D211 BOARD OF EDUCATION APPROVES IPAD AS ONE-TO-ONE DEVICE

In 2012, the District initiated its one-to-one electronic device program built on the founding principles of redesigning student learning opportunities and envisioning instructional methods to develop the skills students will need as they prepare for life after high school. The District provided trained teachers and their students with individual electronic devices, iPads, to achieve these outcomes. The One-to-One Program was fully implemented in 2014, providing each Township High School District 211 student with an iPad to transform their learning experiences and broaden students' ability to demonstrate the acquisition of skills.

After exploring both options, the One-to-One Committee recommended that the program continue to utilize the iPad as its device. The iPad is aligned with the District's vision to create engaging relevant learning experiences for all students. The iPad supports the development of students' creative and collaborative skills and is reflective of the ever-connected experiences students will encounter in college and workplace settings in the future. At its January 19, 2017 meeting, the Board of Education approved the purchase of 7,168 iPads for the 2017-2018 school year at a total cost of $2,501,632 at its Jan. 19, 2017 meeting.

Freshmen, sophomores and faculty members will be provided with a new iPad to start the 2017-2018 school year. In future years, each incoming ninth grade class will be provided with new iPads annually. Retired devices will be sold annually so that iPads are cycled through a four-year service life within the District.

The one-to-one environment has created possibilities for learning that would not be possible otherwise. Teachers and students alike remark on their unprecedented ability to stay organized, maintain contact with one another, and readily share student work and feedback. On-demand access to learning resources is consistently cited as a significant benefit of the One-to-One Program.

Over the past four years, the iPad has served as a high quality individual electronic device for students and has been aligned with the District's overall vision for its one-to-one program. Given educational technology's continual rate of change, in the spring of 2016, the District began a comprehensive review of its one-to-one program and specifically examined different electronic devices in order to determine which electronic device would best serve students and the District in coming years. Early investigative efforts narrowed the possible device choice to two options: (1) the Apple iPad, and (2) the

Google Chromebook.

One-to-One Committee

The District's One-to-One Committee was instrumental in the launch of the one-to-one program in 2012. The committee was expanded in the fall of 2016 to include many teachers experienced with the use of technology in the classroom to evaluate the existing one-to-one program. The expanded committee, consisting of 24 individuals, represents a balanced cross-section of school assignments, academic departments, and specific roles, and was chaired by a core oversight team made up of Mark Kovack, Associate Superintendent for Student Services; Gary Gorson, Chief Technology Officer; and Scott Weidig, Lead Technology Coordinator. Committee members were organized into five unique subcommittees to focus the members' attention and research efforts.

1. *Device Research* – This group of individuals conducted research to gather information about the iPad and Chromebook and made note of factors such as device variants, device features, device options, portability and weight, battery life, app availability, durability, cost, case options, reviews from independent sources, and anticipated enhancements in upcoming device releases.
2. *Innovative Teaching* – This team investigated the use of one-to-one devices in the learning transformation process and researched best practices, benefits and impediments to learning, and ways to assist teachers in effecting a successful transformation to a digital environment.
3. *Input Gathering* – This group collected information from various stakeholders and regarding benefits, challenges, and other factors the District should account for regarding the creation of a learning environment that can inspire students to be successful. Stakeholder groups included students, parents, local business leaders, representatives from local elementary school districts, representatives from post-secondary educational institutions, and District 211 teachers.
4. *Site Visit* – This subcommittee identified other school districts with active one-to-one programs using either iPads or Chromebooks and conducted visits to 13 schools outside of District 211. The team compiled details about each of these school's one-to-one program goals, device implementation, and direct observations of the classroom environments.
5. *Technical* – This set of individuals analyzed the iPad and Chromebook from a technical perspective to identify details relating to device setup, device management, location (recovery) features, repair and support options, infrastructure requirements, options for classroom presentation, and total cost of ownership.

