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GOING 1:1- WRITING POLICY TO SUPPORT THE 21ST CENTURY STUDENT: A POLICY ADVOCACY DOCUMENT

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GOING 1:1
WRITING POLICY TO SUPPORT THE 21ST CENTURY STUDENT:
A POLICY ADVOCACY DOCUMENT

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Educational Leadership Doctoral Program

Submitted in partial fulfillment
of the requirements of
Doctor of Education
In the Foster G. McGaw Graduate School

National College of Education

National Louis University

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Document Origination Statement Digital Commons @ NLU

This document was created as *one* part of the three-part dissertation requirement of the National Louis University (NLU) Educational Leadership (EDL) Doctoral Program. The National Louis Educational Leadership EdD is a professional practice degree program (Shulman et al., 2006).

For the dissertation requirement, doctoral candidates are required to plan, research, and implement three major projects, one each year, within their school or district with a focus on professional practice. The three projects are:

- Program Evaluation
- Change Leadership Plan
- Policy Advocacy Document

For the **Program Evaluation** candidates are required to identify and evaluate a program or practice within their school or district. The “program” can be a current initiative; a grant project; a common practice; or a movement. Focused on utilization, the evaluation can be formative, summative, or developmental (Patton, 2008). The candidate must demonstrate how the evaluation directly relates to student learning.

In the **Change Leadership Plan** candidates develop a plan that considers organizational possibilities for renewal. The plan for organizational change may be at the building or district level. It must be related to an area in need of improvement, and have a clear target in mind. The candidate must be able to identify noticeable and feasible differences that should exist as a result of the change plan (Wagner et al., 2006).

In the **Policy Advocacy Document** candidates develop and advocate for a policy at the local, state or national level using reflective practice and research as a means for supporting and promoting reforms in education. Policy advocacy dissertations use critical theory to address moral and ethical issues of policy formation and administrative decision making (i.e., what ought to be). The purpose is to develop reflective, humane and social critics, moral leaders, and competent professionals, guided by a critical practical rational model (Browder, 1995).

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ABSTRACT

In an effort to prepare its graduates with the 21st century skills of problem solving, collaboration, technology savvy, creativity, and information literacy and to close the learning gaps between students who have access to technology and those who don't, this study proposes that District 123 create a policy to support a 1:1 Chromebook initiative. Using Browder's needs analysis model, the impact of a 1:1 program is analyzed through the educational, social, political, economic and moral frames (Browder, 1995). It is determined that a 1:1 program can transform teaching and learning by giving equal access to technology, by incorporating student-driven and inquiry-based lessons that challenge students to meaningfully utilize resources outside the classroom walls and contribute their voice to the digital sphere. This transition requires significant human and financial capital, as well as careful planning, professional development, curricular and classroom modifications and thoughtful assessment mechanisms. A proposed budget and an assessment plan is included in the study.

PREFACE: LEADERSHIP LESSONS LEARNED

In the process of leading a transition to a 1:1 Chromebook program, I learned many important leadership lessons about the planning and implementation of policy. Development of a common vision, negotiation and compromise, adherence to core beliefs, implementation of small-scale pilots, careful data collection and analysis, inclusion of stakeholder voice, and planned assessment mechanisms all proved to be important components of 1:1 policy development.

When developing a new policy or program, a shared vision and common priorities amongst district and building leadership is essential. District 123 initially suffered from a divided administrative team regarding 1:1 technology. While many of the district and building staff were in support of implementing a 1:1 Chromebook model, not all District leaders were sold on the importance of 1:1 technology, one leader referring to computers as “thousand dollar pencils”. Others were concerned much more with the financial implications of the program than the instructional ones. As a result, those of us fighting to implement this technology faced an internal uphill battle. But, by never wavering in our belief that access to technology is best for our students, and sharing the pilot participant feedback with our Board of Education, we eventually gained support to implement such a program. This success would not have been possible, however, without compromises from those on both sides of the 1:1 debate. For example, while the 1:1 model was ultimately adopted by the District, the financial model used to fund the initiative was not the recommended one.

Because our community has one of the highest property tax rates in the area, I was acutely aware that any additional fees would be unwelcome. As a result, and to

demonstrate the value we place on a 1:1 technology model, the 1:1 committee recommended the district contribute a small amount toward the cost of each device. However, that recommendation was not accepted, with District leaders instead opting to pass 100% of the cost on to the families. The result was an increase of \$95.00 to the existing annual yearly registration fee. While those who finalized the financial structure did not attend the parent informational meetings to review this fee increase, I did attend, and felt the brunt of community displeasure. Nevertheless, this compromise was needed to make 1:1 a reality for the students of District 123.

The collection and analysis of data also proved important during all stages of the 1:1 planning. During the two-year process of investigation, my team ran two pilots across both buildings in the district. In both cases, we collected survey data from parents, students, and teachers about the successes and challenges of a 1:1 model and shared the analysis with the administrative team and with the Board of Education. The data was overwhelmingly positive and helped demonstrate the urgency of getting widespread access to our school community. We also filmed student and teacher responses to questions about the 1:1 pilot and had all the pilot teachers present their experiences at a public Board of Education meeting. No doubt, this information was crucial to gaining the support of our elected Board Members and that of our superintendent.

When writing a policy which supports a 1:1 program, clarity on the goals of the program, the expenditures on professional development, and the methods by which to assess the success of the initiative must be included. In this way, all parties are aware of the expectations of the program and the methods by which its impact will be determined. To support policy, and supports its systematic implementation, procedural documents

should construct parameters and guidelines for implementation. An assessment matrix is included in the study for that purpose.

Through this process, I learned that the development of a common vision, the need for compromise while adhering to core beliefs, and the use of data to reveal needs and measure effectiveness are essential components of writing school policy.

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SECTION ONE: VISION STATEMENT

Awareness of Need for the Policy

Community High School District 123 is in the midst of moving from a Bring Your Own Technology (BYOT) instructional technology model to a 1:1 Chromebook model to support 21st learning and skill development (Partnership for 21st Century Learning, (<http://www.p21.org/about-us/p21-framework>). In a 1:1 model, each student is issued a Chromebook computer for use at school and at home. Preparation for this 1:1 rollout, which will occur with all freshman and sophomores in the 2016-2017 school year and with each incoming class thereafter, took years. Our first step, from 2011-2013, was to improve our network capabilities to improve reliability and capacity for an increasing number of devices trying to access wireless networks. Next, in 2013, we launched a BYOT initiative, inviting students to bring whatever device they owned to class for use. With the new initiative, a new Board Policy was adopted. Policy 6:220 – *Bring Your Own Technology Program; Responsible Use and Conduct* (Appendix B) includes the following language:

the program will...promote educational excellence by facilitating resource sharing, innovation, and communication to enhance (a) technology use skills; (b) web-literacy and critical thinking skills about Internet resources and materials, including making wise choices; and (c) habits for responsible digital citizenship required in the 21st century (http://policy.microscribepub.com/cgi-bin/om_isapi.dll?clientID=1507696028&depth=2&infobase=grayslake_127.nfo&softpage=PL_frame).

With the implementation of this policy, most students brought cell phones, a few brought Ipads or laptops, and still others brought nothing to school each day. While this model required teachers to become more comfortable with increased technology use in the classroom, supported by ongoing professional development in how to do that well, we learned quickly that it was difficult for teachers to plan lessons with the uncertainty a BYOT structure brings. Some students had devices to bring, others did not, and the capabilities of each student device to accomplish the lesson varied greatly. Because of these challenges, teachers relied more heavily on carts of Chromebooks available for checkout than on student's personal devices. Chromebook checkout was popular because with a reliable, consistent device for all students, teachers were able maximize student learning on essential 21st century content and skills and incorporate the technology meaningfully into daily lessons.

As more and more teachers clamored for the few carts of Chromebooks available in the schools, it became increasingly clear that more access to such devices was needed. In combination with a need to modernize the student experience and harness 21st century tools, we shifted our focus from BYOT to the implementation of a 1:1 Chromebook model in our schools. The existing board policy needs to be updated to include the parameters and objectives of a 1:1 model in order to properly execute and implement such a program.

Critical Issues

The critical issues that make this policy a problem in need of a response include the increased importance of the development of 21st century skills in our students, equity

and access for all students, and the ongoing professional development and support needed to shift teaching practice to maximize technology in the classroom.

21st Century Skills

According to Partnership for 21st Century Learning (2015), unless the gap is bridged between how students learn and how they live, today's education system will face irrelevance (p. 1). In an effort to close that gap, Community High School District 123 is working to shift instructional delivery models from those focused on predetermined content standards and teacher-centered lessons to student and inquiry-based classrooms that allow students to apply what they know in meaningful ways. Technology, and its ability to allow on demand learning and access to resources outside the school walls, plays a central role in this pedagogical shift. Without consistent access to technology, our students will fall behind their peers and will not have the opportunity to harness the power of technology in the creation of cutting-edge products and in sharing their voice on a world stage.

Equity and Access

Unfortunately, not all of our students have regular access to technology at home. Under the BYOT model, these inequalities became more pronounced as some students were able to bring expensive laptops, while others had no device at all. A 1:1 Chromebook model addresses these issues of equity and access for all students. Though parents will be asked to participate in a “rent to own” program to give the student ownership of the device upon graduation, the district will allow payment plans and will cover the cost of the device for all students who qualify for free and reduced lunch. Though the district will cover all or part of the cost for students qualifying for free and

reduced lunch, those students will still retain ownership of the Chromebook upon graduation. We believe it is important that resources are distributed equitably, not equally to maximize student potential. As described in *Leading for Equity* (2009), “equity does not mean equal resources, it means equal opportunity” (p.39).

Professional Development

Instructional change of this magnitude will not occur without the necessary support and training for teachers. Ongoing instruction on everything from basic mechanics of the Chromebook machine to the powerful way it can transform learning is an essential component of a successful 1:1 program. “Technology is only effective as a learning tool when educators have the skills to use it in an instructionally sound and pedagogically effective way” (Skyora, 2014. p. 1). Without appropriate teacher training, a school might become “technology rich, but innovation poor” (November, 2015). Any policy language must support the allocation of resources to this training.

