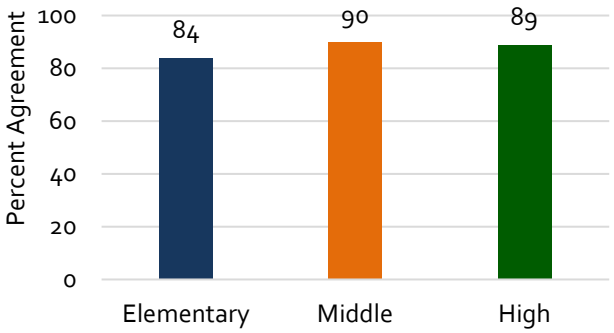
In addition, some of the most pronounced changes from the initiative's first year to its second year involved the information regarding student device usage at home, which is presented in Table 16.

Table 16: Changes in Student Use of Device at Home

School Level	2015-2016	2016-2017	Change
ES Students	9%	30%	+21%
MS Students	28%	62%	+34%
HS Students	74%	59%	-15%

Relatedly, 84 percent of the elementary school respondents, 90 percent of the middle school respondents, and 89 percent of the high school respondents indicated that they can access the internet at night and on weekends.

Figure 8: Students' Internet Access at Home



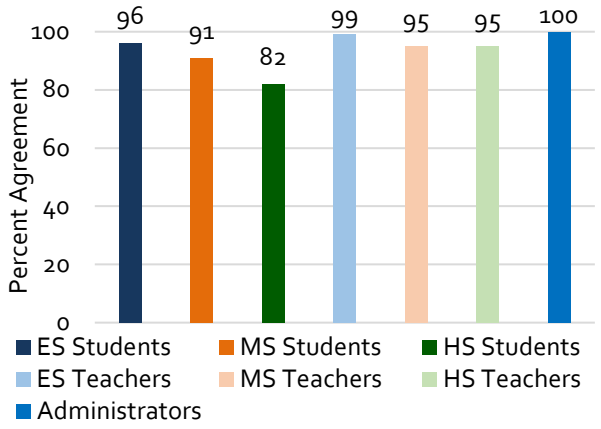
With respect to equity, statistically significant differences between racial groups were detected. However, either they were too small to hold practical significance or they favored the minority group. The greatest disparity with respect to home use of the digital device was a 12 percent difference between African American (38%) students and Caucasian students (26%) at the elementary school level.

Regarding internet access, the greatest disparity in internet access at home was an 8 percent difference between African American students (83%) and Caucasian students (91%), which yielded a trivial effect size of .18.

Greater numbers of secondary teachers noted in 2016-2017 than in 2015-2016 that an increasing number of their students repeatedly failed to bring their devices back to school after taking them home overnight or on weekends. Correspondingly, the year-two evaluation also found an increase in the number of students who stated that they had purposely left their devices at home or had not even brought them home because of a fear that they would be stolen or somehow damaged while in transit and that the students and/or their families did not want to be held financially responsible.

Stakeholders were also asked about their understanding of the division's policies and guidelines for using technology and social media. As shown in Figure 9, high percentages of staff members involved in the initiative agreed that they understood the policies.

Figure 9: Stakeholders Understood Division's Policies and Guidelines for Using Technology and Social Media



These results shown in Table 17 were very similar to the results obtained when the same item was included on last year's surveys.

Table 17: Changes in Stakeholders' Understanding of Division's Policies and Guidelines for Using Technology and Social Media

School Level	2015-2016	2016-2017	Change
ES Students	n/a	96%	n/a
MS Students	94%	91%	-3%
HS Students	84%	82%	-2%
ES Teachers	98%	99%	+1%
MS Teachers	97%	95%	-2%
HS Teachers	91%	95%	+4%
Administrators	100%	100%	0%

Stakeholders' Perceptions About Instruction in DLAS Classrooms

Teachers who participated in the DLAS initiative were asked multiple survey items about the instruction that they provided and how the DLAS initiative impacted instructional practices. Figures 10 and 11 show the percentages of teachers by school level who thought that each practice became more effective and/or efficient as a result of the DLAS initiative.

At least 91 percent of elementary teachers agreed that the initiative led their instructional activities to increase in effectiveness and/or efficiency. Although the agreement rates were lower at the middle school and high school levels, the vast majority of the secondary teachers nonetheless agreed that the initiative had led their instructional activities to increase in effectiveness and/or efficiency.

Figure 10: Instructional Activities Increased in Effectiveness and/or Efficiency

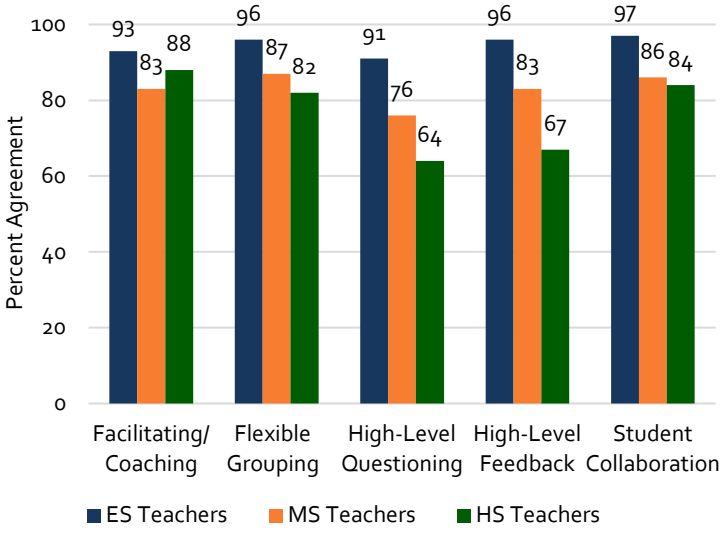
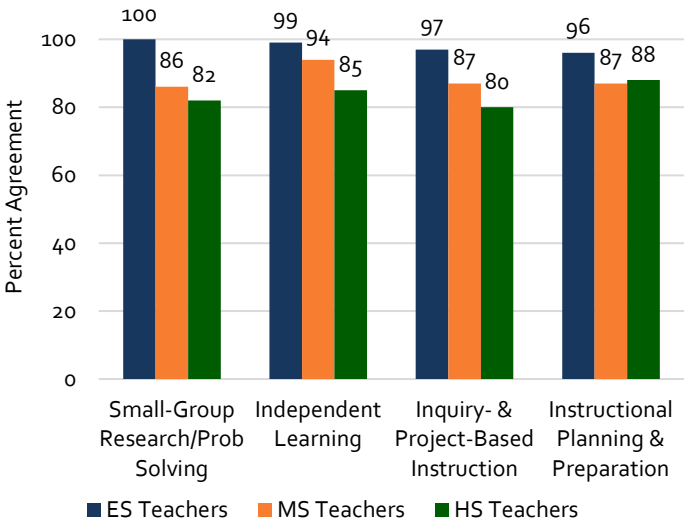
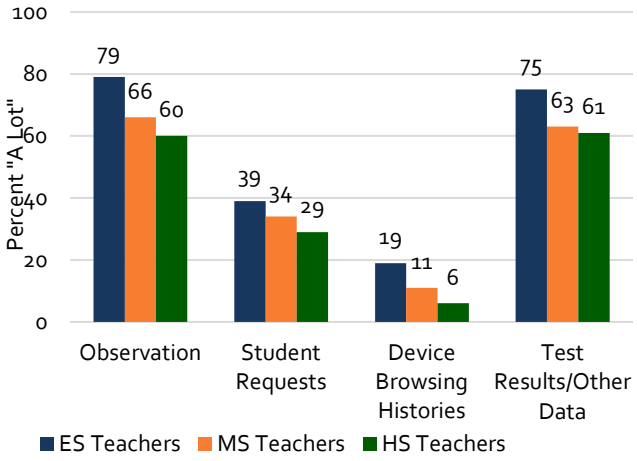


Figure 11: Instructional Activities and Planning Increased in Effectiveness and/or Efficiency



In addition, teachers were asked, "To what degree do you differentiate and personalize instruction, device use, classroom assignments, homework, due dates, feedback, etc., on the basis of the following?" There were three response options: "Not At All," "A Little," and "A Lot." Figure 12 indicates the percentages of teachers who responded "A Lot" to each method of differentiation.

Figure 12: Basis for Differentiating and Personalizing Instruction



Clearly, the two most commonly used differentiation methods involved observation of classroom activity and test results and other data.

In addition, teachers were asked an open-ended question, "How has the Digital Learning initiative changed how you teach?" A review of the responses revealed that more than 80 percent of elementary teachers replied in a positive manner, with dozens commenting that their instruction had become more differentiated and personalized. Typical of elementary responses were the following:

- *"It allows students greater autonomy over their learning."*
- *It allows me to have real-time data to assess my students. I am able to differentiate the learning experiences."*
- *"My students are able to do more independent work so I am able to work with smaller groups."*

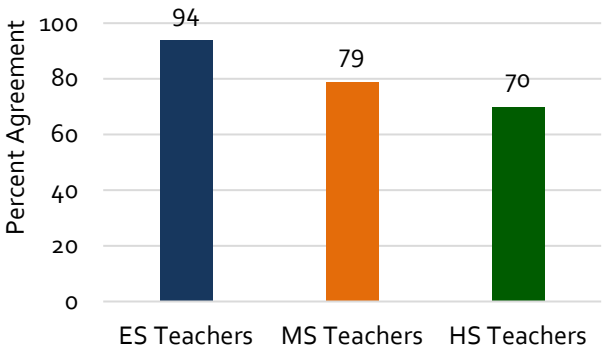
As with the Likert-type survey items, the percentages of favorable replies tended to decline at the middle school and high school levels. Positive replies were not only fewer and farther between but also either more ambiguous or less enthusiastic. Three typical secondary responses are presented below.

- *"I make less* (sic) *copies and have kids do assignments on their computer instead of on paper, [which is] more 'green' so to speak."*
- *"It has made data collection and analysis much more efficient."*
- *"I don't have to spend time looking for labs and carts."*

Stakeholders' Perceptions About Learning in DLAS Classrooms

To develop a fuller understanding of the DLAS initiative, an understanding of 1:1 instructional practices needs to be augmented with an understanding of the resulting 1:1 learning. A key element of that involved critical thinking. Figure 13 displays the percentage of teachers at each level who thought that having their own devices provided students with greater opportunity to use their critical thinking skills.

Figure 13: Teacher Perceptions That Students' Having Their Own Device Provided Them Greater Opportunity to Use Critical Thinking Skills



As shown in Table 18 the year-two perceptions were more positive only at the high school level.

Table 18: Changes in Teacher Perceptions That Students' Having Their Own Device Provided Them Greater Opportunity to Use Critical Thinking Skills

School Level	2015-2016	2016-2017	Change
Elementary	95%	94%	-1%
Middle	93%	79%	-14%
High	65%	70%	+5%

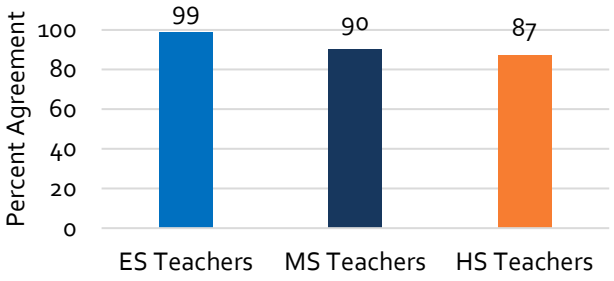
In addition, Table 19 provides the secondary students' responses to the same survey item regarding critical thinking.

Table 19: Changes in Student Perceptions That Having Their Own Device Provided Them Greater Opportunity to Use Critical Thinking Skills

School Level	2015-2016	2016-2017	Change
Middle	76%	73%	-3%
High	57%	59%	+2%

Further, 99 percent of elementary school teachers, 90 percent of middle school teachers, and 87 percent of high school teachers agreed that having their own device gave students greater opportunities to develop new skills (see Figure 14).

Figure 14: Teacher Perceptions That Students' Having Their Own Device Provided Them Greater Opportunity to Develop New Skills



Related to Figure 14, the information in Table 20 shows that the elementary agreement rate remained stable, the middle school agreement rate declined by 7 percent, and the high school agreement rate increased by 7 percent.

Table 20: Changes in Teacher Perceptions That Students' Having Their Own Device Provided Them Greater Opportunity to Develop New Skills

School Level	2015-2016	2016-2017	Change
Elementary	100%	99%	-1%
Middle	97%	90%	-7%
High	80%	87%	+7%

In addition, Table 21 provides the secondary students' responses to the same survey item regarding their development of new skills.

Table 21: Changes in Student Perceptions That Having Their Own Device Provided Them Greater Opportunity to Develop New Skills

School Level	2015-2016	2016-2017	Change
Middle	86%	78%	-8%
High	64%	66%	+2%

Another set of survey items explored students' perceptions of how having their digital device helped them to learn. As shown in Figure 15, at least 76 percent of students at all school levels agreed that having their device helped them work more efficiently. Elementary students had the highest agreement rate that having their device made them more excited about learning (82%).

Figure 15: Student Perceptions of How Using Their Device Helped Them

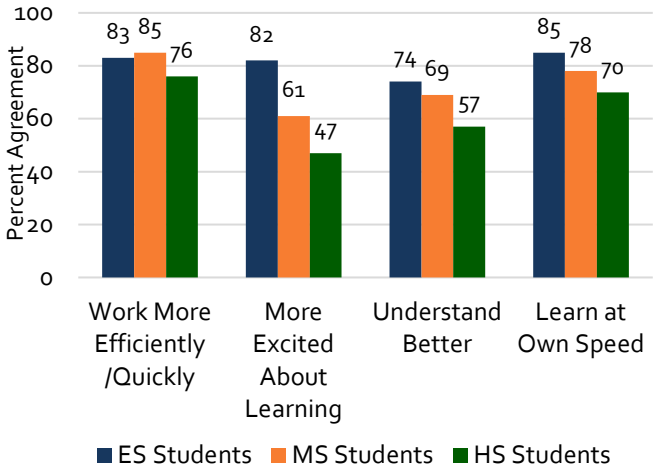


Table 22 displays only the change in percentage points on each item from the first year to the second year.