Research Findings

Based on their experiences, observations, and research, the subcommittees assembled lists of advantages and disadvantages for both the iPad and Chromebook as potential one-to-one devices within the District 211 program. Summary lists are provided for each device.

Device	Advantages	Disadvantages
iPad	• Durable hardware • Supports an array of accessibility features to accommodate student needs • Highly portable • Fully functional touchscreen • Stylus can be used to annotate documents and images • Integrated device tracking • Dual camera • Wireless connection to projector • User account management system integrates with existing District resources	• Lacks integrated keyboard • No Java support (impacts some web-based resources) • Repairs often require outside vendor support • Fixed internal file storage capacity

Device	Advantages	Disadvantages
Chromebook	• Integrated keyboard • Laptop-like form factor • File storage can be expanded using external USB drive(s) • Minor device repairs can be accomplished in-house • Student familiarity with device enhanced by use in junior highs • Full integration with Google Apps for Education tools and resources • Long battery life	• Touchscreen models have limited functionality • Does not support stylus use (inking for notes/annotations) • Lacks forward facing camera • Limited functionality with the District's most widely used learning management system (Schoology) • Limited app availability in Google Play Store • Presentation from device utilizes hardwire connection to projector • Limited set of accessibility features to accommodate student needs • Most resources require Internet connection to function • Prone to hardware breakage

Additionally, the subcommittees identified a set of 47 essential features across 13 categories that any one-to-one device should have in order to support the District's goal of transforming students' teaching and learning experiences. Each of these features was then applied to the iPad and Chromebook using a 4-point rating scale to assess each device's ability to achieve the District's objective. The rating scale was defined as 1 — very weak, 2 — weak, 3 — strong, and 4 — very strong. Subcommittees independently rated the features. Results were combined to create average ratings for each specific feature. The iPad was rated higher on 40 unique essential features. Three features showed equal ratings for both devices. The Chromebook was rated higher on four features. Full details of this analysis are displayed in Appendix A.

Summary Conclusions

The One-to-One Committee considered the District's own experiences with a one-to-one classroom environment, direct feedback from students and parents, input from District teachers and outside educational representatives, technical advisors from Apple and from Chromebook vendors, and observations of schools' implementation of Chromebooks and iPads in one-to-one settings outside of the District. Analysis of those information sources allowed the committee to assess each device objectively.

The Chromebook was deemed a handy electronic device that could provide opportunity for students to access online resources. It's direct integration with the Google Apps for Education tools supports student collaboration, teamwork, and sharing. Google Drive's cloud-based storage combined with accessible USB-based storage options creates the opportunity for vast file storage capacity. The Chromebook is portable in the same way as a laptop computer. It's clamshell design mirrors the laptop's form factor and includes a trackpad and full keyboard. Screen size is sufficient to meet classroom needs. Long-term durability of the Chromebook, however, was suspect. The hinged cover was prone to breakage and, although this could likely be repaired within the District, the feature did have potential to negatively impact the student experience. The Chromebook exhibits strong battery life. The limited touchscreen capacity and lack of annotation ability was a significant criticism of the Chromebook. Students and teachers were clear in naming this feature as essential. Parents of existing students expressed some concern about shifting to a Chromebook after their students have become familiar with the iPad. The productivity tools within Google Apps for Education (i.e., word processing, spreadsheets) lack sophistication as compared to Microsoft Office tools with which many stakeholders have prior experience.