Policy Recommendation and Envisioned Effect

I am recommending an update of the existing BYOT policy to include language that supports the implementation of a 1:1 program with a shared district and parent funding model, articulates the purpose and goal for said program, and commits resources to the ongoing professional development needed to prepare teachers to instruct effectively in a 1:1 setting. The purpose of the District 123 program is to create an environment in which students have equal access to technology and to innovative classrooms that support the discovery process while teaching students to use technology effectively and wisely for academic purposes. Recommended parameters for the 1:1 program include distribution of Chromebooks to all freshman and sophomore students in

the 2016-2017 school year and each incoming class thereafter. In three years' time, all four grade levels will have a Chromebook and all classrooms prepared to fully immerse students in 21st century learning. To express to the community the importance of access to this technology, and to relieve local residents from additional fees, the district should contribute no less than \$50.00 per student towards the cost of this device as this district gets 81% of its revenue from local property tax (IIRC), and our county has one of the highest property tax rates in the state of Illinois (http://www.tax-rates.org/illinois/lake_county_property_tax). This high tax rate already puts a great financial burden on this middle-class neighborhood. Upon initial communication with district families that we will be charging a fee for this Chromebook, we received many angry parent phone calls, emails, and meetings wherein parents expressed resentment toward the required increase in costs, especially those families who already own a different device. As a show of good faith, the school must contribute to the cost of this program.

The expected effect of this 1:1 policy is that it will act as a springboard to a systematized shift from “old-fashioned” text-based classrooms to those where teachers serve as facilitators of student learning, helping them navigate the limitless information and resources available electronically. In addition, this policy would serve as a commitment from our Board of Education to provide the necessary 21st century tools to all students, those who can afford it and those who cannot. Finally, this policy would support the allocation of time and money to staff development and technology coaches to support teachers during this time of transition.

SECTION TWO: NEEDS ANALYSIS

I am advocating that our existing Bring Your Own Technology (BYOT) policy be amended to include a required one to one computing model. In this model, each student will purchase a Chromebook computer to practice needed 21st century skills and enable our teachers to more easily move from traditional teaching methods to those that prepare modern students for post-secondary pursuits. In this section, I examine the five key areas for analysis, educational, economic, social, political, and ethical and explore how this policy advocacy's proposed change impacts or is impacted by each area. It is critical for the district move to a one to one model so students can practice needed skills, so we can improve equality of education for all, and open possibilities for more flexible learning models that become available when students do not need to be in the brick and mortar school to engage in learning.

Educational Analysis

A policy supporting the implementation of a one-to-one Chromebook model will improve teaching and learning by better preparing modern students for college and careers, and will require financial support for staff development to prepare teachers to adapt successfully to this type of classroom environment.

The needs of 21st Century learners require an overhaul in the way classroom instruction is organized and delivered. The current structure of high school was developed at the turn of the 20th Century, over 100 years ago, when the world was much smaller, and modern technology did not exist. These learners needed only to master basic skills to be prepared for life after high school as the vast majority of students did not go on to college or need advanced coursework to enter and compete in the workforce. An

explosion in the numbers of students attending college occurred in the two decades following World War II when the GI bill funded college for veterans and as the American economy began to diversify (Astin & Oseguera, 2004, p.321). Yet, the late 19th century school model is still the basic organizing structure of our modern day high school that must meet the needs of more diverse learners requiring very different skill sets (DiMartino and Clarke, 2008, p. 7). According the Partnership for 21st Century Skills, “A new nationwide poll of registered voters reveals that Americans are deeply concerned that the United States is not preparing young people with the skills they need to compete in the global economy” (Partnership, 2015, p.1). Among those skills are critical thinking and problem solving, communication, technological savvy, collaboration and team building, and creativity and innovation (Critical, 2012). Such skill development requires access to appropriate modern technology, used meaningfully for academic purposes, to practice with peers, engage in interdisciplinary collaboration, and participate an ongoing feedback and reflection loops with both teachers and students.

Eric Sheninger (2016) writes that modern students,

Have embraced this digital world as it provides consistent
relevance and meaning through an array of interactive experiences.

As a result, the job of schools and educators has become
exponentially more difficult as a natural disconnect results when
students enter their school buildings (Uncommon Learning, p. xi).

In other words, schools run the risk of becoming irrelevant if they do not adapt to the way today’s students learn and interact. To be meaningful, learning must be relevant to students’ current and future realities. Today, “our information society needs

people who can effectively manage and use ever-increasing amounts of information to solve complex problems and to make decisions in the face of uncertainty” (Sheninger, 2016, p. 1). It is our job as secondary educators to prepare students for that future.

Impact on student achievement

In addition to developing needed skills, regular access to technology can improve student learning. In a first-of-its-kind analysis of 10 meta-analyses on the impact of one-to-one learning environments, Binbin Zheng (2016) found that these environments have a statistically significant impact on student test scores in English/language arts, writing, math, and science (Zheng, 2016, p.1.). In another study, he reviewed 86 scholarly papers on the impact of one-to-one environments. He found that in addition to increased test scores, there are also modest improvements in student technology use, the amount of student-centered and project-based instruction, student engagement, and better student and teacher relationships (Doran and Herald, 2016).

Improvements in student learning may stem from the increased ability to engage in more inquiry-based assignments with authentic audiences made possible by getting access to resources not available in paper textbooks. Rather than making, for example, poster projects for the class or reading and outlining a textbook, students can create a podcast, film and edit a movie, research a favorite topic, or talk with students both in writing and through video, all at the touch of a button. Students have access to millions of print, video, and audio resources and myriad applications and software solutions to help organize and manipulate the information they gather. According to Larissa Pahomov (2014) in *Authentic Learning in the Digital Age*, these possibilities have shifted the curricular focus from content to skills (p. 4). Instead of regurgitating rote facts,

students are learning content while they harness new skills to develop content into new mediums that make what they have learned more relevant for 21st century college and careers. This notion is in line with the intent of Common Core Standards, adopted as the state standards in Illinois and at least 26 other states in 2010. According to the Common Core website, the standards ask students to apply knowledge through higher-order thinking skills (<http://www.corestandards.org/read-the-standards/>). As schools continue to align their curricula to the Common Core standards, and prepare their students for more application and technology-based college and career readiness exams, like the mandated Partnership for Readiness for College and Careers (PARCC) exams given at least once in high school, we must give students access to the tools necessary to build required digital skills. According to the 2016 Illinois School Code statute 105, “The State Board of Education shall administer no more than 3 assessments, per student, of English language arts and mathematics for students in a secondary education program. One of these assessments shall include a college and career ready determination” (Illinois school code of 2016, Pub. A. No. 27-22 Stat. 5). Because the skills needed for college and career readiness have changed in the information age, our assessments of that readiness must likewise change. One to one technology will be essential in that shift.

Professional Development

This shift from content to skills and the inclusion of laptops into the classroom requires extensive professional development to prepare teachers to do this well. Bebell and O’Dwyer (2011) state that the success of one-to-one programs depends largely on “teacher preparation through professional development” (p. 10). Similarly, Drayton et al. (2010) report that “lack of time for professional development, especially in the form of

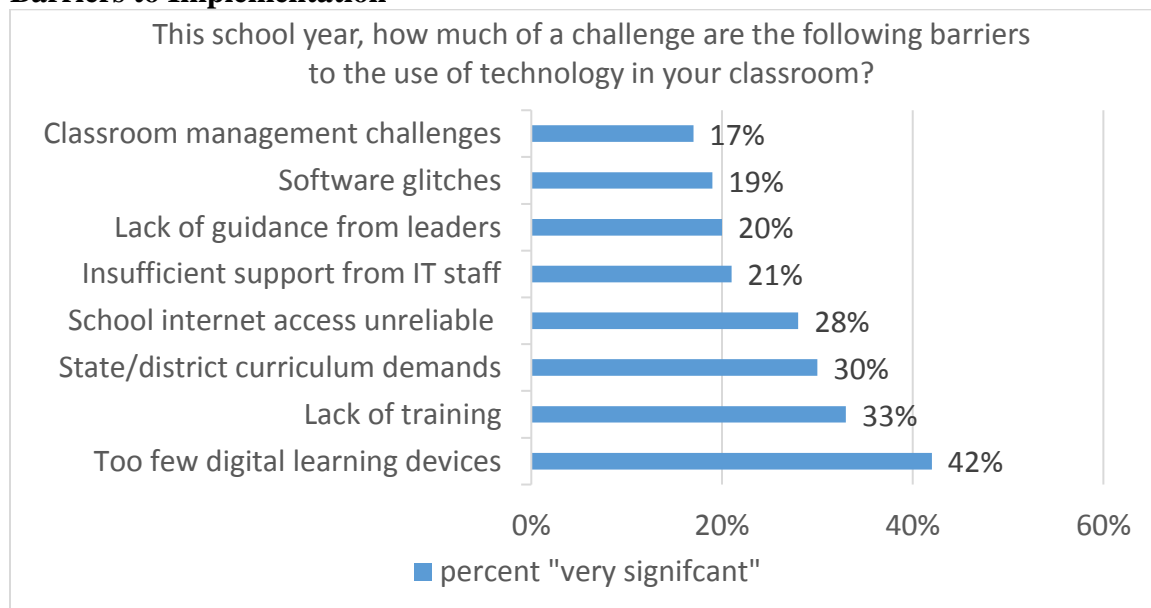
teacher collaboration to develop best practices within the school, becomes a barrier to effective integration of computer and Web resources in the classroom” (p. 41). To effectively shift instruction from a traditional teacher-centered model to a technology-enhanced student-centered model, teachers must change their understanding of what a high quality classroom looks like. For example, the traditional classroom is not designed for collaboration; students are in rows facing the teacher to minimize the chance they might see another student’s work, classes are divided by subject in 50 minute increments, and tests require students work alone (Pahomov, 2014, p. 63). On the other hand, work places of today require team work and collaboration to solve challenging problems, and all parties have a stake in both designing and implementing a project (Pahomov, 2014, p. 64). Preparing them for this reality necessarily requires shifts in practice. When students have access to every answer they could need at the touch of a button, learning moves from memorization to application. This changes the role of the teacher from sage to shepherd. This shift to a one-to-one model, then, requires not only that teachers know how to use the computing tool, but how to use it to change classroom expectations and the entire learning environment. This will only occur with embedded, ongoing professional development.

To support this ongoing development, the one-to-one policy must fund professional learning and hire instructional technology coaches in each of the two high school buildings. These coaches will be “on call” to teachers to provide one-on-one lessons and co-teaching models as they work to make the transition to a 21st century classroom that features inquiry and collaboration. According to a report on one high school in the transition to one-to-one computing, “The presence of a coach sharpens the

school's focus on how technology can best make the learning more engaging and relevant for students, and gives teachers support in navigating the vast field of technology applications and devices” (Instructional Coaching, 2016, p.1). In addition, instructional coaches take the burden of needing to be technology experts off the teachers. Instead, teachers can focus on the “what” and “why” of a lesson, instead of the how (Instructional Coaching, 2016).

A survey given by Education Weekly to its registered online users regarding digital education reveals that teachers cite too few devices and too little training remain the most significant barriers to implementation (see Figure 3 below) of digital learning solutions. While the respondents of this survey are not representative of the entire teaching population, the results nonetheless support the implementation of a one-to-one model to eliminate the two biggest barriers to implementing technology in the classroom as identified by teachers in this one to one survey (Rebora, 2016, p.5).