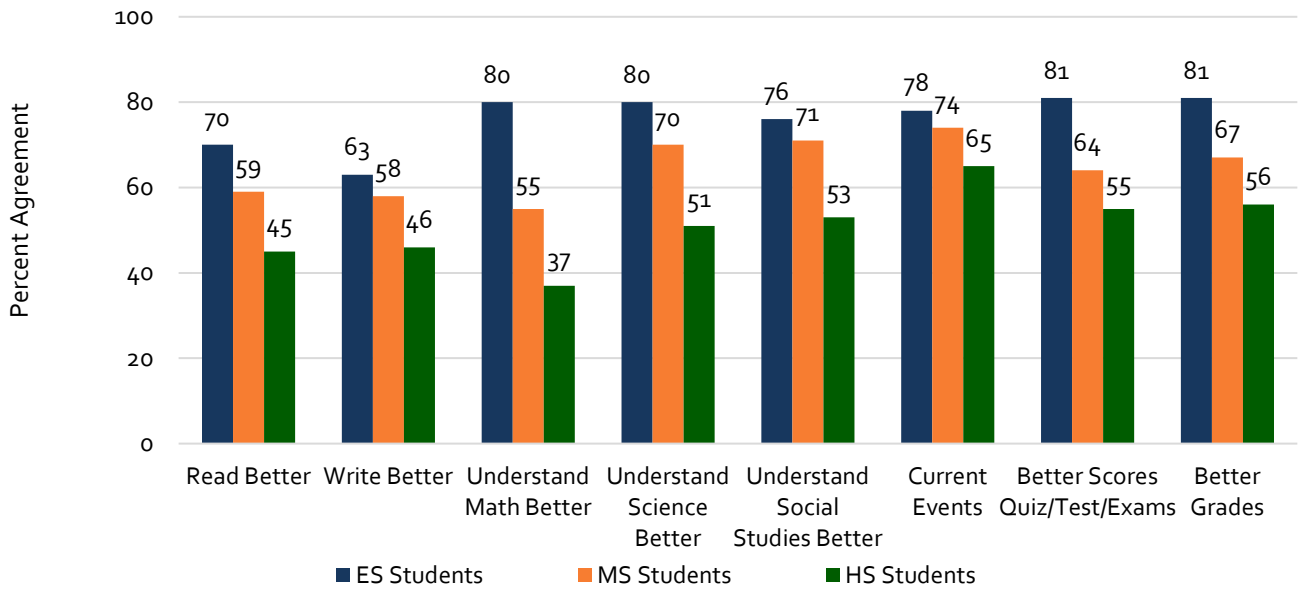
Table 22: Changes in Student Perceptions of How Having Their Own Digital Device Helps Them

School Level	Work Quickly	More Excited	Understand Better	Self-Pacing
Elementary	+1%	-3%	-6%	-1%
Middle	-2%	-2%	0%	-4%
High	+5%	+5%	+3%	-6%

The pattern of change at the middle school and high school levels is mainly due to the addition in 2016-2017 of Larkspur and Kellam. When these two schools were excluded from the comparison, the changes were much closer to zero.

The same pattern of results emerged when students responded to multiple survey items regarding the impact that having their device had on their learning and studying. As shown in Figure 16, 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. The difference between the elementary and secondary students was particularly pronounced with respect to their agreement that having their device helped them to better understand mathematics.

Figure 16: Student Perceptions of Impact of Having Device to Learn and Study



The pattern of change, displayed in Table 23, between the first year and the second year surveys again mirrored previous results. The elementary changes ranged narrowly from two-point declines to two-point increases. At the middle school and high school levels, the pattern of changes were somewhat larger in magnitude with a seven-point increase in middle school math and a seven-point decline in current events.

Table 23: Changes in Student Perceptions of Impact of Having Device to Learn and Study

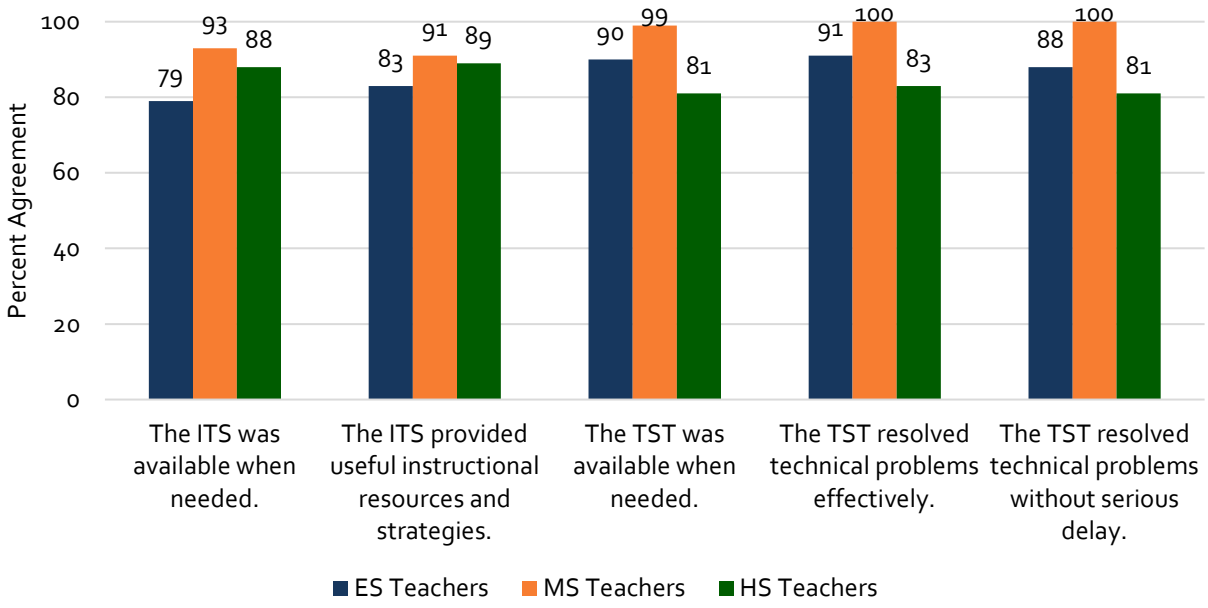
School Level	Read Better	Write Better	Understand Math Better	Understand Science Better	Understand Social Studies Better	Current Events	Better Scores on Quiz/Test/ Exams	Better Grades
Elementary	-2%	0%	-2%	-1%	-2%	+2%	+2%	+1%
Middle	+1%	-2%	+7%	+5%	+3%	-7%	+5%	+4%
High	-2%	0%	-2%	+6%	+5%	+6%	+5%	+4%

Stakeholders' Perceptions About ITS and TST Support

Several new items were added to the 2016-2017 surveys to evaluate Recommendation #2 in the year-one DLAS evaluation report to "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."

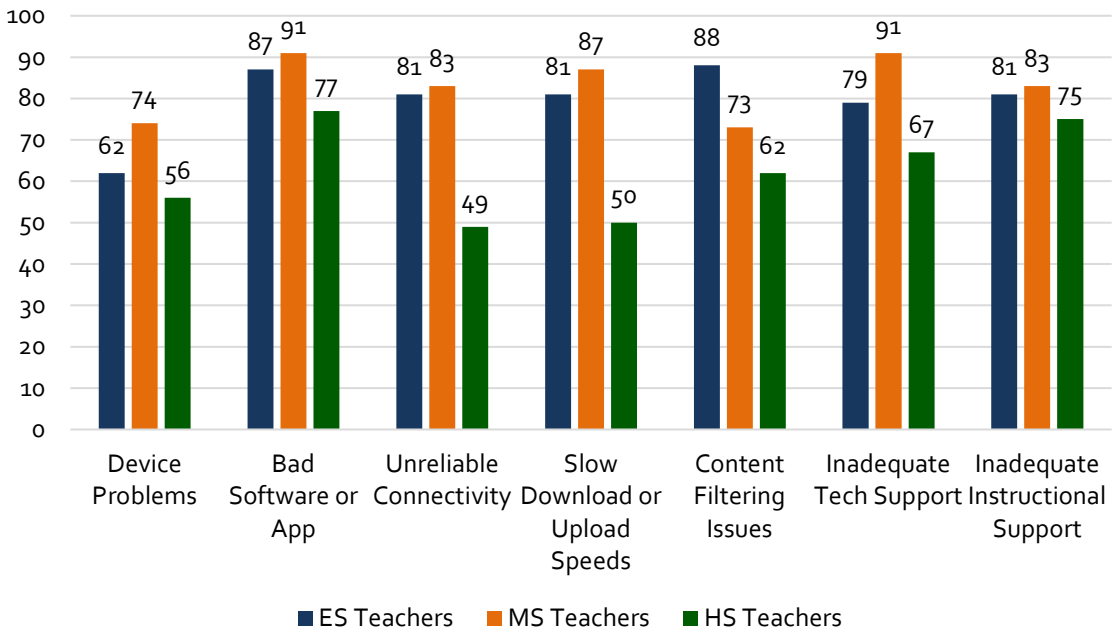
A set of items asked teachers to indicate the level of their agreement with a set of statements regarding the availability and effectiveness of their school's ITS and TST. As shown in Figure 17, all school levels were positive about their school's ITS and TST, with the middle schools tending to perceive their ITSs and TSTs most favorably.

Figure 17: Teacher Perceptions of Their School's ITS and TST



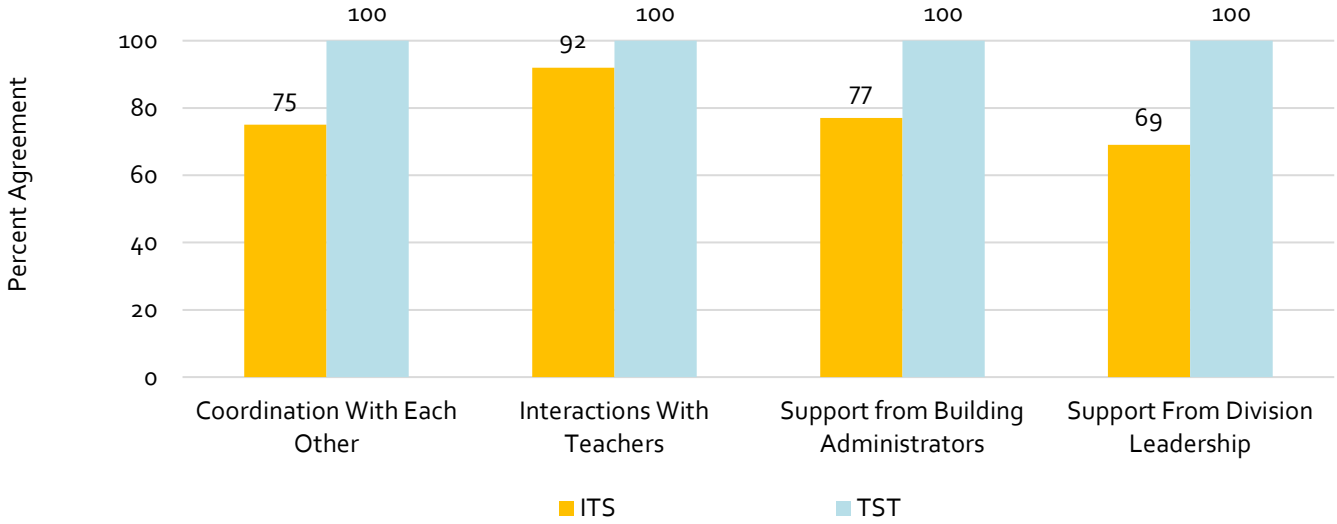
Another set of items asked teachers to indicate their agreement that they had experienced fewer problems on several facets of the 1:1 initiative. Figure 18 indicates that specific improvements were perceived with respect to each problem but less so at the high school level, where roughly one of every five teachers indicated, for example, that the TST did not resolve technical problems effectively or in a timely manner. These percentages aligned with the percentage of high school teachers (19%) who indicated that the TST was not available when needed.

Figure 18: Teacher Agreement That Problems Occurred Less Often in Year Two Than in Year One



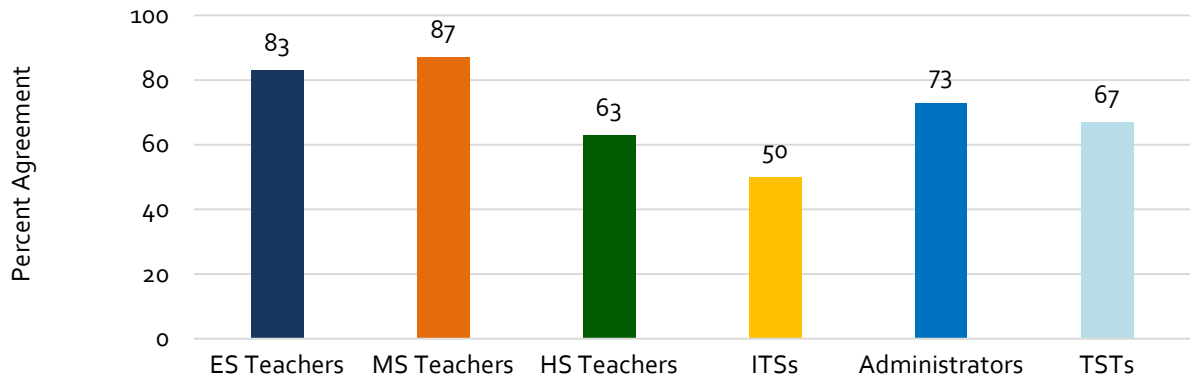
Another set of items asked the ITSs and TSTs to indicate the degree to which they noticed improvement from year one in coordination with each other, interactions with teachers, and support from building administrators and division leadership. Figure 19 displays the results.

Figure 19: Improvement Was Noted Since Year One



A summary item to compare their year-two experience with their year-one experience was administered to all stakeholder groups except parents and students. Figure 20 displays the results.

Figure 20: Year Two Was Better Than Year One



It should be noted that about 28 percent of the high school teachers selected "About the Same" to indicate that their 2015-2016 and 2016-2017 experiences in the initiative were similar. In addition, it was found that the other 50 percent of ITSs that did not choose "Better" or "Much Better" had instead selected "About the Same."