The iPad was recognized for its extreme portability and ease of use. Its user-friendly design allows students to access features quickly and intuitively. Widespread availability of educational apps in the App Store is a particular strength for the Apple product. Students were at ease with the iPad's touchscreen keyboard. Adults, on the other hand, indicated a greater preference for an external keyboard. The District has a supply of external keyboards, which attach via the iPad's lightning port, available for use as needed. The iPad connects readily to projection devices allowing students to share their screens with small and large groups. The iPad's front-facing camera provides opportunities to capture images efficiently and to integrate those images into documents. The fixed amount of storage space on the iPad is easily overcome by accessing cloud-based storage solutions when the device's maximum capacities are reached. One hallmark feature of the iPad is interaction with a stylus. This feature supports students' desire to take notes and to annotate documents with the same ease as if they were writing on a sheet of paper. The iPad's responsive touchscreen is one its hallmark characteristics allowing students to resize webpages, documents, and images with a simple pinch-and-zoom action. The iPad has proven durable in the classroom setting. Damaged devices are easily replaced and individual student settings can be quickly applied to the replacement device. Microsoft Office apps (i.e. Word, PowerPoint, Excel) are available for use on the iPad offering students the chance to use productivity tools they are experienced with. Schoology, a web-based learning management system in wide use across the District, is fully compatible with the iPad's operating system allowing teachers to effectively distribute course materials, collect student work, and exchange commentary with students. Students requiring accessibility accommodations (i.e., enlarged print, assistive communications tools) have identified the iPad as indispensable in connecting them to their educational needs.

Representatives from three separate colleges and universities provided information regarding their expectations of students' technological proficiency upon entering college. All of these representatives shared that students should be prepared to navigate a learning management system and have mastered basic skills needed to use productivity software (i.e. word processing, spreadsheets, presentation software) upon exiting high school. The specific one-to-one device students use in high school to develop their skills was not of concern as the colleges reported students typically use a fully functional laptop at the college level. Many college students reportedly use their smart phones in the classroom for notetaking.
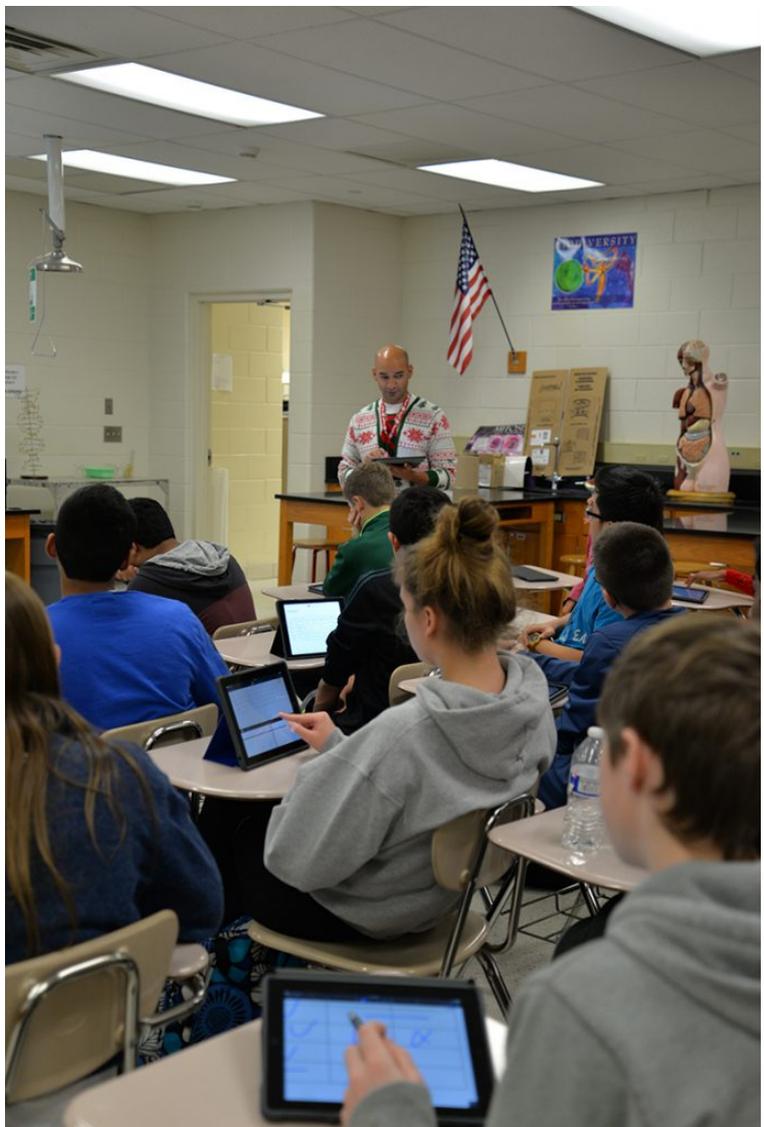
Technical comparisons of the devices revolved around device setup requirements and ongoing device management tasks. Both the iPad and the Chromebook must be configured prior to distribution and assignment to students. The preparation sequence is similar between the two devices with regard to time required by school personnel. Both devices utilize third-party software tools to manage device controls and limit student access to selected features. The difference in overall costs for these tools was not significant when comparing the two devices. Shifting away from Apple devices would require the District to replace multiple hardware interfaces as Chromebooks are not compatible with Apple TVs and other unique ancillary devices. Existing structures built around the Apple format remain aligned with new iPads and would not have to be replaced.