Figure 1
Barriers to Implementation



When making an instructional change of this scope, it is important to offer needed support to the teachers and students engaging in teaching and learning.

Economic Analysis

The implementation of a one-to-one model is not without significant cost to the school and the parents. What follows is an analysis of theoretical budgetary frameworks that support the implementation costs, and an examination of the larger macro-economic issues that support the need to increase student access to technology.

Marguerite Roza (2010) argues that there is a weak link between spending on schools and improved student outcomes primarily because resources are poorly deployed and not aligned to academic priorities (p. 3). She provides a framework that promotes “drive toward a specified level of student outcomes and equitable progress toward those outcomes for all students” as key results that a budget should yield (p. 91). Computers can contribute to equitable progress toward outcomes. In addition to providing all students access to academic resources not easily accessed when bound by classroom walls and textbook pages, computers can fundamentally change how and when students learn. As described by Dimitri Kanevsky, a champion of change in education for people with disabilities, “Technology is constantly evolving to remove barriers that emerge due to a person’s social characteristics, geographic location, physical or sensory abilities” (Technology Change, <https://www.whitehouse.gov/blog/2012/05/07/technology-change-great-equalizer>).

Technology can improve student outcomes. In surveys done in our own district with a 1:1 pilot program, 80% of students said they took more ownership of their learning as a result of having regular access to technology. Measurably improved student

outcomes that open the doors of educational equity should be a driving force in the allocation of District 123 dollars to the 1:1 program.

The BYOT model currently in place in District 123 highlighted inequities among our student body, as parent income seemed to play a role in who had access to a device that might be used at school. Some students brought a laptop, others an iPad, and still others brought smart phones. Many students, however, brought no device at all.

According to an anonymous survey given by the district on the district webpage, 90% of respondents stated they had access to a device. But, we believe that the relatively few students that actually brought a laptop to school reveal the fact that those who answered the survey were primarily those who already owned devices, and the results were not representative of the larger school body. The reality is that approximately 12% of our students qualify for free or reduced lunch and that does not include many of the 2.7% of our English Language Learning students who self-report that they do not apply for such financial benefits because their parents are not of legal status and are afraid to bring attention to their family (Illinois Interactive Report Card,

http://iirc.niu.edu/Classic/District.aspx?source=About_Students&source2=Educational_Environment&districtID=34049127016&level=D). In order to ensure that all of these students have access to technology in the classroom, our one-to-one policy should not only include allowing students on free and reduced fee waivers to keep the device upon graduation, like those who are paying the fee, the District should also contribute to the cost of the program by subsidizing the cost per student.

District 123 should contribute to the cost of the one-to one-program because of the already high property tax costs that burden our residents. As seen in Table 1 below,

our community has among the lowest Equalized Assessed Value per student of schools in our area and in our athletic conference, and, as a result, one of the highest tax rates.

According to Thomas Kersten (2015), Equalized Assessed Value (EAV), “is the revised assessed value of the home after the state multiplier has been applied to adjust for under-assessment” of property values (p. 11). Only two other districts in our area have an EAV lower than District 123 and, as a result, our citizens pay a tax rate of 4.56 per \$100.00, the third highest in our area. Approximately 81% of District 123’s revenue comes from property taxes (Illinois Interactive, 2016).

Table 1
EAV Per Student

2015 Expenditure Rates for Districts Surrounding District 123						
District A	Tax Year	EAV Per Student	Total School Tax Rate per \$100	Fiscal Year	Instructional Spending Per Student	Operational Spending per Student
District A	2012	920,027	2.58	13-14	13,116	21,255
District B	2012	847,309	2.75	13-14	11,233	18,778
District C	2012	506,088	2.17	13-14	7,308	12,090
District D	2012	473,794	2.98	13-14	5,715	11,809
District E	2012	464,460	3.29	13-14	8,754	16,280
District 123	2012	350,908	4.56	13-14	8,617	15,600
District F	2012	162,707	6.3	13-14	4,890	10,728
District G	2012	57,684	8.38	13-14	6,328	10,881

In light of the heavy tax burden already weighing on our community, the additional price tag of \$380.00 for a Chromebook is significant. Per the model approved by the District 123 Board of Education, freshman students will pay \$95.00 per year and

sophomores \$127.00 per year in a lease to own model (Grayslake Board Minutes, p 2). The \$380.00 cost includes the cost of the device plus a battery, interest, an asset tag for labeling the device, and Google management licenses.

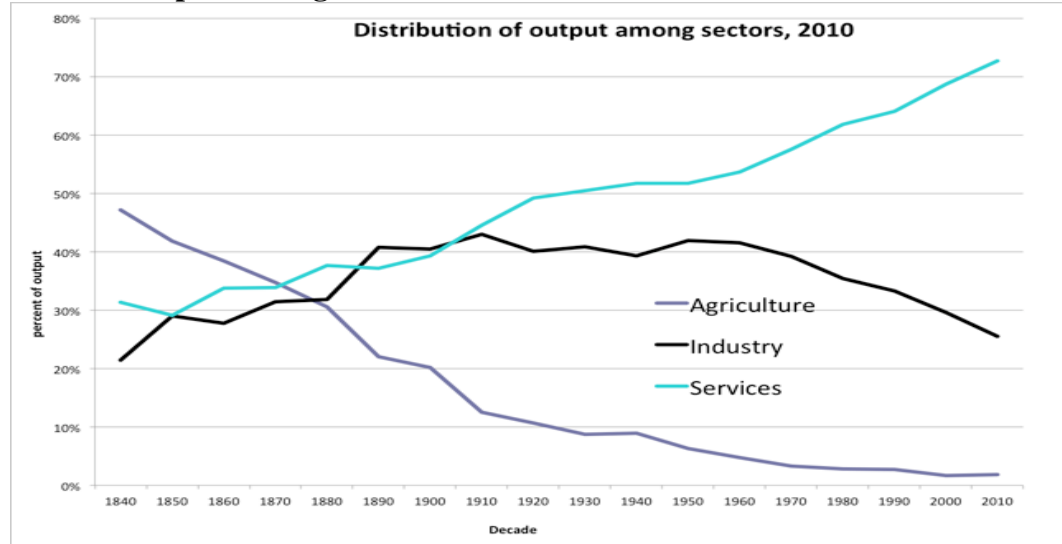
As described earlier in this policy advocacy, District 123 is allotting millions of dollars to support increased technology in the form of infrastructure and personnel. However, if the district could absorb about \$50 per student, for a total of about \$40,000 per year once all four grade levels have the device, it would still leave the brunt of the cost with families but would show good faith to our community our belief in the importance of this technology to student learning while relieving some of the cost burden. With a budget of about 55 million dollars annually (IIRC, 2016), this small amount can go a long way in transforming teaching and learning.

In addition to the cost of the devices and technology-support personnel, the transition to a 1:1 requires dollars be allocated to professional development. Any 1:1 policy should indicate that financial support will be given to the ongoing development of staff to effectively implement this program. According to Allen Odden (2012), “districts that moved the student achievement needle by large increments engaged all teachers in ongoing, comprehensive and intensive professional development” (p. 21). In addition to providing teachers the opportunity for training in the form in internal and external workshops, the district must support an increase in full time employment (FTE) to hire an Instructional Technology Specialist in each school to provide continuous teacher training during the transition. If we assume an FTE costs, including benefits, about \$100,000 per year, then we are asking the District to pay about \$200,000 per year for this essential position.

Economic Trends

It is a fundamental mission of school to prepare students to be successful and be able to make living after high school and college. The skills once required to do that were simple and mundane; learn basic reading, writing, and arithmetic. Prior to the information age, the most common structure to pass knowledge from teacher to student was in a teacher-centered classroom where students passively absorbed information in the “sit and get” method. Author Paulo Friere called this the “banking method” of education, where children are treated as one-way receptacles of information (Friere, 2000, p.72). If students did their homework, and studied for tests long enough to successfully regurgitate basic facts shared with them by their classroom teacher, they could succeed in school and life. However, modern students have a greater need to learn higher-order thinking skills than those of earlier centuries in order to earn a living (DiMartino and Clarke, 2008, p. 7). Tony Wagner (2006) reminds us that, “our economy has transitioned to one in which most people earned their living with skilled hands to one in which all employees need to be intellectually skilled if they hope to make more than minimum wage” (p. 3). Figure 2 below shows this economic transition in America from an agriculturally dominated economy to one more heavily dependent upon the service sector. This shift requires our students learn new and different skills (Johnston, 2012).

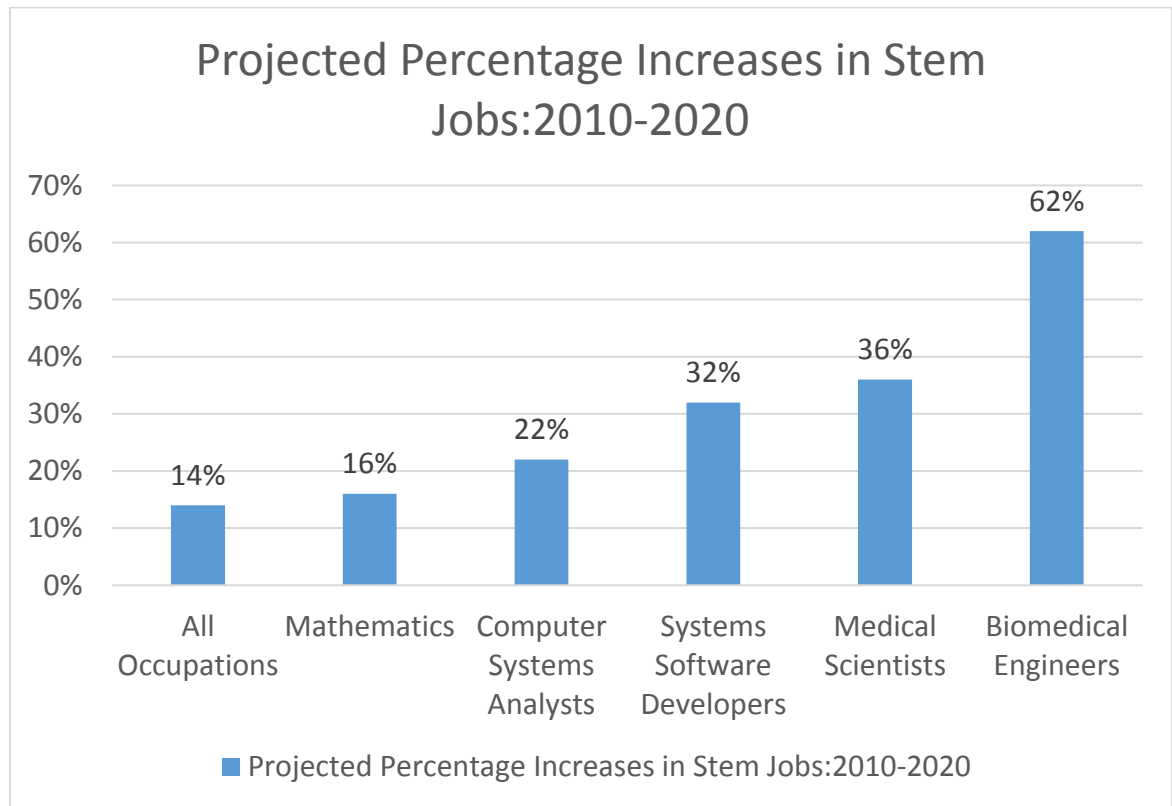
Figure 2
Distribution of Output Among Sectors 1840-2010



Wagner asserts that this shift from agriculture to service has left both colleges and businesses demanding the ability to reason, analyze, hypothesize, find, assess, apply and transfer knowledge, and communicate clearly and concisely (p. 4).