DLAS Alignment With Best Practices

As mentioned previously, each anchor school's Digital Learning Leadership Team completed an online survey that asked them to rate the degree to which the initiative was aligned with 1:1 best practices. Summaries and links to the Hanover Research brief and other sources of evidence-based best practices were provided in the survey. The survey used a five-point rating scale that ranged from "Not At All Aligned" to "Fully Aligned" with the three middle categories remaining unlabeled (see Figure 21).

Figure 21: Alignment Scale

Not At All				Fully
1	2	3	4	5
0	25	50	75	100

Table 24 indicates that a moderate degree of alignment with research-based best practices has been achieved, inasmuch as between 42 percent and 60 percent of the respondents selected one of the top two categories of the rating scale.

Table 24: The Initiative's Alignment With Best Practices

Topic	Percent Bottom Two Categories	Percent Middle Category	Percent Top Two Categories	Weighted Mean	Weighted Mean Label
Student-Centered Learning	10%	39%	51%	63	Somewhat Aligned
Technology Integration and Immersion	14%	26%	60%	65	Somewhat Aligned
Professional Learning	22%	36%	42%	58	Somewhat Aligned
Equity	22%	28%	50%	60	Somewhat Aligned
Effective Leadership	10%	31%	59%	66	Somewhat Aligned
Stakeholder Engagement	12%	45%	43%	58	Somewhat Aligned
Infrastructure	24%	20%	55%	61	Somewhat Aligned
Usage Policies	8%	39%	53%	65	Somewhat Aligned

Because of the ambiguity of whether to group the middle category with the top two or the bottom two categories in Table 24, a weighted mean was calculated by weighting the bottom category as zero percent, the top category as 100 percent, and the middle categories in increments of 25 percent. The percentage of respondents that selected each category served as the weight for that category. This procedure thus yielded a strength of agreement scale, which incorporated all of the original "information" in each response distribution, including the middle category. Thus, as the weighted means all fell within the 50 to 75 percent range, they all were labeled as "Somewhat Aligned," indicating room for improvement on all the topics.

Participant Characteristics

The second evaluation question focused on the demographic and academic characteristics of the DLAS participants. An estimated total of 13,568 students participated in the DLAS initiative at select grade levels.[19] That number nearly doubles the number of DLAS students (7,160) who participated during 2015-2016. In addition, another 8,074 students attended one of the matched comparison elementary schools or middle schools, and 14,835 students attended the non-DLAS high schools that served as a comparison group.

As shown in Table 25, 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 statistically significant chi-square-based differences in race and socioeconomic status at the elementary school and middle school levels. However, when individual pairs of DLAS and matched comparison schools were compared, no differences were found. As was the case in 2015-2016, there were significant differences between the DLAS and the other high schools, especially with respect to race and socioeconomic status. Although not specifically shown in the table, the percentages of African Americans, as well as the percentages of economically disadvantaged students, were significantly higher at Bayside High School and Green Run High School than at the composite of non-DLAS high schools, while the percentages at Kellam High School were significantly lower.

Table 25: Demographic Characteristics of DLAS Participants and Matched Comparison Schools (2016-2017)

Characteristic	Elementary School		Middle School		High School		K-12
	DLAS (N=4,022)	**MCS** (N=4,215)	**DLAS** (N=3,573)	**MCS** (N=3,859)	**DLAS** (N= 5,973)	**MCS** (N=14,835)	**Division Profile** (N=67,214)
Gender							
Female	49.5%	48.8%	48.9%	49.1%	49.2%	48.9%	48.8%
Male	50.5%	51.2%	51.1%	50.9%	50.8%	51.1%	51.2%
Ethnicity							
African American	38.7%	27.8%	24.6%	20.9%	25.8%	23.8%	23.7%
American Indian	0.1%	0.1%	0.4%	0.3%	0.2%	0.2%	0.2%
Asian/Native Hawaiian/Pacific Islander	5.5%	5.9%	5.2%	5.1%	4.9%	7.6%	6.4%
Caucasian	36.4%	46.8%	48.7%	54.7%	52.9%	51.2%	49.7%
Hispanic	9.7%	10.1%	12.3%	10.6%	9.4%	9.6%	11.0%
Multiracial	9.5%	9.2%	8.9%	8.4%	6.7%	7.6%	8.9%
Economically Disadvantaged							
Yes (Free/Reduced Lunch)	45.8%	38.2%	44.9%	37.6%	36.0%	33.3%	37.4%
Identified Special Education							
Yes	10.4%	10.7%	12.2%	11.5%	10.2%	9.5%	11.5%
Identified Limited English Proficiency							
Yes	2.1%	2.3%	1.7%	1.6%	1.1%	0.9%	2.1%
Identified Gifted (Intellectually or Artistically)							
Yes	14.2%	14.0%	12.6%	13.7%	13.4%	18.2%	13.1%

Table 25 also shows that at the elementary and middle school levels, the DLAS and matched comparison schools as distinct groups were reasonably comparable with respect to their demographic characteristics.

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 were not formally assessed at this time.

Instead, progress toward meeting the ancillary goals and objectives set forth in the *Teacher Outcomes With Look Fors* and *Student Outcomes With Look Fors* have been included in this section of the report based on selected data that were collected through survey items that were developed to align with the *Look Fors*. Appendix A includes the complete *Teacher Outcomes* and *Student Outcomes* documents with each student and teacher outcome and its associated set of "look fors." These are the same ancillary goals and objectives that formed the basis of the year-one DLAS evaluation.

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 DLAS initiative. At least 90 percent of staff members agreed (see Figure 22).

Figure 22: Teachers Used Devices and Digital Resources to Connect Students to Authentic Learning Experiences

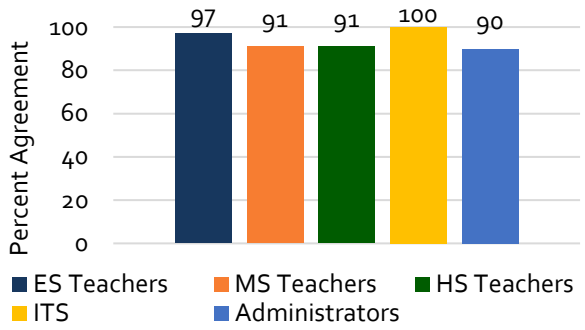


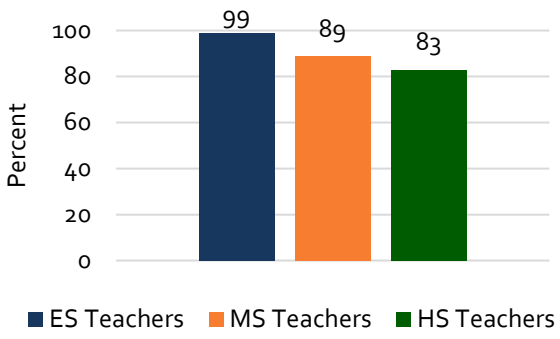
Table 26 compares the year-two and the year-one results. It should be noted that the ten-point decline among administrators is attributable to the disagreement of just three individuals.

Table 26: Changes in Agreement Rates That Teachers Used Devices and Digital Resources to Connect Students to Authentic Learning Experiences

Survey Group	2015-2016	2016-2017	Change
Elementary Teachers	99%	97%	-2%
Middle School Teachers	97%	91%	-6%
High School Teachers	89%	91%	+2%
ITSs	100%	100%	0%
Administrators	100%	90%	-10%

Staff members were also asked to rate their level of agreement with a statement that the initiative led learning incorporated real-time/authentic contexts more effectively or efficiently since the DLAS initiative began. Figure 23 presents the percentages of staff members who indicated their agreement with the statement. The agreement rates were very high for elementary school teachers, but somewhat lower for middle school and especially high school teachers.

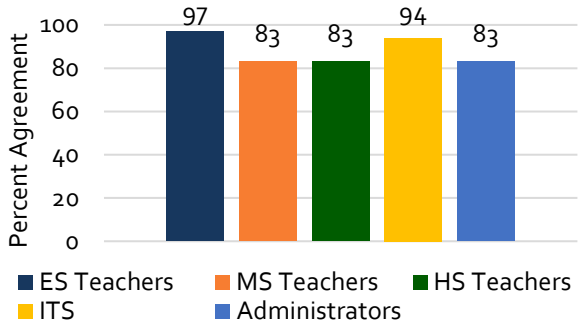
Figure 23: Learning Incorporates Real-Time/Authentic Contexts More Effectively or Efficiently



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 24 shows that high percentages of staff agreed that this occurred as a direct result of the DLAS initiative.

Figure 24: Teachers Empowered Students to Choose Their Learning Path



However, Table 27 indicates that the rates of agreement declined from the initiative's first year.

Table 27: Changes in Teachers Empowered Students to Choose Their Learning Path

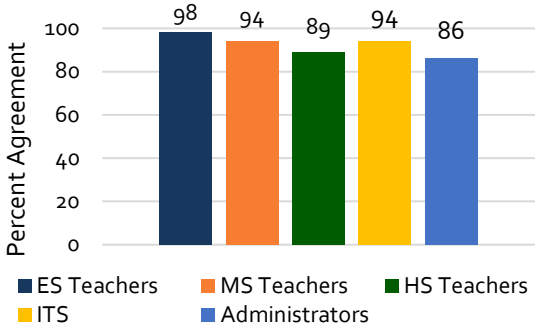
Survey Group	2015-2016	2016-2017	Change
Elementary Teachers	99%	97%	-2%
Middle Teachers	93%	83%	-10%
High Teachers	87%	83%	-4%
ITSs	100%	94%	-6%
Administrators	100%	83%	-17%

Of interest is the fact that the agreement rates to the statement in this item, as well as to the statements in several other items, tended to vary considerably among schools. On this item, for example, the agreement rate at one middle school was 97 percent; at a second middle school, it was 78 percent; and at the third middle school, it was 58 percent. Such a wide range of agreement rates suggests large differences in teacher perceptions, in how the initiative was implemented at each school, or a combination of both perceptions and implementation.

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 25 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 25: Teachers Provided Students Personalized Learning Opportunities



In turn, Table 28 shows that only the middle school teachers showed any increase in agreement rate.

Table 28: Changes in Teachers Provide Students Personalized Learning Opportunities

Survey Group	2015-2016	2016-2017	Change
Elementary Teachers	100%	98%	-2%
Middle Teachers	93%	94%	+1%
High Teachers	94%	89%	-5%
ITSs	100%	94%	-6%
Administrators	95%	86%	-9%

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 26 shows that high percentages of all staff groups agreed that this occurred as a direct result of the DLAS initiative. The agreement rates were highest among the elementary teachers and the administrators.

Figure 26: Teachers Used the Devices to Collect Real-Time Data and Provide Students High-Quality Feedback

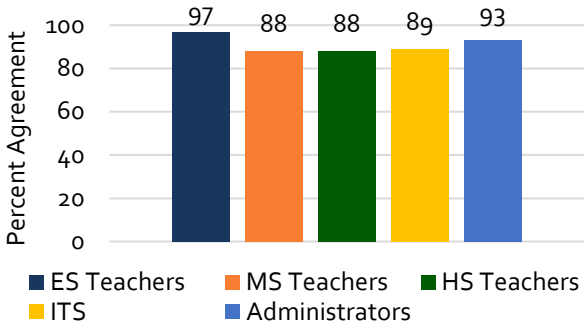


Table 29 shows, however, that only the high school teachers showed an increase in agreement rates from the first to the second year of the initiative.

Table 29: Changes in Teachers Used the Devices to Collect Real-Time Data and Provide Students High-Quality Feedback

Survey Group	2015-2016	2016-2017	Change
Elementary Teachers	99%	97%	-2%
Middle Teachers	90%	88%	-2%
High Teachers	83%	88%	+5%
ITSs	100%	89%	-11%
Administrators	95%	93%	-2%

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 27).

Figure 27: Teachers Shared Digital Resources, Content, and Ideas

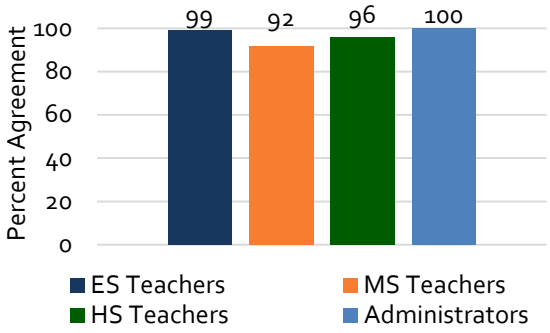


Table 30 indicates that teacher agreement rates with respect to sharing digital resources, content, and ideas remained changed minimally.

Table 30: Changes in Teachers Shared Digital Resources, Content, and Ideas

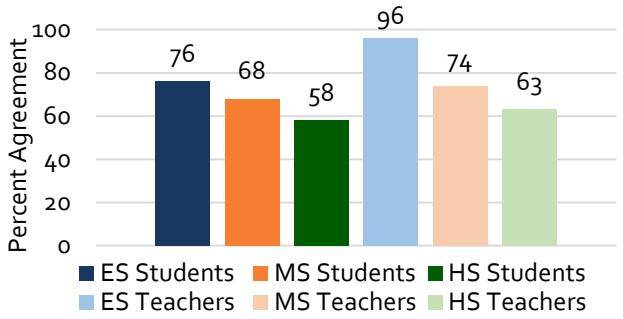
Survey Group	2015-2016	2016-2017	Change
Elementary Teachers	98%	99%	+1%
Middle Teachers	93%	92%	-1%
High Teachers	95%	96%	+1%
ITSs	100%	n/a	n/a
Administrators	100%	100%	0%

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 28, higher percentages of teachers than students agreed with the survey item, 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.

Figure 28: Students Made More Decisions About Their Learning



With respect to student decision making, Table 31 provides the agreement rate changes between the first and second year of the initiative. Note that the table includes not only the student and teacher results but also the agreement rates for both years among elementary school, middle school, and high school parents.

Table 31: Changes in Students Made More Decisions About Their Learning

Survey Group	2015-2016	2016-2017	Change
ES Students	78%	76%	-2%
MS Students	65%	68%	+3%
HS Students	50%	58%	+8%
ES Teachers	95%	96%	+1%
MS Teachers	90%	74%	-16%
HS Teachers	54%	63%	+9%
ES Parents	66%	76%	+10%
MS Parents	71%	71%	0%
HS Parents	60%	67%	+7%

Again, as was the case with several previously presented survey item results, the notable changes in agreement rates among middle school and high school teachers is at least partially attributed to the newly added middle school and high school. When they are excluded from the results, the changes in agreement rates are much closer to zero.