A wide variety of Chromebook models are available to the education market. A Chromebook with the most complete set of essential features identified by the One-to-One Committee would cost between $325 to $400 based on current price quotes. Even at the highest price level, however, the Chromebook would not be equipped with a touch screen comparable in function to the iPad's touch screen. Apple recently released a new iPad model with double the memory and a reduced high volume purchase price of $349 as compared to the entry-level model the District purchased last spring for $354.

Observations of other District's one-to-one programs prompted committee members to recognize strengths of District 211 teachers and their application of the iPad as a learning tool. While strong examples of technology integration were present at other schools, the team members affirmed their belief that the District is on the leading edge of successful implementation and transformative application of one-to-one learning. Universally, committee members agreed that shifting to Chromebooks would set the program back and that it would take at least two years to recover lost momentum.

Implementing One-to-One in Future Years

Continued implementation of the One-to-One Program will be established with each grade level being assigned a common iPad model. Students will be assigned a device upon starting 9th grade and will retain that same device over the four years of high school. Devices will be retired from inventory at the conclusion of each four-year cycle.

As the 2016-2017 school year concludes, graduating seniors will be provided the option to purchase their assigned iPad at current market value. During the summer of 2017, the existing iPad inventory will be redistributed to provide rising seniors and rising juniors with like models by grade level. Seniors' iPads will have been in

service for three years and juniors' devices will have been in service for two years as the 2017-2018 school year begins. In 2017-2018, sophomores and freshmen will be assigned newly purchased iPads. Teachers will also be assigned newly purchased iPads. The remaining iPad inventory will be distributed and assigned as necessary with devices having four years or more of service being sold to a third-party vendor. This annual sequence will continue with new freshmen being assigned a newly purchased iPad at the start of each school year. Faculty will receive new devices every other year. Each year, outdated inventory will be sold first to graduating seniors and then to third-party vendors to eliminate from inventory all devices with more than four years of service within the District.

During the second semester of the 2016-2017 school year, the One-to-One Committee will direct focused attention to the formation of professional development activities District in which faculty can participate during the summer of 2017 and the 2017-2018 school year. These activities will pertain exclusively to the use of the iPad to realize modified and redefined learning tasks for students. These professional development activities represent the next level of instruction for the District's teachers who have a minimum of two years' experience integrating the iPad into their classrooms and will assist them to create lessons that engage students' higher-order thinking skills. Formalized relationships with Apple's dedicated educational resources will be explored to determine how the partnerships can be leveraged to benefit the District's faculty.

Additionally, during that same time, the District's technical infrastructure team will coordinate directly with Apple engineers to refine and improve internal procedures to efficiently set up new iPads, manage the entire iPad inventory, and optimize the technical systems that support the One-to-One Program. Improvements to iPad management continue to include focused attention on minimizing classroom distractions and assisting students to remain engaged with their device for educational purposes. Actions over the past two years have resulted in strong advances in minimizing interferences and reducing reports of student distraction as compared to previous years.