The 21st century learner needs not only to keep our economic engine running, but also must become a contributing member in our increasingly complex democracy. President Obama echoes this sentiment in his Computer Science for All program. In a White House blog describing the same, economic conditions and shifting global demands make computer science a “new ‘basic skill’ necessary for economic opportunity and social mobility” (Smith, 2016). No longer is the traditional teacher-centered, technology-poor approach to education acceptable in getting students the skills they need. In fact, the Department of Education predicts a significant increase in technology related fields in the near future (Science, 2016). As a result, schools need to take the steps necessary to prepare students for their futures. Figure 3 below shows the predicted increase in Science, Technology, Engineering and Math (STEM) related fields.

Figure 3
Projected Increases in STEM Jobs



Students find themselves increasingly uninterested and unmotivated by instructional strategies that do not meet their learning needs. “When interviewed...the majority of high school students acknowledge that they are often bored in class...and that to be motivated they need more opportunities for hands-on learning and closer relationships with their teachers” (Wagner 2006, p. 7). Part of the reason for student boredom is that modern, technology savvy students, “now have the experience, outside of school, of diving into worlds that are richer and more relevant than anything they get in school” (Toppo, 2015, p. 1). According to Partnership for 21st Century Skills (2015), unless the gap is bridged between how students learn and how they live, today's education system will face irrelevance (p. 1). The way people work and live has been transformed by demographic, economic, political, technological, and informational

forces. Schools must adapt to these changing conditions in order to thrive. Students must be equipped to live in a multifaceted, multitasking, technology-driven world. If done well, the inclusion of 1:1 technology will allow for the deep, project-based, student-driven learning that is required to prepare the modern student for his or her future (An, Y. J., & Reigeluth, C, 2011).

Social Analysis

Analysis of a policy to implement a 1:1 initiative requires consideration of the changes that may occur to the school culture and climate as a result of approximately 3000 students, district-wide, bringing computers to school every day. What impact might this have on student interactions? How will the classroom environment be impacted? How will teachers and students respond? Will digital or cyber bullying become more pronounced? How do we embed the teaching of digital citizenship into our curriculum to teach students both how to use technology for academic, not social purposes, and how to interact appropriately online?

Background

Prior to embarking on a full one-to-one program, our district piloted the model in classrooms for two years and solicited student, parent and teacher feedback on how it worked. The overwhelming response by students included that the classroom environment improved (95% agreed or strongly agreed), ownership of their own learning increased (76% of students agreed), and 90% of students said having regular access to technology allowed them to get work done at times they could not have otherwise, like during lunch or before school.

Meanwhile, teachers who piloted the one-to-one Chromebook model also had positive responses. While only about seven teachers piloted the program, their feedback was instructive. One hundred percent of pilot teachers indicated that student learning improved as a result of having Chromebooks available to students at all times. In addition all of the pilot teachers indicated that having access to these tools changed the way they instructed, and all of them indicated that they hoped the school would fully implement a 1:1 program.

A survey given to our entire teaching staff, of which about 95 responded, also indicated a generally positive response to technology in the classroom, but also suggested that more devices and more training would be helpful. While 84% described themselves as intermediate or advanced users of technology in the classroom, about 27% indicated they have students use technology only once per month or less. Similarly, about half of the staff indicated they have checked out a Chromebook or Ipad cart once a month or less. However, this might be due to the fairly limited number of chromebooks currently available, or due to the uncertain nature of the BYOD campaign in place in our district for the last several years. The restriction on available devices became evident when 62% percent of teacher respondents indicated that they have difficulty getting a cart when they need one. In this instance, the logical response by classroom teachers is to plan lessons that do not require technology. When asked if they support moving to a 1:1 model, 67% of staff was in favor or strongly in favor of such a program.

Digital Citizenship

While internal survey data indicates students and staff are generally ready for the shift to a 1:1, and that the culture and climate will be impacted positively by such a

switch, our district does have a responsibility to teach our students how to be good digital citizens. Teachers may be under the impression that modern high school students, as digital natives, know everything there is to know about technology use (Ribble, 2015, p. 1). However, there is a difference between familiarity with technology and understanding how to use it appropriately in an academic setting. The concern about misuse of technology has been an issue in schools since the widespread availability of wireless technologies in the early 2000's. To counteract such behavior, schools implemented Acceptable Use Policies (AUP) that required students and parents to agree to appropriate conduct while online (p.11). Schools found, however, that these agreements were not effective in reducing misuse of technology and so begin to emphasize the teaching of digital citizenship more intentionally (p.11).

To support the growing presence of technology in schools, the International Society for Technology in Education (ISTE) published standards in 2007 for teachers, leaders, and students. The standards for students include six broad categories; creativity and innovation, communication and collaboration, research and information fluency, critical thinking and problem solving, digital citizenship, and technology operations and concepts, respectively (Learning, 2016). According to ISTE (2016), the digital citizenship standard emphasizes that students should be able to:

- Advocate and practice safe, legal, and responsible use of information and technology
- Exhibit a positive attitude toward using technology that supports collaboration, learning and productivity
- Demonstrate personal responsibility for lifelong learning

- Exhibit leadership for digital citizenship

When implementing a one-to-one policy, structures and human and financial capital should be given to the teaching of digital citizenship to students. This becomes especially important in the effort to prevent online or cyber bullying, that has increased with the advent of wireless technology and can negatively effect the culture and climate of a school building (Bhat, 2008). According to a 2011 article in *Tech Trends*, “a lack of digital citizenship awareness and education can , and has, led to problematic, even dangerous student conduct” (Hollingsworth, 2011, p.1). One example of dangerous student conduct includes online or digital bullying. A 2014 study shows that cyber bullying was both perpetrated by and toward both male and female adolescent victims, though girls in earlier adolescence and boys more in later adolescence (Bartlett, 2014). A recent study from the University of Antwerp found an inverse relationship between the degree of Social Intelligence (SI) and the amount of bullying both cyber and traditional. Prevention of bullying, then, could be improved by teaching social skills that raise the levels of empathy and social intelligence (Pabian, 2016).

One of the challenges faced by schools in regards to cyberbullying is that the conduct happens off school grounds, in the “cloud”, but has an impact on students as real as face-to-face “traditional” bullying (Bhat, 2008). Schools are increasingly finding ways to combat this phenomenon like with online, anonymous bullying reporting mechanisms, and direct student instruction and staff training to spot and mediate this type of bullying. One small study in Taiwan shows that students who received 8 weeks of instruction about cyber bullying demonstrated a better understanding of it and its effect and showed less

intent to participate in such behavior than those students who did not get the same instruction (Lee, 2013).

In addition to cyber bullying, a one-to-one program must include student education on creating a positive digital footprint. A digital footprint, or online reputation, accumulates from the varied postings made by students online. Because students are online and sharing personal information now more than ever, and because everyone from college admissions officers to prospective employers can “Google” a student, schools must teach students to be thoughtful about their digital persona. According to Van Ouystel (2014), “Social media are at the heart of the daily communications of adolescents. In many cases, however, adolescents are unaware of the consequences of the long-term availability of their online personal information” (p.1). To help student build a digital presence they can be proud of, Van Ouystel recommends that teachers should model all of the following online behaviors for students and expect them to practice them independently: use proper grammar and spelling in all online endeavors, blog about or post volunteer experiences and extracurricular activities, share quality work online, and treat others with respect (p. 184).

The implementation of a one-to-one policy in District 123 should include financial support for the implementation of staff and student education about how to use technology responsibly for educational purposes, to prevent cyber bullying, and to teach students the importance of a positive digital footprint. These proactive efforts will support the positive and successful implementation of Chromebooks into the school environment and keep the culture and climate of the school healthy.

Political Analysis

In her work, *Political Spectacles and the Fate of American Schools* (2004), Mary Lee Smith writes that “when stakes are high...the political processes that underlie policy reveal themselves as particularly salient” (p. 2). In terms of the increasingly important role of computer technology in education, national, state and local politics have proven salient and provide meaningful context that supports the implementation of a 1:1 computer policy.

The importance of computers and computing education has been a focus of President Obama’s education agenda. In his Computer Science for All initiative, President Obama is looking to

Empower all American students from kindergarten through high school to learn computer science and be equipped with the computational thinking skills they need to be creators in the digital economic, not just consumers, and to be active citizens in our technology-driven world (Smith, 2016, p.1).

In an effort to keep American students internationally competitive, President Obama has made it a national priority to infuse computer education into schools by supporting and implementing such an initiative.

Following the national lead, the State of Illinois passed a public law into Illinois School code that raises the importance level of Computer Science on a student’s transcript. As of the 2015-2016 school year, schools are required to count Advanced Placement Computer science as a math credit on a transcript, not as an elective credit. Because the state requires two years of math to graduate

from high school, and because this course can count as one of those years, the importance of this class towards graduation increases (ILSC 105 5/27-22). When counted as an elective, fewer students would be able to fit such a class into their schedule.

The political push for increased access to courses like computer science emerge from the larger national discussion surrounding the importance of STEM (science, technology, engineering, and math) education. The U.S Department of Education (DOE) has made this a priority, citing President Obama’s desire to “develop, recruit, and retain 100,000 excellent STEM teachers over the next 10 years. He also has asked colleges and universities to graduate an additional 1 million students with STEM majors” (Science, 2016, <http://www.ed.gov/stem>). The reason for this push is to keep the U.S a global leader in this technology-driven world. To support the success of all students in this endeavor, the DOE emphasizes that “These improvements in STEM education will happen only if Hispanics, African-Americans, and other underrepresented groups in the STEM fields—including women, people with disabilities, and first-generation Americans—robustly engage and are supported in learning and teaching in these areas” (Science, 2016, <http://www.ed.gov/stem>). Public schools have the responsibility to pursue this goal of preparing all students, including traditionally underrepresented groups, for success in post-secondary pursuits.