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 with a statement that since being assigned their own digital learning device, students were gaining a broader, more global view of the world. As shown in Figure 29, the majority of students and the majority of teachers agreed with this survey item. Again, teachers' perceptions were more positive than students' perceptions, and agreement levels were lower as the school level increased.

Figure 29: Students Gained a More Global View of the World

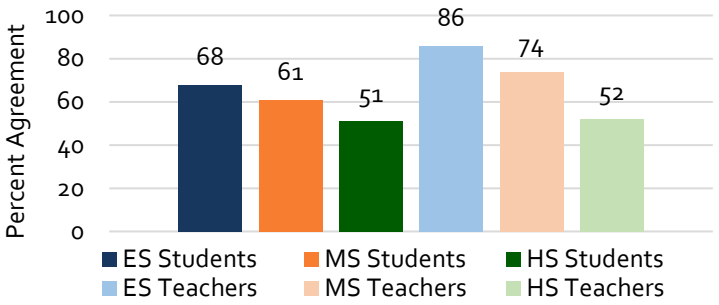


Table 32 indicates that the changes in agreement rates were small among students and teachers from 2015-2016 to 2016-2017. The agreement rates changed more noticeably among the elementary school and middle school parents.

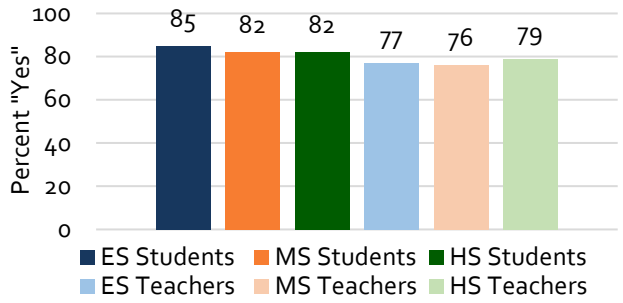
Table 32: Changes in Students Gained a More Global View of the World

Survey Group	2015-2016	2016-2017	Change
ES Students	64%	68%	+4%
MS Students	61%	61%	0%
HS Students	46%	51%	+5%
ES Teachers	88%	86%	-2%
MS Teachers	70%	74%	+4%
HS Teachers	56%	52%	-4%
ES Parents	71%	81%	+10%
MS Parents	75%	66%	-9%
HS Parents	60%	61%	+1%

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 30, at least 76 percent of students and teachers at each school level indicated that the digital devices were used for this purpose.

Figure 30: Perceptions That Students Collaborated With Others on Assignments



As shown in Table 33, agreement that students collaborated with others on assignments tended to become more positive, especially among the parents at all three school levels.

Table 33: Changes in Perceptions That Students Collaborated With Others on Assignments

Survey Group	2015-2016	2016-2017	Change
ES Students	78%	85%	+7%
MS Students	83%	82%	-1%
HS Students	73%	82%	+9%
ES Teachers	83%	77%	-6%
MS Teachers	70%	76%	+6%
HS Teachers	70%	79%	+9%
ES Parents	66%	82%	+16%
MS Parents	63%	71%	+8%
HS Parents	58%	78%	+20%

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, students were asked their level of agreement that using the assigned device helped them better understand what they were learning. The majority of students agreed with this survey item, although the percentages declined as the school level increased.

Figure 31: The Device Helped Students Better Understand What They Are Learning

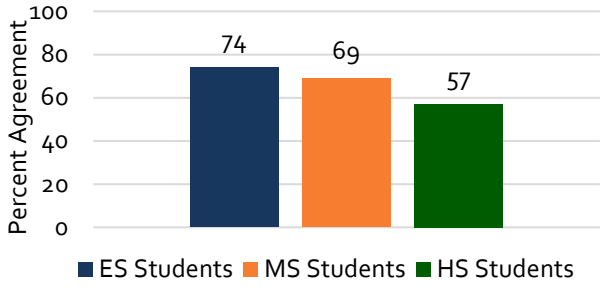


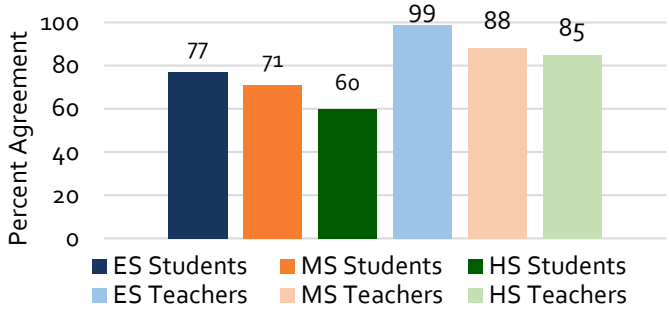
Table 34 includes the parents' and students' agreement rates from both years. The table indicates that the parental agreement rates changed more than those of the students.

Table 34: Changes in the Device Helps Students Better Understand What They Are Learning

Survey Group	2015-2016	2016-2017	Change
ES Students	80%	74%	-6%
MS Students	69%	69%	0%
HS Students	54%	57%	+3%
ES Parents	69%	79%	+10%
MS Parents	76%	70%	-6%
HS Parents	62%	69%	+7%

Next, stakeholders were asked to indicate their level of agreement that having their own device gave students greater opportunity to show their knowledge. Among both students and teachers, perceptions were more positive at the elementary school level than at the secondary level. Further, the agreement rates were higher among the teachers than among the students at all three school levels.

Figure 32: The Device Gave Students Greater Opportunity to Display Knowledge



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

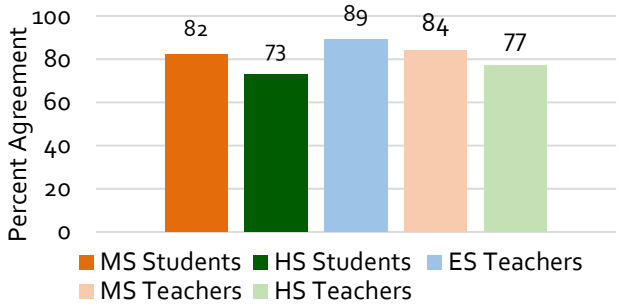
Table 35 indicates that the students' agreement rates declined from year one to year two, especially at the secondary level.

Table 35: Changes in the Device Gave Students Greater Opportunity to Display Knowledge

Survey Group	2015-2016	2016-2017	Change
ES Students	82%	77%	-5%
MS Students	84%	71%	-13%
HS Students	68%	60%	-8%
ES Teachers	99%	99%	0%
MS Teachers	90%	88%	-2%
HS Teachers	77%	85%	+8%

Stakeholders were also asked to indicate their level of agreement with a statement 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 67 percent of students and teachers agreed with the statement. Overall, 71 percent of parent respondents agreed that students created digital work and shared it with others.

Figure 33: Students Had Greater Opportunity to Create High-Quality Digital Work



Note: ES students were not asked this survey item.

Table 36 shows the changes in agreement rates among secondary students, as well as teachers and parents at all three school levels.

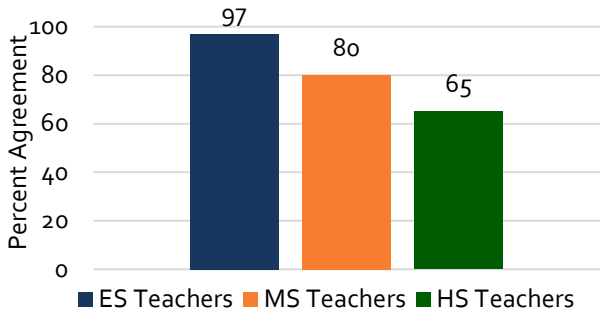
Table 36: Changes in Perceptions That Students Had Greater Opportunity to Create High-Quality Digital Work

Survey Group	2015-2016	2016-2017	Change
MS Students	86%	82%	-4%
HS Students	70%	73%	+3%
ES Teachers	94%	89%	-5%
MS Teachers	80%	84%	+4%
HS Teachers	73%	77%	+4%
ES Parents	78%	89%	+11%
MS Parents	73%	79%	+6%
HS Parents	63%	80%	+17%

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

The fifth student outcome was that students would become responsible and ethical digital citizens. Accordingly, teachers were asked to indicate their agreement with a statement that having their device helped students to use technology in responsible and ethical ways. The results in Figure 34 show that the agreement rates were very high among elementary teachers, lower among middle school teachers, and even lower among high school teachers.

Figure 34: The Device Helped Students Use Technology in Responsible and Ethical Ways



As indicated in Table 37, the agreement rates declined from the first year to the second year at all three school levels.

Table 37: Changes in the Device Helped Students Use Technology in Responsible and Ethical Ways

Survey Group	2015-2016	2016-2017	Change
ES Teachers	100%	97%	-3%
MS Teachers	97%	80%	-17%
HS Teachers	72%	65%	-7%

Overall Perceptions Related to Goals

Stakeholders were asked about the extent to which they agreed that the school had made progress toward meeting the goals of the DLAS initiative during the second year. Note that TSTs were counted as a separate group during the second year only.

As shown in Figure 35, at least 78 percent of all stakeholder groups agreed that progress had been made during 2016-2017.

Figure 35: School Made Progress Toward Meeting DLAS Goals

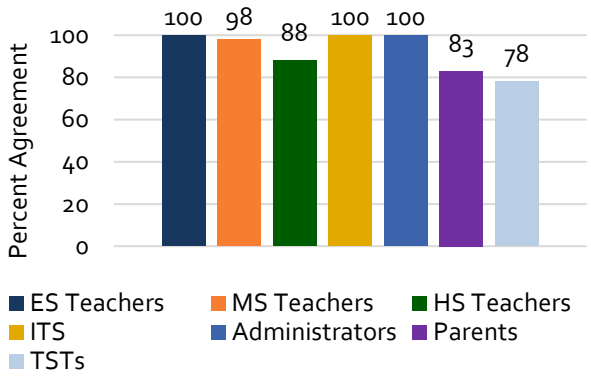


Table 38 shows that the agreement rates remained relatively stable for the groups that were surveyed in both years.

Table 38: Changes in Schools Made Progress Toward Achieving Goals and Objectives

Survey Group	2015-2016	2016-2017	Change
ES Teachers	99%	100%	+1%
MS Teachers	100%	98%	-2%
HS Teachers	89%	88%	-1%
ITSs	100%	100%	0%
Administrators	100%	100%	0%
Parents	81%	83%	+2%

Stakeholder Perceptions

This section of the report provides a summary of the general survey items that were asked of multiple stakeholder groups. Comparisons were drawn not only among stakeholder groups but also with the results of the same survey question from the 2015-2016 DLAS evaluation. The summaries address the results of the Likert-type, multiple-choice survey items, as well as the written responses to open-ended survey questions.

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 36, at least 85 percent of all staff groups agreed that they understood the outcomes, although agreement was lower for middle school teachers compared to other groups.

Figure 36: Stakeholders Understood Desired Student and Teacher Outcomes for the DLAS Initiative

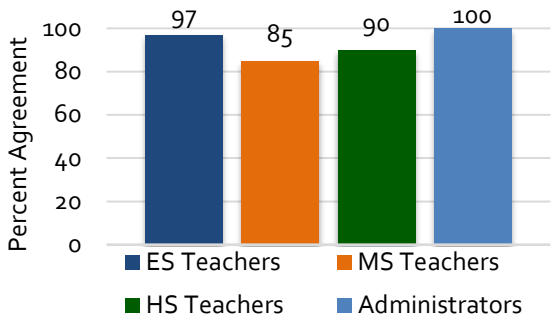


Table 39 provides a comparison of this year's and last year's results. Analysis revealed that the 12 percentage-point decline among middle school teachers was attributable to just one school. Without that school, the agreement rate for 2016-2017 was 95 percent.

Table 39: Changes in Perceptions That Stakeholders Understood Desired Student and Teacher Outcomes for the DLAS Initiative

Group	2015-2016	2016-2017	Change
ES Teachers	96%	97%	+1%
MS Teachers	97%	85%	-12%
HS Teachers	83%	90%	+7%
Administrators	100%	100%	0%

Further, although parents were not asked about their understanding of the specific student and teacher outcomes ("look fors"), 71 percent of all parent respondents in 2015-2016 and about an equal percentage (73%) in 2016-2017 agreed that they understood the general goals for digital learning.

As shown in Figure 37, high percentages of staff members (88% to 99%) agreed in 2016-2017 that the work at their school supported the outcomes identified for the DLAS initiative.

Figure 37: My Work at School Supports Outcomes Identified for DLAS Initiative

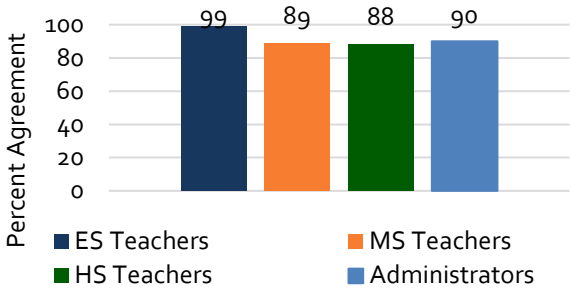


Table 40 provides a comparison of this year's and last year's results. The decline among administrators was attributable to just three individual respondents. The decline at middle school was attributable to just one school. Despite the declines, the levels of agreement remained high.

Table 40: Changes in Perceptions That Work at School Supports Outcomes Identified for DLAS Initiative

Group	2015-2016	2016-2017	Change
ES Teachers	96%	99%	+3%
MS Teachers	97%	89%	-8%
HS Teachers	89%	88%	-1%
Administrators	100%	90%	-10%

Figure 38 displays perceptions of staff members of how well the initiative was implemented. Generally, most of the respondent groups tended to concur that the initiative during 2016-2017 was carefully planned, well-organized, and successfully implemented. With only one exception, the agreement rates ranged from 74 percent to 100 percent. The one exception was that only 44 percent of the TSTs agreed that the initiative was carefully planned.

As was the case last year on all three items, the agreement rates of the elementary teachers were higher than those of the middle school teachers, which were higher than those of the high school teachers.