Initiatives to strengthen students' digital citizenship will receive attention as well. Existing models of exposing students to critical concepts will be examined for areas of improvement. Security of personal information, maintaining appropriate digital conduct, and information literacy are vitally important components of students' use of technology and readiness for college and career experiences.

iPad Insurance Program

Consistent with past years, approximately 90% of the student body participated in the District's iPad insurance program in the 2016-2017 school year. The voluntary insurance policy costs $25 for a full year of coverage against repair charges for damages and for loss due to theft. In addition to the annual premium, policy holders pay a deductible upon filing a claim. Deductible amounts increase with each claim and range from $25 to $150 for repairable damages and from $75 to $200 for loss due to theft or unrepairable damage. In future years, the District will continue to sponsor an insurance program.

Moving Forward

Overall, the iPad supports the development of students' creative and collaborative skills and is reflective of the ever-connected experiences students will encounter in college and workplace settings in the future. Aligned with District 211's vision, the iPad will continue to be instrumental in providing engaging, relevant learning experiences for all students.

Appendix A

Essential Device Features/Abilities by Category	Specific Feature or Ability of One-to-One Device	Chromebook	iPad
Handwritten Annotation	Inkability	1.4	4
	Inking ability	1.4	4
	Annotation abilities	1.2	4
Camera and Image Processing	Use of camera and video capture to produce portfolios	1.4	4
	Dual camera/video and photo editing	1.2	4
	Back facing cameras	1.2	4
Alignment with Classroom Innovation and Creativity	Creative learning environment	2	4
	Creative potential	1.6	4
	Create and present work in a multitude of formats, including portfolios	1.8	4
	Student choice	1.8	3.2
	Creativity & Innovation features	1.6	4
	Ability to create and find apps for creation	1.6	4
Learning Focused Classroom	Ability to control the device to have a learning focus	3	2.8
	Ability to manage the device without negatively impacting the experience	3	2.6
	Classroom management	2.4	2.8
	Student to student / teacher to teacher Collaboration	3	3.6
Effective Device and Administrative Controls	User management (Active Directory Integration)	2.2	3
	Ability to create tiered access levels (by user, by condition)	2	3.8
	Ability to easily locate the device in and out of the District	2	3.8
	Management tool availability and cost	2.2	2.8

Classroom Workflow	Ease of workflow	2.4	3.6
	Workflow and integration of apps and platforms is essential	2	4
	Notability work flow	1	4
	Workflow	2	4
LMS Functionality and Student Organization	Organization of student work	3.4	3.4
	Schoology functionality	1.6	3.8
	Access to Schoology	2.4	3.8
	Establish knowledge of the device & learning management system	2.4	3.6
Mobility/ Portability	Mobility	2.6	4
	Mobility while teaching	1.2	4
Wireless Presentation	Ability for the device to seamlessly present with mobility	1.4	4
	Ease of wireless projection	1.4	4
	Sharing resources/rotating presentation of work during class	2.2	4
	Ability to quickly rotate displaying student's work	2.2	4
Accessibility	Accessibility	1.8	4
	Ability to differentiate instruction / Accessibility	2	4
	Accessibility features (assistive technology)	1.6	4
Offline Potential	Offline access to materials	2.2	3.4
	Offline access to apps	1.75	3.4
Touch	Touch screen and active responsiveness	1.6	4
Cost of Ownership	Durability	2.2	3.2
	Battery Life	3.4	3.2
	Availability of apps	2.4	4
	Dependability and reliability	2.6	3.4
	Ease of ability to repair and cost of repair	2.6	2.6
	Total cost of ownership	2.4	2.4
	Ease of the initially onboarding the user and device	2.8	2.6