At the local level, our District has engaged in a strategic planning process to set district goals that include increased access to technology in an effort to prepare students for college and careers. Members of the strategic planning

committee included elected Board of Education members, community members, students, and school staff and administration. The goals set through the most recent strategic plan include that District 123 should “design and implement curriculum and instruction that promotes creativity, problem solving and incorporates innovative technology into the classroom” (Grayslake Strategic Plan, 2013). This goal reflects the desire of our school community to increase the amount and use of technology in our schools to prepare students for their respective futures. Our response to this goal has been the aforementioned technology upgrade and implementation process from infrastructure to devices to professional development for our staff. The next logical step is to craft a policy that supports a successful transition to a one-to-one model.

The national, state and local stages provided important context for our curricular transition to infuse more technology, and remind us that we must continue to hear the voices of those that support our school and our students as we move forward with this and other policies.

Moral and Ethical Analysis

Public schools have a moral and ethical responsibility to educate all students and to be responsible stewards of tax dollars. A thoughtfully implemented one-to-one policy can support both goals. Technology has the possibility of opening new educational doors for previously marginalized students. Whether that is using “flipped learning” to allow at-risk students to have continuous access to teacher lessons at home (Flumerfelt, 2013), giving disabled or special education students tools with make the curriculum more accessible (*Technology Change*, 2012), presenting all students with seemingly unlimited

resources, at all different reading levels, languages, and subject matters, regular access to technology has the capability of offering these options to students. Historically, diverse student populations with high proportions of low-income students were associated primarily with large urban districts. However, “over half of minority students in large metropolitan areas now attend suburban schools. Similarly, there are more low-income people living in the suburbs than in cities” (Frankenburg & Orfield, 2012, p. 2). As a far northern suburb of a large city, we have the moral and ethical duty to provide access to education to all of our students. As discussed earlier in the work, a recent meta-analysis revealed improvements in core subject area performance in schools that adopted 1:1 technology (Zheng, 2016, p.1). If technology can help close existing performance gaps between our student body sub groups (IIRC, 2016), we have the responsibility to pursue the option.

We also have a responsibility to be good stewards of public money. And, the fiscal reality facing public school districts has changed. According to Allen Odden (2012), “school budgets will be tight for several years – if not decades- to come” (p. 2). As a result, “states, districts, and schools must figure out how to set new strategic directions and align their dollars with programs, strategies, and systems that together boost student learning (Odden, p. 3). District 123’s strategic plan includes the increase in technology use to improve student preparedness for college and careers. In addition, our preliminary data matches that of academic studies of successful implementation of 1:1 technology, that is, improved student performance. To adopt this system, however, and to be good stewards of our tax revenue, we must be financially responsible. The proposed cost-share model where parents make payments over four years on the total cost

of the device minus a small contribution by the district, allows transparency and fiscal responsibility.

The recommended 1:1 policy in District 123 is suggested in the pursuit of improving student performance and in teaching vital 21st century skills in the most fiscally responsible way to uphold our moral and ethical responsibilities and to maintain a positive school culture. Increased access to technology is supported by the local, state, and national context that includes greater focus on STEM education.

SECTION THREE: ADVOCATED POLICY STATEMENT

This section provides in clearer detail the advocated 1:1 technology policy in District 123. Included in this section are the suggested policy goals and objectives, the needs, values and preferences represented in the advocated policy, and an explanation of how the goals and objectives are appropriate and good.

Policy Goals and Objectives

According to a 2002 report on technology in schools conducted by the National Center for Education Statistics, “The overall goal of technology policies and plans is the successful integration of technology to support student learning and school management” (p. 11). The report argues that technology policy should focus on three things, vision, access, and integration. “Vision pertains to what is expected from the technology overall. Access refers to the acquisition, deployment, and availability of technology to the target audiences. Integration of technology is the development and implementation of strategies that make technology useful and capable of accomplishing the vision” (p. 11). The proposed policy for District 123 is an update of the existing BYOT policy that will support vision, access, and integration of technology in the classroom.

The existing District 123 BYOT policy will be updated to add a depth of vision not currently written into the policy. The current BYOT policy indicates that the BYOT program will

Promote educational excellence by facilitating resource sharing, innovation, and communication to enhance (a) technology use skills; (b) web-literacy and critical thinking skills about Internet resources and materials, including making wise choices; and (habits for responsible

digital citizenship required in the 21st century (Policy 6:220 – Bring Your Own Technology Program).

While technology-use skills and Internet savvy are important, the above vision focuses on device literacy, and not on the intended purpose of a 1:1 Chromebook program, which is to improve student learning. The proposed language would include a vision that articulates the importance of supporting meaningful student learning through authentic tasks. Technology integration should support skill development that prepares students for post-secondary pursuits that goes beyond device literacy. Well known technology thought leader Will Richardson nicely summarizes the vision of effective technology integration. “Technological change becomes ecological when the classroom walls are obliterated, when students truly drive their own learning, and when people whom we will never meet in person become some of our best teachers” (Richardson, 2013, p. 10). A successful 1:1 program must aim for that type of significant educational impact, and the access and integration plans must support this vision.

Needs, Values, and Preferences Represented

A fundamental responsibility of public schools is to ensure that ALL students have access to a high quality education that prepares them for post-secondary pursuits. The advocated 1:1 policy must therefore remove possible barriers to student participation in the program. Because we have about 12% of our student body qualifying for free and reduced lunch status, in addition to many other families without spare computing devices at home and with limited disposable income, we must create avenues for students to have full access to the program.

However, student access to computers is only the first step of successful implementation of 1:1 technology. Teachers must have adequate training and support in order to make meaningful changes in the classroom. Through thoughtful planning for student access and technology integration methods, the needs of students, families, staff and community stakeholders can be met.

Access

The advocated policy statement will articulate the requirement that all students must be provided a device as a part of this 1:1 program. Beginning in the 2016-2017 school year, all freshman and sophomores will have a device and each subsequent freshman class will also purchase a device, so that all four grade levels will have 1:1 by the 2018-2019 school year. While the exact device and price may change over the years, consistent access to technology is an essential component of a 21st century education.

The current BYOT policy does not outline an implementation or access plan because the very nature of a BYOT program is to simply encourage students to bring from home whatever device to which they might have access. Such a program, we have found, leads to significant discrepancies between students who have devices and those who do not. Of those whom had access to a device, the type and capacity of the device differed from student to student, and in many instances, it was our most at risk population that did not bring technology to school. In many cases, those students either did not or could not bring a device from home and so access was limited to the availability of devices in the student library for check out. A 1:1 program guarantees that all students have access to the same technology and can participate equally in their learning.

However, the cost of the 1:1 device should not serve as a barrier to students whose parent cannot afford the price. The advocated policy will ensure that the district pays for the partial or full cost of the device for those families who qualify for free or reduced lunch. Students who qualify for this program will get to retain the device upon graduation, like all other students. In addition, the district should pick up a small portion of the overall cost of the device on behalf of all families, both as a sign of good faith and to demonstrate the importance the district places on the program.

In addition, we would like to support student access to technology outside of the building. To do so, we will pass out information to all families about the \$9.99 per month discounted wireless rate offered by Commonwealth Edison (ComEd) for qualifying families. Furthermore, we hope to partner with area businesses willing to allow students access to their wireless networks at no cost during after school hours. These business partners will be listed on our website and each will have a sticker they place in their window that states a “WI-FI Here: School to Community Partner”. Lastly, as a Google supported school, students can work in Google even without an internet connection, and the information will be updated in their school Google accounts when they reboot the device while next in the school building. While the above strategies will not be in the policy language, they are important components of a successful initiative.

Students who have an Individualized Education Plan (IEP) will participate in the 1:1 program, but will also be provided with any other assistive technology required by the student’s IEP. Some students with an IEP will not be required to participate in the 1:1 program if his/her education plan makes it inappropriate. The student, parents, and IEP

school team will together decide what device(s) are appropriate for students receiving special education services.

The most well-intended and well-funded 1:1 program will not meet its goals if all students do not have access to appropriate technology both inside and outside the school walls.

Integration

Author and technology thought leader Alan November opens his 2010 book, *Empowering Students with Technology*, with a discussion about why technology fails to make a difference in some schools and businesses. Citing Shoshana Zuboff, a professor at Harvard Business School, the conclusion is that technology layered on top of existing processes and procedures will serve only to make current practices more efficient, but not lead to any real systematic change or improvement (p. 2). The same outcome will happen in District 123 if implementation of the 1:1 program is not done intentionally and thoughtfully.

To change existing processes and procedures with classrooms, teachers must participate in ongoing professional development and be given time to collaborate with colleagues to develop and evaluate lessons so that computing technology can change instructional practices. It is easy to simply digitize a worksheet and call it technology integration, but if the vision is about remaking student learning, more support must be offered. Teacher capacity must be developed so that student capacity can, too. The advocated policy will articulate that teachers will be supported through professional development opportunities and that each building will have a full-time technology integration staff member who can provide on demand support and planning for teachers.

Like classroom teachers must have ongoing professional development to innovate classroom practice, school and district leaders must also understand and model the innovative use of technology and have a common and clear vision for its implementation in the school building. In the words of Tony Wagner in his 2006 work *Change Leadership*, “If we, as leaders, deny ourselves the opportunity to ‘grow on the job,’ how likely is it that those around, those who work for us, are going to feel genuinely entitled to the same right themselves?” (p. 223). Without a clear vision and clear modeling, confusion ensues, and staff will not understand the expectations.

Objectives are Appropriate and Good

A 1:1 technology initiative is intended to support the goal of arming students with the skills necessary to succeed in future endeavors. Technology plays an increasingly important role in that preparation. As public servants, we must ensure all students have access to these fundamental educational tools, and the best possible instruction to maximize potential and make truly innovative thinkers. Teachers, administrators, students, families, and community members all play an important role in this transition. Teachers must shepherd students through their high school journey, administrators foster a climate conducive to effective teaching and learning, students perform the heavy lifting of learning new skills and applying content in meaningful and authentic ways, while parents and community members offer support both financially and emotionally to the students and the larger organization. As a community-based organization, it is our responsibility to collaborate with stakeholders to offer the tools, the facilities, and the curriculum necessary to prepare the students we serve.

SECTION FOUR: POLICY ARGUMENT

This section outlines the pro and con arguments of the advocated 1:1 technology policy. The arguments consider research findings, public and professional opinions, and other relevant factors. While the extent to which any of the possible pro and con outcomes will be realized in practice is unknown, each is important to consider prior to and during implementation.