Figure 38: Perceptions of DLAS Initiative Implementation

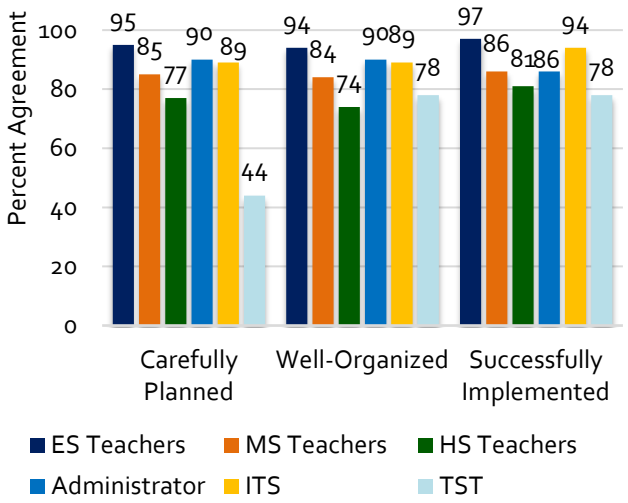


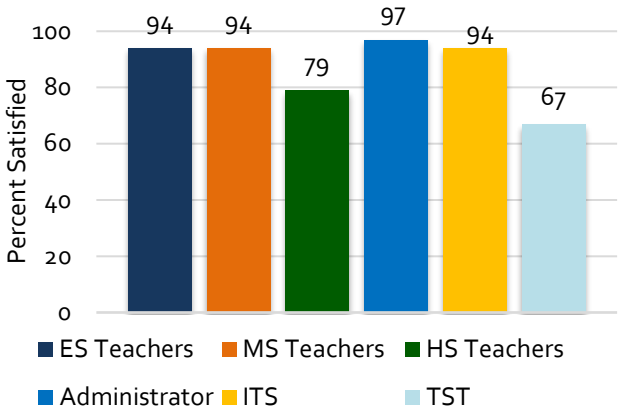
Table 41 summarizes the differences between the 2015-2016 and 2016-2017 survey results across respondent groups. Generally, significantly higher agreement rates were observed in 2016-2017 for the high school teachers, and more modest improvements were observed for the elementary teachers. The agreement rates of the middle school teacher and ITS groups declined.

Table 41: Changes in Perceptions of DLAS Initiative Implementation

Item	Group	2015-2016	2016-2017	Change
Carefully Planned	ES Teachers	89%	95%	+6%
	MS Teachers	93%	85%	-8%
	HS Teachers	61%	77%	+16%
	Administrators	100%	90%	-10%
	ITS	95%	89%	-6%
Well-Organized	ES Teachers	88%	94%	+6%
	MS Teachers	93%	84%	-9%
	HS Teachers	61%	74%	+13%
	Administrators	90%	90%	0%
	ITS	95%	89%	-6%
Successfully Implemented	ES Teachers	96%	97%	+1%
	MS Teachers	93%	86%	-7%
	HS Teachers	57%	81%	+24%
	Administrators	90%	86%	-4%
	ITS	100%	94%	-6%

Staff members were asked to rate their level of satisfaction with their digital learning experience during 2016-2017. The response pattern among the respondents remained consistent. The lowest agreement rates were observed among the TSTs (67%) and the high school teachers (79%), respectively. The remaining agreement rates ranged from 94 percent to 100 percent.

Figure 39: Staff Member Overall Satisfaction With DLAS Initiative Experience in 2016-2017



The student and parent results exhibited in Figure 40 were somewhat less variable than those of the staff results. Elementary school students were the most satisfied group while high school students were the least satisfied group among students.

Figure 40: Student and Parent Overall Satisfaction With DLAS Initiative Experience in 2016-2017

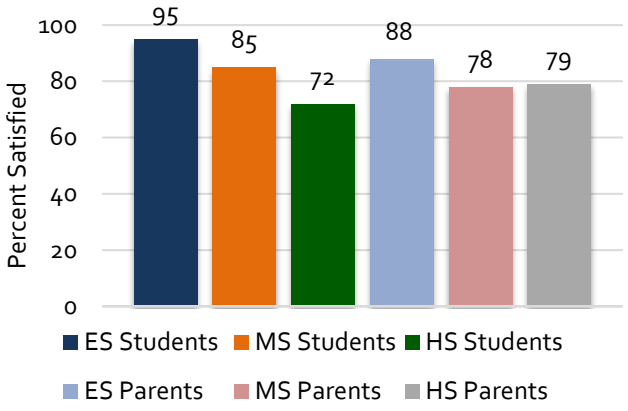


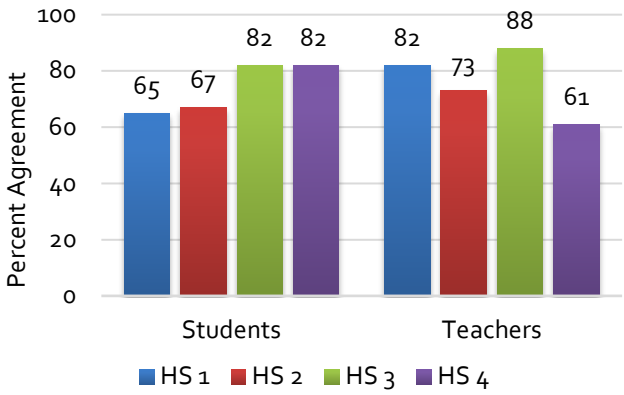
Table 42 summarizes the differences between the 2015-2016 and 2016-2017 survey results of the respondent groups. Given the respective size of each particular respondent group, the information in Table 42 indicates that the levels of overall satisfaction among staff, students, and parents remained relatively stable from the first to the second year of the initiative. The increases in overall satisfaction outnumbered the declines.

Table 42: Summary of Changes From 2016 to 2017 in Overall Satisfaction Levels

Group	2015-2016	2016-2017	Change
ES Teachers	96%	94%	-2%
MS Teachers	93%	94%	+1%
HS Teachers	70%	79%	+9%
Administrators	90%	97%	+7%
ITS	100%	94%	-6%
TST	n/a	67%	n/a
ES Students	95%	95%	0%
MS Students	84%	85%	+1%
HS Students	71%	72%	+1%
ES Parents	82%	88%	+6%
MS Parents	88%	78%	-10%
HS Parents	69%	79%	+10%

Nonetheless, analyses of the differences between individual schools within school level revealed significant variation in the levels of overall satisfaction during the initiative's second year. The variation among the four high schools, for example, is displayed in Figure 41 and Table 42.

Figure 41: Overall Satisfaction With the DLAS Initiative Experience in 2016-2017 by Individual High School



Variability in the overall satisfaction rates was less pronounced at the elementary and middle school levels, but still present.

Another item asked parents to rate their level of agreement with a statement, "Important information about the Digital Learning Anchor Schools initiative is communicated to me by the school." The agreement rates decreased notably from elementary school to high school. Less than 50 percent of the high school parents indicated that they received important DLAS-related information from their child's school.

Figure 42: Parent Perceptions That Their School Communicated Important DLAS Information

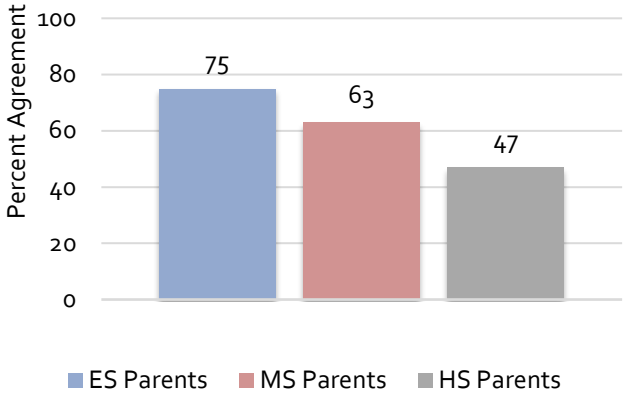


Table 43 shows that the decline from elementary school to high school was similar during the initiative's first year and that the agreement rates increased from year one to year two, especially at the middle school level.

Table 43: Changes in Parent Perceptions That Their School Communicated Important DLAS Information

Group	2015-2016	2016-2017	Change
ES Parents	71%	75%	+4%
MS Parents	50%	63%	+13%
HS Parents	45%	47%	+2%

When the parent agreement rates with respect to this item were analyzed by individual school, much more variability was found. It was found that the agreement rates ranged from a high of 90 percent at one of the elementary schools to a low of 43 percent at one of the high schools.

Further, it is important to note that when responses to several other survey items were examined by individual school, the agreement rates often varied by 30 or more percentage points even within a particular school level. For some items, the agreement rates among individual schools differed by more than 50 percentage points.

School Climate Survey Comparisons With Non-Anchor Schools

As explained previously, sets of five items were included on each form of the *School Climate Survey* in 2016-2017 completed by students, staff, and parents. Doing this enabled the perceptions of anchor schools and matched comparisons to be compared. The comparisons, it should be noted, were limited by two factors. First, because the *School Climate Survey* is administered to students and parents at grades 5, 8, and 12, two anchor schools – Diamond Springs and Newtown – were excluded from the student and parent analyses. Staff members at Diamond Springs and Newtown were among the respondents to the staff version of the survey. Second, both for the sake of brevity and to safeguard the anonymity of individual survey respondents, the responses of administrators, teachers and other support personnel were not differentiated. The remained combined and labeled "staff."

Four sets of descriptive questions drove the discussion of the *2017 School Climate Survey* results:

1. What was the pattern across each response group's survey items? If any high points, low points, or variation were worthy of note, what were they?

2. Were any patterns or differences worthy of note across school levels – elementary, middle, and high school?

3. Were any of the overall differences between the anchor and comparison schools worthy of note at a particular school level? Were any of the differences large enough to be statistically significant? If so, did any of those significant differences bear practical significance, as indicated by effect sizes?

4. Were any of the pairwise differences between an anchor and a matched comparison school statistically significant, practically significant, or otherwise worthy of note?

In the staff, parent, and student sections that follow, the four aforementioned questions were answered as thoroughly as warranted.

Staff Members

The results of School Climate Survey comparisons between anchor school and comparison school staff members are presented in tabular form in Table 44 and graphically in Figure 43. They show high (above 80%) to very high (above 90%) agreement rates on four of the five items among both the anchor and comparison schools. The one exception involved the rate of agreement with a statement that students effectively use digital tools and resources to facilitate and further their own learning. The -12 percentage point difference between the anchor high schools (73%) and the comparison high schools (85%) was not mirrored at the elementary school or middle school levels. Exactly why the anchor school agreement rate was so low remains unclear.

Additional analyses tested whether the overall differences between the anchor and comparison schools at each school level were large enough to be statistically significant on each of the five survey items. When a significant difference was found, an effect size statistic (Cohen's D) was calculated to determine if the difference held practical significance.

As indicated in the "Difference" column of Table 44, the elementary anchor schools exhibited higher agreements rates than the matched comparison elementary schools on all five items. The differences, which were all statistically significant, ranged in size from 5 to 10 percentage points. The effect sizes for these differences were all small, ranging in absolute magnitude from .21 to .36. Effect sizes of these magnitudes can be interpreted as small.[20]

At the middle school level, none of the five differences between the anchor and comparison schools was large enough to be statistically significant. Nonetheless, four of the five differences favored the anchor schools.

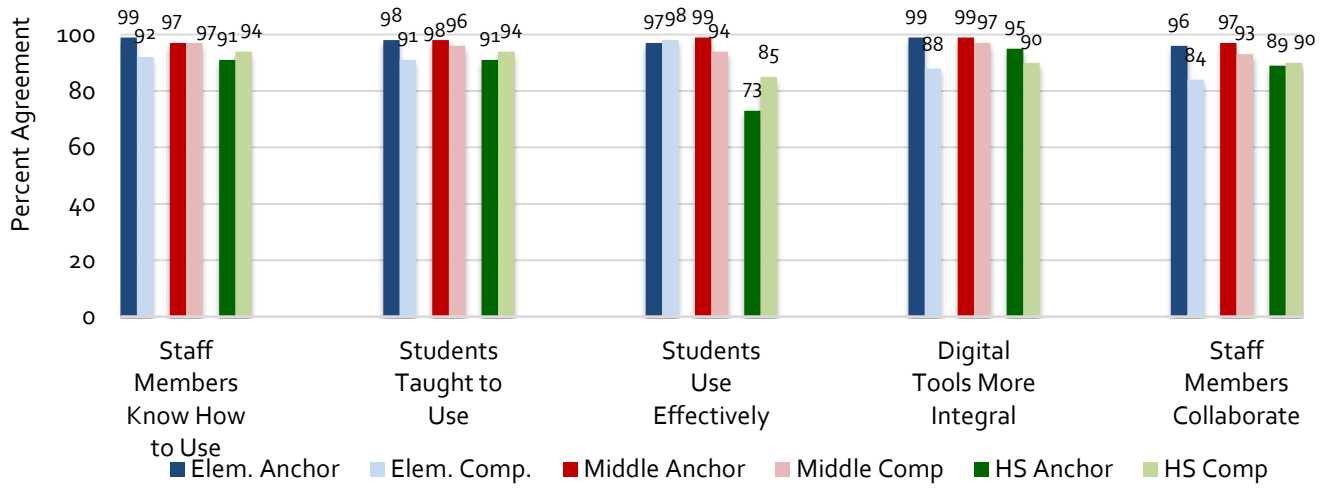
At the high school level, one of the five items exhibited a statistically meaningful difference that favored the anchor schools (effect size = +.17). The item involved agreement with a statement that digital technology, tools, and resources had become a more integral part of the teaching and learning at their school.

Table 44: DLAS and Matched Comparison Staff Agreement Rates With Five 2017 *School Climate Survey* Questions

Survey Statement	School Level	Anchor	Comparison	Difference	Effect Size**
Most staff members at my school know how to use digital tools and resources to facilitate student learning.	Elementary Middle High	99% 97% 91%	93% 97% 94%	+6%* 0% -3%	+.22
Students at my school have been taught to use digital tools and resources to facilitate their schoolwork and learning.	Elementary Middle High	98% 98% 91%	93% 96% 94%	+5%* +2% -3%	+.21
Students at my school effectively use digital tools and resources to facilitate and further their own learning.	Elementary Middle High	97% 90% 73%	89% 94% 85%	+8%* -4% -12%*	+.26 -.36
In the last year or two, digital technology, tools, and resources have become a more integral part of the teaching and learning that occurs at my school.	Elementary Middle High	99% 99% 95%	89% 97% 90%	+10%* +2% +5%*	+.32 +.17
Most staff members at my school share digital tools, content, and ideas with one another to facilitate teaching and learning.	Elementary Middle High	96% 97% 89%	86% 93% 90%	+10%* +4% -1%	+.29

* Denotes a statistically significant difference less than .05.
** Effect size benchmarks: .20 = small; .50 = moderate; .80 = large

Figure 43: DLAS and Matched Comparison Staff Agreement Rates With Five 2017 *School Climate Survey* Questions



Drilling down further, additional follow-up analyses of the *2017 School Climate Survey* staff results for the five items included significance testing between each one of the 15 anchor schools and its matched comparison school. Given five survey questions and fifteen pairs of schools across the three school levels, as many as 75 significant differences could have been detected. In actuality, 16 statistically significant differences were found. As indicated in Table 1 in Appendix B, the results from 11 of these items (61%) favored the anchor school.

Parents

The parent version of the *School Climate Survey* also included five items related to digital learning. The survey was administered to parents with a student in grades 5, 8, or 12. The results of these comparisons are presented by school level (elementary, middle, and high) in tabular form in Table 45 and graphically in Figure 44.

Perhaps most noticeably, the rates of agreement at all school levels were markedly lower on one item. The item involved a statement that students seemed to have more opportunity in the last year or two to make decisions about their own schoolwork and learning. The average agreement rate on this particular item was more than 20 percentage points lower than the average agreement rate of the other four survey items. The differences could have implications for the student agency component of transformational learning, except that the student and teacher agreement rates were found to be in the vicinity of 90 percent or higher.

Nine of the ten differences in agreement rates at the elementary school and middle school levels favored the anchor schools. The size of four differences achieved statistical significance. The first set of significant differences involved agreement with a statement that students use a laptop or other digital device to do schoolwork after school or on weekends. The effect sizes for the anchor-comparison school differences at the elementary school and middle school levels were both .25, which is considered small.

The second item involved agreement with a statement that digital technology, tools, and resources had become a more integral part of the teaching and learning at their child's school. The effect sizes for the elementary school level difference was .21 and .22 at the middle school level. The magnitude of these effect sizes are considered small.

In contrast, at the high school level, all five differences favored the comparison schools. Two of the differences were large enough to be statistically significant. The first involved the item regarding the use of laptops or other digital tools to do schoolwork at home. The other item involved agreement with a statement that teachers and other staff members use digital tools and resources to facilitate student learning. The effect sizes calculated for these differences also were small: -.19 and -.28, respectively.

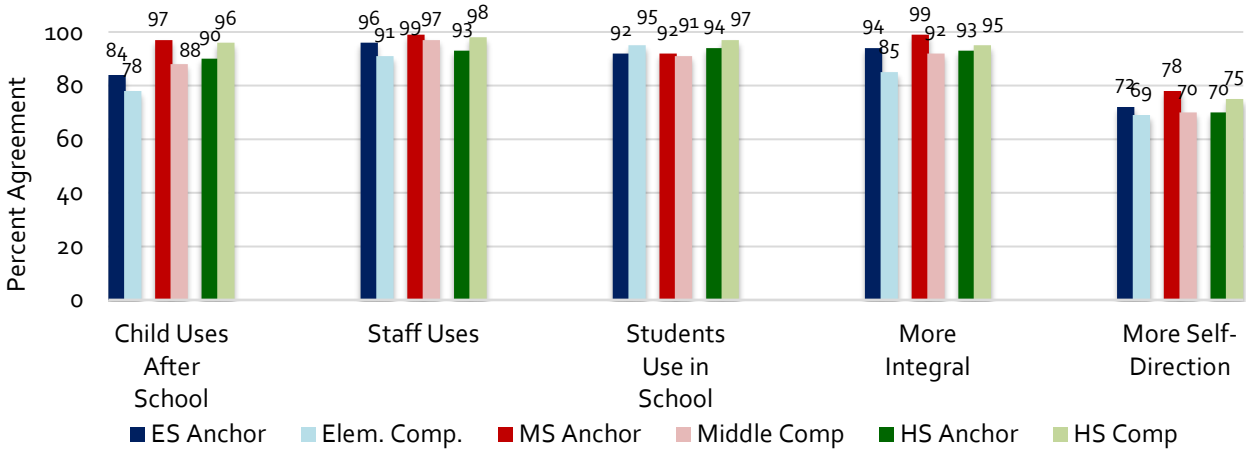
Further, of the 65 composite differences between the anchor and comparison schools at each school level (30 at elementary, 15 at middle, and 20 at high school), 8 differences were found to be statistically significant. All eight (100%) favored the anchor schools. Three of the statistically significant differences were found at two elementary schools; three were found at the middle school level, all at one pair of schools; and the final two involved just one high school level anchor school. The effect sizes are included in Appendix B in Table 2.

Table 45: DLAS and Matched Comparison Parent Agreement Rates With Five 2017 *School Climate Survey* Questions

Survey Statement	School Level	Anchor	Comparison	Difference	Effect Size
My child often uses a laptop or other digital tools and resources to do schoolwork after school or on weekends.	Elementary	85%	74%	+11%*	+.25
	Middle	97%	88%	+9%*	+.25
	High	90%	96%	-6%*	-.19
Teachers and other staff members at my child's school seem to use digital tools and resources to facilitate student learning.	Elementary	95%	94%	+1%	
	Middle	99%	97%	+2%	
	High	93%	98%	-5%*	-.28
My child and other students use digital tools and resources to facilitate and further their own learning.	Elementary	93%	93%	0%	
	Middle	92%	91%	+1%	
	High	94%	97%	-3%	
In the last year or two, digital technology, tools, and resources have become a more integral part of the teaching and learning that occurs at my child's school.	Elementary	97%	91%	+6%*	+.21
	Middle	99%	92%	+7%*	+.22
	High	93%	95%	-2%	
In the last year or two, my child and other students seem to have more opportunity to make decisions about their own schoolwork and learning.	Elementary	72%	69%	+3%	
	Middle	78%	70%	+8%	
	High	70%	75%	-5%	

* Denotes a statistically significant difference.

Figure 44: DLAS and Matched Comparison Parent Agreement Rates With Five 2017 *School Climate Survey* Questions



Students

The student version of the *2017 School Climate Survey* also included five items related to digital learning. Mirroring the parent version of the survey, they were administered to elementary students in grade 5, to middle school students in grade 8, and to high school students in grade 12. The results of the comparisons between anchor and comparison school students are presented in tabular form in Table 46 and graphically in Figure 45.

Most noticeably, the student agreement rates tended to be lower than those of the staff and parents. While most of the staff and parent agreement rates were above the 85 percent mark at all three levels (28 of 30 among the staff and 22 of 30 among the parents), only 10 of the 30 student agreement rates exceeded the 85 percent mark.

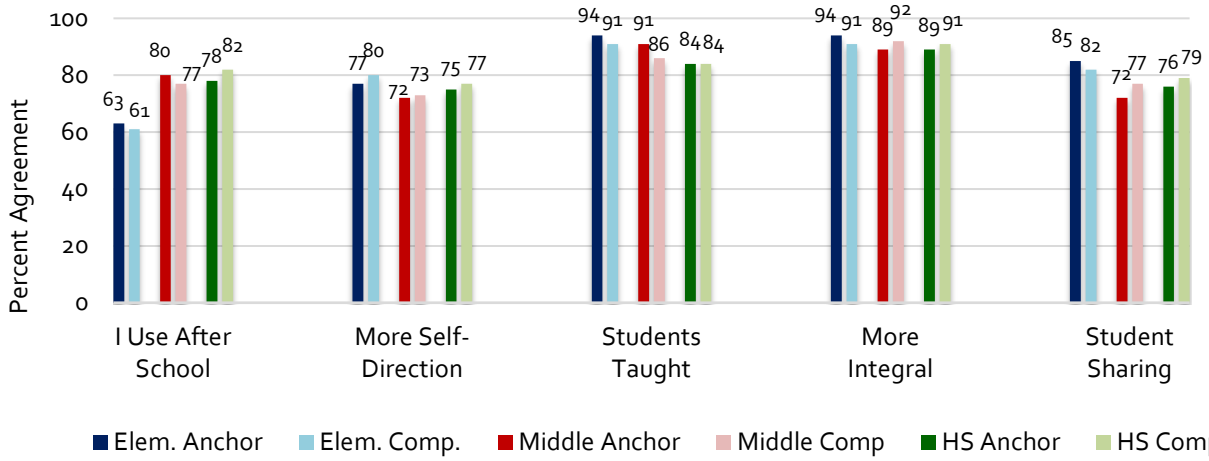
Across the three school levels, the highest agreement rates among the anchor school students were associated with the statement that digital technology, tools, and resources had become a more integral part of teaching and learning. The lowest agreement rates involved using the laptop or other digital device to do school at night or on weekends. This can be at least partly attributed to the low agreement rate among elementary students stemming from the differing policies at different schools regarding whether the devices were allowed to be brought home.

Of interest is the fact that the pattern of agreement rates at the anchor schools were mirrored at the matched comparison schools. That is, when an agreement rate was relatively low or relatively high among the students at the elementary anchor schools, for example, the agreement rate was also low at the corresponding comparison schools. Thus, as indicated in the two columns of Table 46 farthest to the right, only three of the differences between the anchor and comparison schools were statistically significant. Two involved the agreement rates among middle school respondents, and the third involved the high school agreement rate. The only one of the three significant differences that favored the anchor schools involved agreement with a statement that students have been taught to use digital tools and resources to facilitate their own learning.

Table 46: DLAS and Matched Comparison Student Agreement Rates With Five 2017 *School Climate Survey* Questions

Statement	School Level	Anchor	Comparison	Difference	Effect Size
I often use a laptop or other digital tool to do schoolwork at night or on weekends.	Elementary	63%	61%	+2%	
	Middle	80%	77%	+3%	
	High	78%	82%	-4%*	-.08
In the last year or two, I have had more opportunity to make decisions about my own schoolwork and learning.	Elementary	77%	80%	-3%	
	Middle	72%	73%	-1%	
	High	75%	77%	-2%	
Students at my school have been taught to use digital tools and resources to facilitate their schoolwork and learning.	Elementary	94%	91%	+3%	
	Middle	91%	86%	+5%*	+.12
	High	84%	84%	0%	
In the last year or two, digital technology, tools, and resources have become a more integral part of the teaching and learning that occurs at my school.	Elementary	94%	91%	+3%	
	Middle	89%	92%	-3%	
	High	89%	91%	-2%	
My classmates and I share digital tools, content, and ideas with one another to facilitate our learning.	Elementary	85%	82%	+3%	
	Middle	72%	77%	-5%*	-.12
	High	76%	79%	-3%	

Figure 45: DLAS and Matched Comparison Student Agreement Rates With Five 2017 *School Climate Survey* Questions



With respect to the anchor-vs-comparison school pairwise comparisons across the staff, parent, and student groups, a total of 45 school-level differences were computed. Of these, 18 differences (40%) were found to be statistically significant – 8 at the elementary school level, 4 at the middle school level, and 6 at the high school level. Of these, 11 (about 61%) favored the anchor schools. The results of these pairwise analyses are summarized in Table 3 of Appendix B.

Summary of School Climate Survey Analyses

Table 47 provides a summary of the statistically significant results from the five digital learning items included on each version of the *2017 School Climate Survey*. A brief summary of the pairwise differences between each anchor school and its matched comparison school follows the table.

Table 47: Summary of 2017 *School Climate Survey* Statistically Significant Results by Individual Item

Statement	Groups	Finding
Most staff members at my school know how to use digital tools and resources to facilitate student learning.	Staff	A statistically significant difference of 6 percentage points favored the elementary anchor schools.
Students at my school effectively use digital tools and resources to facilitate and further their own learning.	Staff	Statistically significant differences favored the anchor schools at the elementary level (+8%) but favored the comparison schools at the high school level (-12%).
In the last year or two, digital technology, tools, and resources have become a more integral part of the teaching and learning that occurs at my school.	Staff, Parents, Students	Two statistically significant differences among elementary and high school teachers (+10% and +5%, respectively) and among elementary (+6%) and middle school parents (+7%) favored the anchor schools. No statistically significant differences among students were found at any level.
Most staff members at my school share digital tools, content, and ideas with one another to facilitate teaching and learning.	Staff	A statistically significant difference of 10 percentage points at the elementary level favored the anchor schools.
Students often use a laptop or other digital tool to do schoolwork at night or on weekends.	Parents, Students	Three small but statistically significant differences were found among parents. The elementary and middle school differences favored the anchor schools (+11% and +9%, respectively). At the high school level, the 6 percentage-point difference favored the matched comparison schools, as did a small but statistically significant difference (-4%) among high school students.
In the last year or two, I have had more opportunity to make decisions about my own schoolwork and learning.	Parents, Students	No statistically significant differences between the anchor and comparison schools were found at any school level.
Students at my school have been taught to use digital tools and resources to facilitate their schoolwork and learning.	Staff, Students	Statistically significant differences favored the anchor schools among elementary teachers (+5%) and middle school students (+5%).
Teachers and other staff members at my child's school seem to use digital tools and resources to facilitate student learning.	Parents	A small but statistically significant difference of 5 percentage points at the high school level favored the comparison schools.
My classmates and I share digital tools, content, and ideas with one another to facilitate our learning.	Students	At the middle school level, a statistically significant difference of 5 percentage points favored the comparison schools.

The pairwise comparisons yielded no clear, consistent, or compelling overall conclusions regarding the effects of the digital learning initiative in relation to the matched comparison schools. Nonetheless, the following findings are worthy of note:

- The greatest number of statistically significant differences between the anchor and comparison schools was associated with the student version of the *School Climate Survey*, where 18 of 65 differences (28%) were statistically significant. Of the 18 differences, 11 (61%) favored the anchor schools.

- The staff survey yielded the second greatest number of significant differences – 16 of 75 (21%). Of the 16 differences, 12 (75%) favored the anchor schools.