Arguments for 1:1 Policies

As described earlier in this paper, the positive effects of implementing a 1:1 policy are many. Improved student achievement, both in the areas of content mastery and 21st century skill development, are the most significant improvements that stem from a 1:1 computing initiative (Doran, L., & Harold, B. 2016; Zheng, Warschauer & Chang, 2016). If done well, schools can transform learning from teacher-centered, content-based classrooms that ask students to function at the lowest levels of Bloom's taxonomy, to those that foster authentic, inquiry-driven, skill-based, and student-centered learning that maximizes the potential of technology-rich classes (An, Y.J., & Reigeluth C., 2011; DiMartino, J. & Clarke, J.H., 2008; Friere, Paolo, 2000).

In addition to 1:1 initiatives improving content and skill development within specific disciplines like reading, math, and science, providing students intentional and guided practice with technology at a young age prepares them to be good digital citizens (Bebell, D., & Kay, R., 2010; Bhat, C. S., 2008; Hollandsworth, R., Dowdy, L., & Donovan, J., 2011). Awareness of the impact of cyberbullying, along with offering social-emotional supports within a school to deal with such issues can prevent problems on and off the school campus. Teaching students to use technology appropriately for

academic purposes, to be aware of their digital footprint, and to interact meaningfully in the digital space are skills essential for the modern student (Van Ouytsel, J., Walrave, M., & Ponnet, K., 2014).

Implementing a 1:1 program prepares students to contribute to the national and global economy. In the last decade, the composition of the American economy has changed so that the service sector represents over 70% of the product market, far surpassing agriculture and industry (Johnston, 2012). The service sector includes technology-based industries. In fact, the percentage increase in available STEM jobs far outpaces the percentage increase in jobs across all industries in the years 2010-2020. While all jobs are predicted to increase by 14% during that time, the number of computer science analysts, systems software developers, medical scientists and biomedical engineers are expected to rise by 22%, 32%, 36%, and 62%, respectively (Science, 2016). In light of this reality, the Department of Education has placed an emphasis on increasing access to technology and technology-based education courses (Science, 2016, <http://www.ed.gov/stem>). Schools have the responsibility of preparing students for their futures. Today, technology savvy and the ability to think deeply are critical components of a high school educational program.

On a smaller scale, the implementation of a 1:1 may reduce the need for paper textbooks and therefore reduce the burden on students who have to carry these bulky and often outdated resources. In addition, digital texts potentially decrease costs to schools and provide richer and more interactive content to students. Instead of stagnant printed texts that become outdated shortly after purchase, digital textbooks allow students access to interactive content that often includes embedded videos, dictionaries, and linked

activities and quizzes. In addition, they often provide resources that help students with disabilities or who speak English as a second language to fully access the curriculum. For example, most online texts have the ability to be read in multiple languages, have text-to-speech options, have more visual and auditory components, and feature digital study tools like flashcards or games.

In addition to supporting the use of digital texts, a 1:1 allows students to access to technology that enables them to collaborate with peers from home, get digital feedback on submitted work, and keep all materials organized and accessible in the teacher's online classroom housed within the learning management system (LMS) used in District 123. District 123 uses an LMS called Schoology, which like many of the others such as Blackboard or Edmodo, provides a "walled" digital environment for students and teachers to interact.

The positive outcomes associated with implementing a 1:1 initiative are such that teaching and learning could be transformed in ways not before possible. The walls of classrooms are virtually eliminated and learning can happen anywhere, any time, and with teachers and colleagues from across the globe.

Counterarguments of a 1:1 Policy

While the potential of a 1:1 to redefine teaching and learning is staggering, if not done well, its implementation might not have the desired impact on teaching and learning and at its worst, could bring unanticipated consequences that stall the program.

Many articles and research studies have asserted that the implementation of 1:1 models in schools has not had the desired effect. Some studies indicated that pedagogy

did not change with the inclusion of technology, which ultimately served only as a digital worksheet provider (November, 2010; November, 2013).

Other studies indicate that student performance was negatively impacted by the infusion of technology. A study of eight Michigan schools found a negative impact in reading and math in three of the schools and no effect in a fourth (Goodwin, 2011; Lowther, Strahl, Inan, & Bates, 2007) Yet another study of schools in Texas found that while math scores slightly increased with the addition of technology, writing scores were lower for the laptop group than those students who did not have technology (Shapley et al., 2009).

While some research points to disappointing results in student growth and little effect on pedagogy, other research highlights increased student achievement after technology was meaningfully embedded in teaching and learning (Zheng, Warschauer & Chang, 2016). The difference in the schools for which 1:1 programs had a positive impact was in the implementation. Schools that included a carefully planned model that included teacher training and support seemed to have more success (An, Y. J., & Reigeluth, C., 2011; Bebell, D., & Kay, R. 2010). Schools that did not support teacher growth or offer courses and professional development to teach teachers how to use technology well, saw little change in the classroom.

One of the nation's largest school districts, Los Angeles Unified, rolled out Ipad's to its students in 2013, and two years later found themselves in a huge financial hole with devices that did not work and an incomplete curriculum package (Lapowsky, 2015). Like many other districts, LA rushed to implement the newest and shiniest toy without first asking what curricular problem are they were trying to solve and finding the best

solution. Similarly, a school district in Hoboken, New Jersey ended up throwing away hundreds of thousands of dollars of laptops because of poor implementation. Without guidance and training, students broke, lost, stole or mistreated the devices, the security software bogged down the system, and teachers were unsure how best to use the devices in the classroom (Barshay, 2014).

In addition to the pitfall of implementation, communities may push back at the cost of bringing on such a program. In District 123, for example, parents are required to pay \$95.00 annually beginning freshman year. This is in addition to the regular registration fees of about \$180.00, not including optional purchases. When information was first shared about this new requirement, parents called, emailed and attended meetings to vociferously object to the new required fee. Some parents are refusing to have their students participate in the 1:1 program, stating their student will bring their own device instead of buying the school issued one. This is a conundrum the district has yet to solve, and is an example of an oversight in planning. Because all members of the district did not have the same vision for the rollout of these devices, there is no clear district position on this issue.

Like any new program, bumps in the road are inevitable, and without proper planning of logistics, finances, and training, the bumps can become mountains. However, if a vision is cast and a technology plan is developed that considers the needs and desires of the programs while planning for implementation, the pros of a 1:1 program far outweigh the potential pitfalls (Jackson, 2011).

SECTION FIVE: POLICY IMPLEMENTATION PLAN

District 123 has an existing Bring Your Own Technology (BYOT) policy that outlines the purpose of said program. Policy 6:220 *Bring Your Own Technology Program; Responsible Use and Conduct* articulates the technology skills the BYOT program is intended to promote, like web-literacy and habits of the 21st century. However, this paper advocates for updating the BYOT policy to reflect a 1:1 computing model in District 123 that emphasizes more than just device literacy and pledges resources toward communication, equal access, shifting instructional environments and professional development while adhering to other board policies and legal requirements for child safety and acceptable use. What follows is a plan for implementation of a 1:1 policy so that the policy is administratively feasible.

Background

As we embark upon this 1:1 journey it is essential that all stakeholder groups understand the need for a 1:1 program and the essential components to make it successful. These stakeholder groups include building and district leaders, school board members, teachers and students, and families and community members. To gain support for this initiative, a common vision must be constructed and shared so that an understanding of the problem and the urgency of the solution are shared by most (Wagner, 2006). While District 123 began years ago the logistical and technical preparation for this transition to a 1:1 by improving our infrastructure and expanding our technology staff, a common vision for the role of and potential for technology in the classroom has been more challenging to achieve. What follows is background that

places into perspective our journey thus far and highlights the causes of disunity amongst the leadership.

Early Technology Expansion

Access to technology in our school buildings has expanded in recent years, starting with the purchase of carts of laptops and Chromebooks for teacher checkout, the inclusion of Ipads in the ELL, science and world language classrooms, and then with the BYOT program implemented in 2013. With that came an increase in professional development featuring innovative classroom strategies and the integration of technology. In the 2014-2015 school year, I successfully advocated for a 66% increase in the staff development budget that was used to organize seminars and workshops to train teachers in 21st century skills as well as to pay teachers to develop curriculum during the year and over the summer.

Gaining Support from Veteran District Leaders

During this time, there was some turnover in the district office and building administration. The new administration was very much in support of the increasing need for and training around meaningful integration of technology. A new duty release period was created for teachers to work in a support capacity as fellow instructors transitioned from a conventional to a more innovative classroom. However, the veteran district leaders were less enthusiastic about supporting a 1:1 initiative, sometimes referring to computers as “electronic pencils”. The rest of the cabinet team, which includes principals, the associate superintendents, and the directors of special education, technology and curriculum and instruction, worked to build support for the endeavor. Bringing research, videos, student voice, and inviting well known speakers on the topic to

create excitement around the notion of 21st century classrooms, we hoped to gain some momentum for the idea. After several months, the superintendent gave permission for a small 1:1 pilot in each school.

Launching a Pilot

Excited by this opportunity, we researched and wrote an extensive executive brief on the topic, the pilot, and the measurement tools used to determine the impact of technology in the 1:1 classroom for members of the Board of Education. We then recruited teachers in English and social studies to pilot the devices in their varied classrooms. After identifying participating students, we mailed home letters explaining the free pilot to students, enclosed an agreement form, and invited families to attend an informational meeting. The meetings were sparsely attended, with three families attending in one building and none in the other. Nevertheless, students returned their signed forms and we visited each classroom to talk about the pilot, the safety and filtering mechanisms, and to distribute the devices.

The pilot teachers attended trainings, visited 1:1 schools, and met quarterly to share experiences with us and with each other. Twice during the pilot, we surveyed students, teachers and parents about their experience to see what impact it was having on student learning, student academic behaviors, classroom environment and academic achievement. The data revealed the positive impact a 1:1 structure has on teaching and learning (see Appendix A). Almost all parents were supportive, noting that students used the devices at home for academic purposes. Students were primarily positive, stating that they were not distracted by the devices as many feared they would be, instead able to remain more organized in and out of school, collaborate more with peers and

teachers, and increase the quantity of writing they produced. Teachers agreed, students came to class with their device charged most of the time, and students did not misuse the device while in class. One English teacher even noted that her “prep” level students improved in their writing quality and quantity as compared to other non-laptop classes. All teachers clearly and loudly shared the desire for more and increased training on how to implement technology to rethink the classroom experience.

Expanding the Pilot

Following this pilot of about 150 students, we plotted the survey data, filmed students and teachers speaking about their experience and showed it to the Board of Education and the cabinet. The Board was very supportive, with all but one member willing to financially support the devices. Our superintendent asked for a one-page summary as well as a recommendation on the next steps, and after returning it for revision on at least on occasion, we finally produced a document that successfully shared our desire to expand the pilot to gather more data. We brought this to the Board for discussion and the approved expanded pilot increased by twice the number of participating students and teachers, and included more subjects and levels of classes, from prep to AP.

Like in the first pilot, we hosted parent meetings, distributed permission slips, had teacher meetings and trainings, and surveyed students, teachers and parents who participated. Again, the data was supportive of 1:1, with even more empirical data from science teacher who included assessment results comparing students in the pilot with those who were not. Students in the pilot group outperformed non-pilot students and performed better than past classes as well. While there were many variables not

controlled for in this data, it was interesting nonetheless and demonstrated the powerful potential of technology in the classroom. The final presentation to the Board featured all of the pilot teachers speaking to the impact of technology on teaching and learning, many wondering aloud how they would instruct the following year without devices.

1:1 Budget Models

The Board of Education saw the need for increased access to technology, and expressed support for moving forward with a 1:1 program. However, cost was a concern, and they asked for several cost models be brought forward for consideration. We researched cost models in other districts and offered proposals that reflected different options, including a full-district pay program, a shared parent-district cost model, and a model in which computers were fully paid for by families. The device we suggested was a moderately priced, but well-constructed Chromebook that was used by our students in the pilot. And, despite the committee recommendation that the district absorb some of the cost of the device, district leaders chose ultimately to make families absorb the full cost of the device, plus all ancillary costs, like the cost of the lease and Google licensing fees. As a result, freshman parents now have a required fee increase of \$95.00 each year for four years, after which time the student takes ownership of the device.

While our educational activities and action research revealed to most the need for a 1:1 program, the district leadership remains in different places regarding its importance. Despite the disunity, the 1:1 is moving forward in the 2016-2017 school year, and we now need a plan to foster the development of a common vision and standards and a system to effectively manage the program.

Developing a Common Vision

To successfully implement the 1:1 program and the new policy suggestions, building a common vision is essential. Mary Dawe writes in her 2013 work *The School Leader's School Kit* that “to have a shared sense of purpose is crucial to real school improvement” (p. 16). Though the 1:1 has already begun in District 123, we are a ship without a rudder. There has been no shared vision amongst all members of the administrative team. And for the majority of us who do agree on the vision, we have not clearly articulated it or the indicators of success for the new program. To remedy this, we need to do the following:

- Identify our common expectations for the program as a leadership team.
- Gather a committee of teachers and students to help develop indicators of success for the program and use those indicators as measures of progress.
- Communicate our belief about the importance of transforming teaching and learning through digital tools with our community via the website and the strategic planning process.
- Solicit feedback from all stakeholders with regular feedback mechanisms. Make changes to the program, or to the program goals, as a result of that feedback.

While having a shared vision and related indicators of success will allow all stakeholders to measure the success of the program and to adjust as needed, only having a vision is not enough. Robert Evans (1996) notes, “It is one thing to say in most successful organizations members share a clear, common vision, which is true, but quite another to suggest that this stems primarily from direct vision-building, which is not. Vision-

building is the result of a whole range of activities” (pp. 208-209). What follows is “a whole range of activities” a successful implementation will require.

Adult Learning

As earlier stated, robust and individualized professional development is an essential component of a successful 1:1 initiative (Skyora, 2014; Bebell and O’Dwyer, 2010). To date, we have allotted hundreds of thousands of dollars toward this goal, but the policy should reflect the district’s ongoing commitment by including the allocation of resources to it. Staff development comes in the form of conferences and workshops, both on and off campus and led by local teaching staff as well as local, state and national experts in the area of technology integration. In addition, monies must be allotted to support curriculum development done outside of the school day.

In preparation for this new classroom reality, teachers have already begun training. The summer before the 1:1 launch, the district hosted a 3-day summer university in June of 2016. During the 3-day event, teachers attended a variety of sessions taught by a combination of internal staff and external experts who highlighted ways to integrate technology and implement pedagogical best practice. This training will continue at the opening day institutes when we welcome a national expert on technology integration and 21st century learning followed by classroom sessions taught by our own internal experts. Growing internal expertise through job embedded professional development has been shown to be one of the most effective ways to systemically improve teaching and learning (Hirsh, 2009).

Pre-planned development is one avenue for learning, but to support on-demand teacher learning, the 1:1 policy should articulate that the district will provide technology

support personal as deemed necessary and appropriate to bolster teaching and learning. In the short term, the district has already created a full-time position of “Technology Integration Specialist” (TIS) in each building. These staffers are expected to provide embedded professional development and on-demand support in the form of co-teaching and co-planning with classroom teachers. Experts in technology integration and curriculum development, the TISs will offer courses before and after school, host “lunch and learn” sessions, develop online resources for teachers and parents, and offer a technology session for our community at Parent University in the fall. Parent University is an evening of courses to which we invite the adult members of our community to attend at no cost. Sessions include a wide range of topics, from social/emotional to technology use to college planning. The effectiveness of the TIS in support system-wide change will be will be reevaluated as the program matures and the needs of the staff may change.

Student Learning

Like teachers, our students will also be experiencing a 1:1 model for the first time while in high school. Though some of our students participated in a similar model in junior high, most have not, and we need to prepare our young adults to participate effectively. To facilitate that preparation, District 123 developed a Digital Citizenship course that teaches not only basic keyboarding skills, but introduces students to online organization tools like Google, demonstrates how to evaluate online sources and find scholarly articles, teaches students about the lasting nature of a digital footprint and the power of social media. While not yet a required course, we hope the Board supports reevaluating the graduation requirements to include this class among those needed earn a

diploma. While all students sign an acceptable use policy as per policy 6:235- *Access to Electronic Networks*, and policy 5:125 – *Personal Technology and Social Media: Usage and Conduct*, this course is an important addition to prepare our students for life in a technology-driven world and help them understand the purpose for the appropriate use agreements they sign.

Time Schedules

Students will pick up their devices during summer walk-in residency and registration in July of each year. This event is required of all students, as this is when families prove they live with the boundaries of the school district, pick up student school and bus schedules, select textbooks, and purchase other required materials. Any remaining devices will be given to students at the freshman orientation, which occurs the week before school starts. Distribution of 1:1 devices begins with the graduating classes of 2020 and 2021. Incoming freshman of each subsequent class will also participate so that all four grade levels will have a device in three years' time.

Program Budgets

Technology related expenses represent an increasing share of our yearly expenditures. Where only 10 years ago they accounted for only about \$250,000, the current technology budget has ballooned to about 1.1 million dollars annually simply to cover the costs of existing technology staff, regular hardware and network maintenance, cloud-based software contracts like Google and Schoology, as well as subscription and installed software. We know these costs will likely increase as the 1:1 initiative is implemented.

Costs that are likely to increase due to 1:1 program include additional technology staff and more software and hardware requests as teachers begin to transition their teaching to integrate Chromebooks. In addition, classroom spaces will gradually change in their physical layout, with more student tables and collaborative spaces instead of traditional student desks in rows. New furniture and technology will be required to support this classroom shift. Another cost to be absorbed by the district in the proposed policy includes a small fraction of the cost of student Chromebooks. The approximate costs of the increases in technology expenditures due to the 1:1 rollout are listed in Table 2 and detailed in the paragraphs which follow the table. These costs can be expected to remain fairly stagnant during the initial rollout and for the first two years thereafter.

Table 2
Approximate Costs of a 1:1 Initiative

Item	Approximate Cost
New Staff	\$400,000 annually
New Software	\$50,000 annually
New Hardware and accessories	\$50,000 annually
New Furniture	\$40,000 annually
Total additional approximate annual cost for each of first 4 years.	\$540,000

New Staff

New staff will cost about \$400,000 annually. This dollar amount encompasses one additional technology staff member, two full-time Technology Integration Specialists, one for each building, and one additional classroom teacher to support new coursework for students. The need for these positions will be evaluated during the four years of implementation.

New Software

As more and more teachers use the device, we anticipate an increase in requests for new software and program subscription. We have allotted approximately \$50,000 annually toward these purchases. The current software costs are about \$100,000 dollars. We assume requests for additional software and applications will grow by at least half as more devices are in classrooms. However, we believe the costs will be partially offset by a reduction in the number of hard copies of textbooks. Historically, we purchase one copy of the text for each enrolled student, plus a few extra. New textbooks can cost anywhere between \$100-\$200 per book. Instead of buying, for example, 800 U.S. History textbooks for all junior students in the district, we can buy classroom sets, one for each classroom, and share with all students the code to the online textbook. In the U.S. History example, this would reduce the number of books purchased from 800 to about 300.

New Hardware and accessories

We budgeted for a \$50,000 increase in hardware and accessory requests during the early years of the 1:1 rollout. We expect that teachers will begin requesting additional hardware, like better teacher laptops, Chromecast devices, improved sound systems, etc., as classrooms become more technology based. As an example, teachers are already requesting better teacher laptops that are more portable and have touch screen capabilities. Each device costs around \$300 more than the current teacher issued laptops cost.

Furniture and classroom set-up

We are currently budgeting an increase of \$40,000 annually in teacher requested capital expenses for classroom furniture and set-up. As classrooms become more inquiry and student-centered, the need to change classrooms from the traditional desks-in-rows structure to more versatile collaborative spaces will become increasingly obvious. We have seen this evidenced in local high school districts ahead of us in the 1:1 model. Though the shift of classroom layouts and furniture can happen gradually, innovative furniture solutions are costly, running as much as \$1000 for a single power-capable student table on wheels (smithsystem.com).

Contribution to Student Chromebooks

The proposed policy asks the district to absorb a fraction of the cost of the student Chromebook devices, instead of passing the entire cost onto our families. This contribution would bring an increase in district expenditures of approximately \$40,000 dollars annually. Because the cost of the required Chromebook is in addition to, and not in place of, the typical registration costs for students, many parents have expressed anger and resentment at the increased cost. Some even refused to participate, contacting the superintendent directly. As a show of good faith to the community that we believe this transition is a crucial one for student preparation, the proposed policy includes a \$50.00 contribution towards each \$380.00 device cost. Unless student population increases dramatically, this cost will remain fairly constant.

Summary

The inclusion of a 1:1 model is expensive, adding over a half million dollars to an already growing part of the school budget. And, these numbers do not include any increase in the rate of wear and tear on existing network or technology infrastructure from increased use. However, these are the necessary costs of doing business in the field of education in the 21st century. Budgets are not limitless, and choices will need to be made, but we must make them always through the lens of what is best for students.

The logistical components of a 1:1 plan are complex, and each component as important as the next. Quality staff development, adequate budgets, organized distribution and student support, are all necessary for a successful implementation. Above all else, ensuring that a common vision is not only cast, but maintained and measured as time passes is most crucial to the maximizing the impact on teaching and learning and keeping coherent the purpose for the teachers and the community.