- The smallest number of significant differences – 8 of 65 (12%) – was yielded by the parent survey. The parent survey yielded only eight statistically significant differences, but all (100%) favored the anchor schools.

- Elementary agreement rates tended to be higher than the secondary level agreement rates on most items, while the agreement rates at middle school and high school varied by school level and respondent group.

Greatest Challenge

In both years, teachers were posed an open-ended survey item that asked, "What were the greatest challenges that you faced in using the digital tools to maximize student learning in your classroom?" The coding of the 2016-2017 responses proceeded in two phases. Initially, nine separate categories were identified across all school levels, making fine-grained distinctions between what teachers perceived as the "greatest challenge" that they faced in using digital tools to maximize student learning in their classrooms. As Table 48 displays, the most often cited challenges at the elementary school level involved lack of time for staff learning and planning, as well as lack of effective training (23%); issues related to network connectivity or speed, as well as issues related to websites and applications (20%); and devices that were broken or uncharged (17%). At the middle school level, the most frequently cited challenges included students being off-task or unmotivated (41%) and broken or uncharged devices (17%); and at the high school level, the greatest challenge cited most frequently involved students not bringing their devices back to school (24%), students being off-task or unmotivated (22%); and devices being broken or uncharged (18%).

Table 48: Teachers' Perceptions of "Greatest Challenge" by School Level

Challenge	Description – The challenge involves issues related to…	ES	MS	HS
1	Network connectivity or speed; websites; apps.	20%	9%	14%
2	Devices that are broken, uncharged, etc.	17%	17%	18%
3	Students not bringing devices back to school	3%	5%	24%
4	Students being off-task, unmotivated, etc.	11%	41%	22%
5	Lack of time for staff learning and planning; lack of effective training	23%	15%	9%
6	Low-quality website or app design… or lack of compatibility	6%	5%	4%
7	Grade-level availability of devices – esp. in mixed classes	0%	0%	3%
8	Personalization or lack of student readiness or preparedness	16%	8%	6%
9	Lack of prompt or effective technical or instructional support	3%	0%	0%

To facilitate easier comparison and interpretation across individual schools, the nine categories were recoded into just the three categories displayed in Figure 45.

Figure 46: Summary of Open-Ended Responses Regarding "Greatest Challenges" Among the Teachers at Three Middle Schools

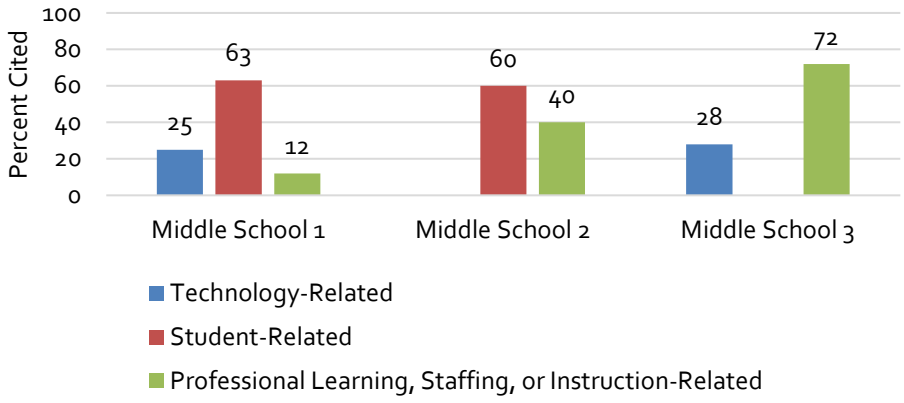


Figure 45, which uses the three middle schools as an example, shows first that the pattern of greatest challenges differed notably by the individual school. For instance, student-related issues were most commonly cited by the teachers at two of the three middle schools but not mentioned at all at the third middle school. Similarly, the percentage of teachers who cited issues related to professional learning, management, staffing, or instruction ranged from 12 percent at the first middle school, to 40 percent at the second middle school, and to 72 percent at the third middle school. Although not shown here, similar findings were found among the schools within the elementary school level and within the high school level.

In short, analysis of the "greatest challenge" open-ended item clearly demonstrated both the variability of the anchor school cultures and the differences in how the initiative was implemented at different schools, not only across school levels but within them, as well. Not only for the "greatest challenge" item but also for many of the open-ended and Likert-type items, comparable levels of variability across school levels and individual schools were found.

Numbers alone do not adequately describe the nature or the intensity of each challenge. So, what follows are some of the more common and/or thought-provoking responses to the question, "What were the greatest challenges that you faced in using the digital tools to maximize student learning in your classroom?"

- *"Students who did not bring their devices to school. Parents who did not want their child to have a school computer because they did not want to be responsible for it… As a teacher, I had to come up with a computer for the students and/or plan alternative assignments."*
- *"Intermittent wireless connections and students devices that do not turn on even when charged overnight. Several students also consistently leave their devices and chargers at home, as well as lose their chargers, although they have been repeatedly admonished to bring their devices and chargers to school daily."*
- *"Technology in the classroom not working properly and major delays in fixing it; and the problem persisting even when fixed."*
- *"When the bandwidth isn't big enough to handle all the devices in the building. Also, when your lesson plan is tech driven and the tech doesn't work or when too few students brought their devise to school that day."*
- *"All of the above. The devices were unreliable, students didn't bring them as a result, and they did bring them, it was obvious that they use them more for gaming, streaming music, and watching videos."*
- *"The devices were not ready for students at the beginning of the school year, so we were not able to start off with them and set the tone for what would be expected. Students did not get the devices until the end of October/early November."*
- *"Challenges involved lack of technical support. In order to service all the students and teachers, the school needs to have more personnel to support the need."*
- *"The biggest challenge was finding the time to learn about and explore all the different applications and websites."*
- *"One of my biggest challenges was always having to reinvent the wheel for assignments that are technology based."*
- *"Each grade level having different platforms."*
- *"The greatest challenge lies in the irresponsibility and immaturity of the students."*
- *"The biggest challenge is students plagiarizing rather than analyzing and applying new info."*
- *"I don't have enough time to figure out how to utilize the software I am learning about. It's quicker and easier to run off a worksheet."*
- *"It is challenging when we have good hardware, like Smart Boards, but we do not have good software to go with it. Or vice versa, when we discover a good application that is not compatible with the devices we have."*
- *"My greatest challenge was accepting that personalized learning is not just about using the devices to have different students work on the SAME task at their own pace. More importantly, it's about letting students work individually or in pairs or small groups on entirely DIFFERENT tasks."*

Recommendations to Other Schools Included in Responses to Open-Ended Survey Items

Building administrators, ITSs, TSTs, and teachers were asked to provide recommendations to other schools for when they begin to implement digital learning. This was the same open-ended survey item posed in 2015-2016 to staff members. Each group's responses were examined separately by school level - elementary, middle, and high. While some of the same common

themes emerged across groups and school levels in 2016-2017 as in the previous year, new ones also emerged. This section provides summaries of the most common and/or thought-provoking themes, as well as representative comments, arranged by stakeholder group. Direct comments from stakeholders are included in quotes and italicized while paraphrasing of multiple comments by the first author are not.

Building Administrators

- *"Take it slow but constant. The principal drives the bus and must both set priorities and model the use of new tools. When a new school comes on board, the digital effort MUST be a priority. Focus on professional learning and growth."*
- *"Teachers could really use time to play…experiment…and learn before full implementation."*
- *"Have a good technical support team."*
- *"Clear communication of the vision. Collaboration with the ITS. Collaborative goal setting. Regular PLP. Regular follow-up through observations, PLCs, etc."*
- *ITSs*
- *"Train students and staff BEFORE giving them a variety of devices with high performance expectations. Trying to catch up on pedagogy after flooding the school with devices is not effective for students' learning and successful implementation."*
- *"More training for teachers, not just on using the devices but on creating lessons and finding appropriate content."*
- *"Start with the Personalized Learning aspect and then talk about how the Technology supports that."*
- *"Make the devices all the same. Give teachers more training ahead of time."*

TSTs

- *"Same model of device for all grade levels. If we are going to be a GAFE (Google Apps For Education), then have a device geared more towards that then Microsoft…i.e., Chromebooks."*
- *"Develop/implement guidelines for distribution, accountability, and use that supersede site based management. Administrators are making policy on the fly and not being consistent with each other. Investigate some form of device protection plan/insurance for the parents… Find some method to GPS-locate missing devices. Scrap Content Keeper."*
- *"Decide on a more unified way to do things. I understand that there is a certain amount of 'site based management' and 'what works for us.' But, by and large, schools should not be having to invent their own wheels on some of these things."*
- *"Work on communication. We TSTs often feel that we learn things via 'I heard from someone who heard from someone that maybe…' There has not been a lot of concrete information for us until it has come to crunch time. And we are almost always left in the dark about the reasons."*
- *"Keep the most used parts from the most common damages/repairs in STOCK. It is silly to continually wait for parts to come in for a LCD power port. If these things keep breaking and you keep seeing tickets for them every day…order the parts and keep ordering them…or buy better laptops that don't have defective/cheap components that break when you plug hem in or turn them on."*

Teachers

- *"Take it step by step. It seems overwhelming at first. But once you get a system for managing each device, the kids really do benefit from this technology."*
- *"Start slow, focus on one tool at a time. Get comfortable with that, then move on. Don't get overwhelmed with all that is out there. Spend spare time playing with new things."*
- *"Some teachers may need more intensive training than others."*
- *"Get to know your ITS and TST."*
- *"Prepare ahead of time, ask many questions, learn from your mistakes, and always be a month ahead when it comes to planning when looking at your fastest kids. Personalized learning means kids at different places academically at different times. Be ready for that."*
- *"Set up a discipline system to deal with students who forget their computers or do not charge them… It is difficult to embrace technology based lessons when you cannot count on the students actually having their devices in the classroom that day."*
- *"Establish your expectations for device management and a backup plan for when the internet or device is not working."*

Additional Cost

The final evaluation question addressed the additional costs of the DLAS initiative to the school division through the 2016-2017 school year. These involved one-time expenses (e.g., devices) and recurring expenditures from the 2016-2017 fiscal year 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) reversion 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 48 displays the various cost categories for implementing the initiative at the anchor schools. As shown, VBCPS expenditures for the DLAS initiative during 2016-2017 totaled approximately $1.7 million, much of which came from local operating funds and EOY reversion funds.

The largest cost was for hardware, which included the various digital devices and related equipment ($1,384,016.13). The hardware category accounted for 83 percent of the $1.7 million total expenditure. Replacement costs were not delineated because the initiative remained in its early stages, and devices are generally under warranty and have not reached the end of their useful life.

An estimate of the per student expenditure for hardware was obtained by dividing the year-two expenditure by the total number of students at the four schools added during the initiative's second year (4,780 students). The estimated cost was approximately $288 per student. This was a high-end estimate, given that some of the $1.4 million hardware expenditure was spent on devices for expansion at some of the original year-one schools, as well. Nonetheless, for purposes of comparative context, Houston (TX) Independent School District spent approximately $260 per student during the first phase of its successful 1:1 rollout for 11 schools.[21]

To provide additional context, a 2013 report by Project Red - an initiative to bring technology into classrooms that conducted a research study of more than 1,000 schools – the cost of implementing a 1:1 program can range from $100 to $400 per student per year. Its 2017 update raised the upper end of the estimated cost to $493 per student.[22]

While Table 48 indicated that an additional $19,539 of grant funds was spent on professional learning related to the initiative, the actual investment in professional learning would have been greater if at least some of the expenses of the ITS and TST positions were included. The ITS at each participating school worked with the participating teachers and provided site-based professional learning throughout the year. The TST at each school provided first-level troubleshooting and resolution of technology-related problems. However, because the ITS and TST positions were created for the purpose of providing instructional and technical support for technology integration in all schools and were not specifically created for the DLAS initiative, the costs of those positions were not included as *additional* costs for the 1:1 initiative.

Providing funding or mechanisms for professional learning is a key consideration for digital learning initiatives. Research that led to the creation of a 1:1 implementation model by Project RED[23] indicated that successful digital learning initiatives allocate 10.6 percent of their total budget to professional learning.

Table 49: Additional DLAS Costs Through 2016-2017

Category	Item	Cost	Type and Source of Cost (Initial Start-Up vs. Recurring; CIP, Operating, EOY, or Grant)
Hardware	Devices	$1,204,140.00	One Time (Operating and Reversion)
	Hardware (Additional Outlets, Power Strips, Generators, and Device Cases)	$179,876.13	One Time (Operating and Reversion)
Network	Internet Access		
	Network Infrastructure		
	Servers, Routers, Firewall, and Related Network Software		
	Maintenance and Support		
Tech Support Personnel	Technical Consulting	$25,050.00	Recurring (Operating)
	Personnel Hired Specifically for DLAS Initiative		
Instructional Resources	Educational Software/Licenses, Warranty, and Chrome OS Licensing	$223,924.00	One Time (Operating)
	Other DLAS Instructional Resources	None reported	N/A
Professional Learning	Professional Conferences with Travel and Accommodations	$19,539.17	One Time (Grant)
	Professional Organization Dues and Publications	$2,000.00	Recurring (Operating)
Community Relations	Meeting and Showcase Support	$6,859.47	One Time (Operating)
TOTALS	One Time Recurring Grants **Total Expenditures** **Total VBCPS Expenditures**	$1,614,799.60 $27,050.00 $19,539.17 **$1,661,388.77** **$1,641,849.60**	

Recommendations and Rationale

Recommendation #1: Continue the Digital Learning Anchor Schools Initiative with modifications. *(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 served as learning laboratories to prepare for the future expansion of the 1:1 digital learning initiative beyond 2016-2017.

Recommendation #2: Continue to work toward funding at least one full-time ITS at each school and review TST allocations to support the 1:1 digital learning initiative as it expands to all schools. *(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. Among elementary teachers, 79 percent agreed that the ITS was available when needed, and 83 percent agreed that the ITS provided useful instructional resources and strategies. At two elementary schools, the agreement rates were below 55 percent for whether the ITS was available when needed. Meanwhile, when asked if their school's digital devices had been unable to do what the teachers and/or students had wanted them to do, 60 percent of teachers and 68 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 responsibility of the TST rather than the ITS. However, the year-two survey respondents echoed the comment of the respondent who wrote during year one that the biggest problem is "insufficient technical support…One TST is not sufficient to maintain all of the devices in our building." Further, although notable improvement was found, nearly 20 percent of high school teachers indicated that their TST was not available when needed and that technical problems were not resolved effectively or in a timely manner. Although the problems related to ITS allocations and TST-to-device ratio diminished between year one and year two, they have not yet been eliminated. Therefore, it again is recommended that at least one full-time ITS be available at each school to support the DLAS initiative so that the instructional technology needs of each classroom are addressed in a timely manner. While each school currently has one full-time TST, these allocations need to be reviewed as the initiative progresses to determine if they are sufficient to support schools' technical needs.

Recommendation #3: Provide professional learning, especially for high school staff, so that staff will have as much time as possible to plan in informed and effective ways. *(Responsible Group: Department of Teaching and Learning)*

Rationale: Teachers continued to express a desire and a need for extensive and continuous professional learning to focus on the instructional components of transformational learning rather than focusing on how to operate a device or being cursorily introduced to an overwhelming number of websites and applications. Although professional learning was seen as beneficial at the elementary and middle school levels, the need for professional learning was most pronounced at the high school level, where the agreement rates on all 12 survey items related to professional learning were notably lower than those at the elementary and middle school levels. The high school agreement levels ranged from 67 percent to 78 percent. The comments from several administrators in response to open-ended items regarding how the initiative has changed the teaching and learning in their school emphasized that the

professional learning should be provided within a broader context of the instructional reform associated with *Compass to 2020*.

Recommendation #4: Continue 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. In addition, policies regarding device usage at home may need clarification to ensure that students and their families understand their financial liability for devices that are damaged or lost at home or in transit after school or on weekends. For the goals of the initiative and *Compass to 2020* to be achieved, all of the initiative's technical components – hardware, software, network, connectivity, and bandwidth – must be first-rate, promptly and properly maintained, and usage policies designed and implemented in a manner that supports the basic tenets of personalized devices to facilitate transformational learning.

Recommendation #5: Conduct an evaluation update during the 2019-2020 school year to monitor the continued progress of the 1:1 initiative and its continuing alignment with evidence-based best practices. *(Responsible Group: Department of Planning, Innovation, and Accountability)*

Rationale: Although the anchor schools have shifted their focus to other facets of digital learning (e.g., the Schoology Learning Management System), a developmental evaluation update is recommended for the 2019-2020 school year to monitor the 1:1 initiative's progress as it expands by high school feeder pattern. Perception data from staff and students would be collected and analyzed to compare with data from this evaluation in order to document continued progress and improvements. Student performance data relevant to academic and behavioral outcomes would also be collected and analyzed. Attention would focus not only on the technology – that is, the devices, infrastructure, and the instructional websites – but also on how much and how well the technology is being used to support the transformational learning dispositions. By using a common hashtag across schools, examples of integrated instruction could be collected and rated with the SAMR or a similar rubric, as was done for the year-one evaluation. The need for ongoing progress monitoring is evidenced by the Digital Learning Leadership Team Alignment Study, which found that the initiative's implementation of eight general components were only "Somewhat Aligned" with research-based best practices. The rationale for an evaluation update reflects the ongoing need to guide the 1:1 initiative's implementation beyond the anchors schools.

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 learning 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

Appendix A: Teacher and Student Outcomes With Look Fors (continued)

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, and 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: Anchor and Matched Schools Comparisons of Staff Agreement Rates on the Five DLAS-Related 2017 Climate Survey Items

Key

Item	Statement
1st	Most staff members at my school know how to use digital tools and resources to facilitate student learning.
2nd	Students at my school have been taught to use digital tools and resources to facilitate their schoolwork and learning.
3rd	Students at my school effectively use digital tools and resources to facilitate and further their own learning.
4th	In the last year or two, digital technology, tools, and resources have become a more integral part of the teaching and learning that occurs at my school.
5th	Most staff members at my school share digital tools, content, and ideas with one another to facilitate teaching and learning.

Table 1: DLAS and Match Comparison Staff Agreement Rate Differences With Effect Sizes on Five School Climate Survey Questions

Paired Schools	Number of Significant Differences	Description*	Agreement Rate Difference (Percentage Points)	Effect Size**
Diamond Springs and College Park (K-1)	0***			
Kingston and Red Mill	2	4A 5A	+14 +14	+.39 +.39
Newtown and College Park (2-3)	2	4C 5C	-17 -21	-.44 -.50
Rosemont and Green Run	0			
Strawbridge and Three Oaks	0			
Tallwood and Glenwood	5	1A 2A 3A 4A 5A	+18 +17 +20 +27 +27	+.47 +.43 +.46 +.61 +.61
Thoroughgood and John B. Dey	1	5A	+24	+.55
Williams and College Park (4-5)	0			
Corporate Landing and Independence	1	3C	-12	-.64
Great Neck and Princess Anne	1	2A	+7	+.42
Larkspur and Brandon	0			
Bayside and All Other Non-DLAS High Schools	0			
Green Run and All Other Non-DLAS High Schools	1	3C	-19	-.53
Kellam and All Other Non-DLAS High Schools	1	4A	+8	+.25
Kempsville and All Other Non-DLAS High Schools	2	3C 4A	-14 +5	-.41 +.18

* In this column, the number refers to the Climate Survey question (see Key above). Meanwhile, an "A" indicates that the agreement rate was significantly higher for the anchor school while a "C" indicates that the agreement rate was significantly higher for the comparison school.
** Value of Cohen's D, computed as difference in agreement rate between the anchor and matched school comparison divided by the standard deviation of the comparison school's distribution.
*** If the number of significant differences between an anchor and comparison pair was zero, the row contains no other information

Table 2: DLAS and Match Comparison Parent Agreement Rate Differences With Effect Sizes on Five 2017 School Climate Survey Questions

Paired Schools	Number of Significant Differences	Description*	Agreement Rate Difference (Percentage Points)	Effect Size**
Diamond Springs and College Park (K-1)	0			
Kingston and Red Mill	0			
Newtown and College Park (2-3)	0			
Rosemont and Green Run	0			
Strawbridge and Three Oaks	1	1A	+24	+.53
Tallwood and Glenwood	2	2A 4A	+17 +29	+.44 +.63
Thoroughgood and John B. Dey	0			
Williams and College Park (4-5)	0			
Corporate Landing and Independence	3	1A 4A 5A	+9 +8 +18	+.32 +.29 +.40
Great Neck and Princess Anne	0			
Larkspur and Brandon	0			
Bayside and All Other Non-DLAS High Schools	0			
Green Run and All Other Non-DLAS High Schools	0			
Kellam and All Other Non-DLAS High Schools	2	1A 4A	+11 +4	+.31 +.16
Kempsville and All Other Non-DLAS High Schools	0			

* In this column, the number refers to the Climate Survey question (see Key above). Meanwhile, an "A" indicates that the agreement rate was significantly higher for the anchor school while a "C" indicates that the agreement rate was significantly higher for the comparison school.
** Value of Cohen's D, computed as difference in agreement rates between the anchor and matched school comparison divided by the standard deviation of the comparison school's distribution.
*** If the number of significant differences between an anchor and comparison pair was zero, the row contains no other information

Table 3: DLAS and Match Comparison Student Agreement Rate Differences With Effect Sizes on Five 2017 School Climate Survey Questions

Paired Schools	Number of Significant Differences	Description*	Agreement Rate Difference (Percentage Points)	Effect Size**
Diamond Springs and College Park (K-1)	n/a			
Kingston and Red Mill	2	1C 2C	-27 -16	-.54 -.41
Newtown and College Park (2-3)	n/a			
Rosemont and Green Run	2	1A 5A	+21 +36	+.44 .+72
Strawbridge and Three Oaks	0			
Tallwood and Glenwood	3	1A 3A 4A	+34 +14 +11	+.68 +.36 +.30
Thoroughgood and John B. Dey	1	4A	+5	+.22
Williams and College Park (4-5)	0			
Corporate Landing and Independence	1	3A	+6	+.14
Great Neck and Princess Anne	2	1A 3A	+7 7+	+.19 +.23
Larkspur and Brandon	1	5C	-11	-.25
Bayside and All Other Non-DLAS High Schools	0			
Green Run and All Other Non-DLAS High Schools	0			
Kellam and All Other Non-DLAS High Schools	2	1A 5A	+6 7+	+.14 +.17
Kempsville and All Other Non-DLAS High Schools	4	1C 2C 4C 5C	-22 -15 -8 -20	-.57 -.36 -.27 -.49

* In this column, the number refers to the Climate Survey question (see Key above). Meanwhile, an "A" indicates that the agreement rate was significantly higher for the anchor school while a "C" indicates that the agreement rate was significantly higher for the comparison school.
** Value of Cohen's D, computed as difference in agreement rates between the anchor and matched school comparison divided by the standard deviation of the comparison school's distribution.
*** If the number of significant differences between an anchor and comparison pair was zero, the row contains no other information

Endnotes

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

[2] Source: https://www.vbcps.com/depts/CI/Framework/Documents/Transformational%20Learning%20White%20Paper.pdf#search=Transformational%20Learning

[3] 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.

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

[5] Sung, Y.-T., K.-E. Chang, and T.-C. Liu. "The Effects of Integrating Mobile Devices with Teaching and Learning on Students' Learning Performance: A Meta-Analysis and Research Synthesis." Computers & Education, 95, March 2016.

[6] Bebell, D. and L.M. O'Dwyer. "Educational Outcomes and Research from 1:1 Computing Settings." Journal of Technology, Learning, and Assessment, 9:1, January 2010. p. 10. http://files.eric.ed.gov/fulltext/EJ873675.pdf.

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

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

[9] Cashwell, Banicky, and Gorham (2017). "The Journey to Transformational Learning in Virginia Beach City Public Schools." Virginia Beach, Virginia: Virginia Beach City Public Schools. https://www.vbcps.com/depts/CI/20162017%20Citywide%20Principal%20Meetings/February%20Session/Transformational%20Learning/Transformational%20Learning%20in%20VBCPS.pdf#search=transformational%20learning

[10] Source: Cashwell, Banicky, and Gorham (2017). "The Journey to Transformational Learning in Virginia Beach City Public Schools." Virginia Beach, Virginia: Virginia Beach City Public Schools. https://www.vbcps.com/depts/CI/20162017%20Citywide%20Principal%20Meetings/February%20Session/Transformational%20Learning/Transformational%20Learning%20in%20VBCPS.pdf#search=transformational%20learning

[11] 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.

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

[13] Higgins, Xiao, and Katsipataki (2012). The Impact of Digital Technology on Learning: A Meta-analysis Conducted for the Education Endowment Foundation. School of Education, Durham University. Durham, United Kingdom.

[14] Popham, W. J. (2010a). Instructional sensitivity. In W. J. Popham (Ed.), Everything school leaders need to know about assessment. Thousand Oaks, CA: Sage.

[15] Program Manager's explanation as provided in the DLAS Year 2 Actions on Year 1 Recommendations questionnaire.

[16] Memorandum from Department of Teaching and Learning and Department of Technology to Principals. Subject: Device Expansion. Virginia Beach City Public Schools. May 25, 2017.

[17] W. Johnsen, personal communication, October 18, 2017.

[18] Cashwell, Banicky, and Gorham (2017). The Journey to Transformational Learning in Virginia Beach City Public Schools, p.9 Virginia Beach, Virginia: Virginia Beach City Public Schools.

[19] 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.

[20] Source: http://soltreemrls3.s3-website-us-west-2.amazonaws.com/marzanoresearch.com/media/documents/pdf/AppendixB_DTLGO.pdf

[21] Source: http://blogs.edweek.org/edweek/DigitalEducation/2014/01/houston_launches_ambitious.html .

[22] Finance Brief – Project Red. Retrieved from http://one-to-oneinstitute.org/images/remository/Finance_Brief.pdf.

[23] 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

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

Notice of Non-Discrimination Policy

Virginia Beach City Public Schools does not discriminate on the basis of race, color, religion, national origin, sex, sexual orientation/gender identity, pregnancy, childbirth or related medical condition, disability, marital status, age, genetic information or veteran status in its programs and activities and provides equal access to the Boy Scouts and other designated youth groups. School Board policies and regulations (including, but not limited to, Policies 2-33, 4-4, 4-6, 4-43, 5-7, 5-19, 5-20, 5-44, 6-7, 7-48, 7-49, 7-57 and Regulations 4-4.1, 4-4.2, 4-6.1, 4-43.1, 5-44.1, 7-11.1, 7-17.1 and 7-57.1) provide equal access to courses, programs, counseling services, physical education and athletic, vocational education, instructional materials and extracurricular activities.

To seek resolution of grievances resulting from alleged discrimination or to report violations of these policies, please contact the Title VI/Title IX Coordinator/Director of Student Leadership at (757) 263-2020, 1413 Laskin Road, Virginia Beach, Virginia, 23451 (for student complaints) or the Section 504/ADA Coordinator/Chief Human Resources Officer at (757) 263-1133, 2512 George Mason Drive, Municipal Center, Building 6, Virginia Beach, Virginia, 23456 (for employees or other citizens). Concerns about the application of Section 504 of the Rehabilitation Act should be addressed to the Section 504 Coordinator/Executive Director of Guidance Services and Student Records at (757) 263-1980, 2512 George Mason Drive, Virginia Beach, Virginia, 23456 or the Section 504 Coordinator at the student's school. For students who are eligible or suspected of being eligible for special education or related services under IDEA, please contact the Office of Programs for Exceptional Children at (757) 263-2400, Laskin Road Annex, Virginia Beach, Virginia, 23451.

Alternative formats of this publication which may include taped, Braille, or large print materials are available upon request for individuals with disabilities. Call or write the Department of Planning, Innovation, and Accountability, Virginia Beach City Public Schools, 2512 George Mason Drive, P.O. Box 6038, Virginia Beach, VA 23456 0038. Telephone 263-1199 (voice); fax 263-1131; 263-1240 (TDD) or email Mary Ann Morrill at maryann.morrill@vbschools.com.

vbschools.com
your virtual link to Hampton Roads' largest school system

VIRGINIA BEACH
CITY PUBLIC SCHOOLS
CHARTING THE COURSE

November 2017