SECTION SIX: POLICY ASSESSMENT PLAN

The purpose of this Policy Assessment Plan is to introduce processes to monitor the implementation of a 1:1 Chromebook program in District 123. This study proposes updating the current BYOD policy language to include the goals of a 1:1 Chromebook program and allocation of appropriate resources to support it. The following plans include a discussion of the policy's expected results, the impact areas to be studied, the assessment mechanisms, and the person(s) responsible.

The proposed amendment to the current policy 6:220 – *Bring Your Own Technology Program; Responsible Use and Conduct* includes shifting the language to support the transition to a 1:1 Chromebook program so that the goals of improved student academic achievement, inquiry-focused classrooms, and increased technology and internet savvy are clearly stated. It is further expected that an update on the impact of the 1:1 program is given to the Board of Education in the spring of each year.

Expected Results of the Policy

The expected results of this policy and program implementation are classrooms that are more dynamic, that feature student-driven learning, and that develop students who can interact meaningfully in the digital space. Under this model, students can demonstrate mastery in unique ways and gain an academic voice in the global digital community. To achieve this, we need not only a thoughtful logistical plan of device distribution and maintenance, but a robust assessment mechanism to measure if the program is having the desired instructional effect.

The 1:1 assessment mechanism(s) must be developed prior to implementing the 1:1 program. In his work *Utilization-Focused Evaluation* (2008), Michael Quinn Patton

tells the reader “that what happens from the very beginning of a study will determine its eventual impact long before a final report is produced” (p 36). He goes on to say a piecemeal approach to evaluation will result in piecemeal impact (p. 36). To maximize the impact of the 1:1 policy, a method by which to evaluate the success of the 1:1 program in achieving the desired goals must be developed from the beginning. A multi-dimensional assessment mechanism will allow the district to identify where the 1:1 is working and where additional support is needed. Each of the areas below will be a targeted area of assessment used to measure the impact of the proposed 1:1 policy. See Appendix C for a complete 1:1 Assessment Matrix which includes the areas to be assessed, the assessment mechanism, and the person(s) responsible.

Areas to be Assessed

A thorough assessment of the 1:1 policy and program must include curricular, financial, cultural, and technical components and collect feedback from stakeholders at all levels of the organization. From the technology staff who manage the logistical components of the initiative, to the building leaders who support meaningful teaching and learning across all disciplines, and the district staff who monitor and manage it at a macro level, all are necessary to transition District 123 to one that best prepares modern students for post-secondary pursuits. Each of the following impact areas is essential to the successful rollout of this initiative and must be assessed to understand the impact of the 1:1 Chromebook model.

Effectiveness of the Device

Though a seemingly simple portion of the assessment, it is important the we are asking our teachers to use and students to purchase a device that is durable, reliable, and

worth the cost. To evaluate this, the district technology staff and the Director of Technology will collect data on the number of times devices are brought to the technology office for repair and the types of repairs required. The Director will also keep up to date on other available devices should a switch be necessary. In addition, a student survey will be sent out by the Director of Curriculum to gather student feedback on this issue, and many of the others included in this list of assessed impact areas.

Technology Support

The proposed policy includes financial support for additional technology staff. We need to measure if we have the appropriate amount of support as the number of devices grows over the first three years of the program. To measure this, our technology staff will log the amount of time they spend on 1:1 devices. In addition, an ID scanner will be placed in the technology office to measure how many students go to the tech office for assistance. Similarly, our Technology Integration Specialists, who are intended to serve as instructional coaches, use a software program that measures how many appointments they have each day, and with whom. This data will help us determine if we have enough or too many technology support staff. It will also reveal if we should consider creating a student run “genius bar”, manned by tech savvy students who can answer questions from students and teachers alike.

Student Achievement

While the academic impact of a 1:1 might be the most desired piece of data, it might also be the challenging to collect. Though the Board of Education demands to know this impact, there are a number of challenges in collecting quantitative data of this kind. First, because we are starting with freshman, we have no “non 1:1” data to

compare for this cohort of students. Second, standardized tests, the most common marker of school success, do not necessarily measure the desired effect of technology in the classroom, that is, more inquiry-based problem solving. Third, many other variables cloud the impact of technology in the early stages of the rollout. As we adjust our support mechanisms, build a culture of digital expectations, and establish student technology skills, a lack of those things will mitigate the positive impact in the short run.

Despite these challenges, we must do our best to measure the academic impact of the 1:1. To do so, we will use our sophomore students, who are also participating in year one of the rollout, to compare pre and post 1:1 GPA. Specifically, the Director of Curriculum will compare the cumulative average GPA of that cohort as freshman and as sophomores. While many factors could contribute to a GPA increase, it is one piece of data that could generate continued support for the policy. In addition, the Director of Curriculum will also survey teachers, students, and parents about their perceptions of whether skills, grades, and work product have improved as a result of the 1:1. Finally, the Director of Curriculum will compare the freshman and sophomore PSAT (practice SAT) tests to the state and national average. However, because those are new exams this year, we have no comparable data.

Classroom Environment

It is expected that the introduction of Chromebooks to the classroom will positively impact the classroom environment. One of the desired outcomes of the 1:1 model is the increased use of technology to support collaborative, student-driven and inquiry based lessons. In such a classroom, students are talking more than the teachers, and classroom activities require increasing student cognitive demand. This increase in

cognitive demand is represented in Webb's Depth of Knowledge (DoK) (Webb, 2005). See the DoK in Appendix D. This model, which has been a part of earlier District 123 professional development, organizes curriculum into four categories of intellectual rigor from lowest to highest. Classroom activities that fall into the lowest level are those that feature recall as the primary skill. Those in the highest level promote extended thinking. The addition of a 1:1 Chromebook model will support the movement of classroom activities from the lowest to the highest levels of the DoK. We will track the extent to which this is happening through formal and informal classroom observations, which are stored in our online evaluation database. In addition, all of our teachers must develop district-wide common pre and post assessments for a given course. Those assessments are reviewed by department chairs and are to include tasks that fall into all of the levels of the DoK, so we can measure student growth on mirrored assessments that capture the growth of students at all academic levels. The data from these assessments are analyzed at the district level and will reveal what classes have students performing well in extended thinking.

As teachers shift their methods of instruction, it is expected that they will begin to request a different classroom set up that requires different furniture. Principals will be required to monitor teacher requests and include them in their yearly building budgets.

Cost Sustainability

As a public school we have a fiduciary responsibility to provide the best education in the way that is most fiscally responsible. To that end, we must make sure that the increased costs of this program are within our budget and be prepared to reduce costs if necessary. The Director of Technology and the Business Manager will review

yearly revenues and expenditures to ensure we are within budget and recommend needed changes.

School Culture and Climate

The inclusion of 1:1 technology will impact the school climate and culture in unexpected ways. We need to monitor if there is a rise in student visits to school social workers, counselors, or deans related to the 1:1. Is there an increase in cyberbullying? Do we see an increase in student anxiety? Is a change in student interaction in public spaces, i.e. the cafeteria or student commons? Principals and associate principals will review social worker and dean's logs to measure how many students are visiting and for what types of issues. We also have an anonymous bullying reporting mechanism that can alert building leaders to an increase in this type of activity. Finally, a student and staff survey will help measure the perception of building culture and climate. Should data reveal concerning patterns, building leaders will develop interventions to address unhealthy student behavior and/or staff concerns.

Student Perceptions

Students are among those most impacted by a 1:1 initiative. Therefore, it is essential that we understand what they are experiencing and gather their feedback on what is working and what needs improvement. The primary method for collecting this information is a student survey that will be administered district-wide by the Director of Curriculum. The results will be shared with building and district administrators.

Curricular Implications

As building and district leaders, we understand that students enter high school with varying degrees of comfort with using technology as an academic tool, and not just a

social one. During year one of the 1:1 rollout, we must identify the extent to which students need training on the social-emotional aspects of technology-based learning. For example, students should understand the long-term impact of digital footprints, or the dangers of cyberbullying. We must also gauge how well students are able to use technology to research and develop high quality academic papers and projects. Gathering this information will happen initially in middle school articulation meetings. These meetings include teacher content-area representatives from the high school and each middle school that sends students to District 123. A focus of conversation will be around strategies by which we might ingrain these academic and social-emotional skills in our students to make sure they enter high school ready for the transition.

In addition to middle school articulation, we will use the aforementioned student and staff survey to gather information about needed student skill development. The information collected from deans and social workers will help inform this as well.

To prepare students to use technology well, District 123 is planning a Digital Citizenship curriculum in our freshman study halls to ensure every student gets baseline exposure to these important skills.

Teacher Training

District leaders understand that teacher training is essential to a successful 1:1 program. The proposed 1:1 policy includes a commitment to providing funds towards teacher training. Continued feedback from teacher evaluations, common assessments, technology coaches, and teacher surveys will inform the Directors of Technology and Curriculum how much and what type of professional development is needed. It is imperative that the training is differentiated, so that teachers at all levels of the

technology proficiency spectrum can learn and grow. The Director of Curriculum will be responsible for monitoring and developing professional development opportunities.

Community Perceptions

The parents are funding most of the cost of the Chromebooks. Taxpayers are funding the rest. We need to understand how well the parents are receiving the 1:1 and how willing the community is to continue to support their purchase. We can gather that information, in part, by counting how many parents refuse to participate in the initiative by not buying a device for their students. The Director of Technology and the Business Manager have this data. But we are interested in more than just participation rates, rather we also want to know how the devices are being used at home and to what extent parents believe they are effective in supporting their student's academic growth. We will collect parent perceptions of the 1:1 through two primary mechanisms, parent advisory groups and parent surveys. Principals meet monthly with their respective parent groups to share information and gather feedback and perceptions on school issues. The 1:1 is a standing agenda item. Second, we will send out a parent survey early in second semester to gather parent impressions.

The information collected in all of the above areas will be reviewed by the Cabinet team, which meets weekly and consists of the Superintendent, Associate Superintendents, Directors and Principals. The feedback will determine what changes, if any, must be made to support the success of the initiative and the ongoing classroom transformation. We will share the results during a formal presentation to the Board, and with the larger community on the district website and through the strategic planning process.

SECTION SEVEN: SUMMARY IMPACT STATEMENT

This Summary Impact Statement provides a discussion regarding the beneficial effects of implementing the proposed 1:1 Chromebook policy that are addressed in this study. Section seven also includes a description of those impacted by the policy, provides a statement regarding the appropriateness of it, and offers a reflection of the values addressed in the policy.

Impact on Stakeholders

Suggested updates to the current policy 6:220 – *Bring Your Own Technology Program; Responsible Use and Conduct* would impact all stakeholders in the organization. Shifting to a 1:1 device model impacts students, parents, staff, and administrators at all levels of the organization. As described earlier in this paper, all stakeholders have a role in the implementation of this model, but the impact of the model on stakeholders is just as important. If done well, implementation of a 1:1 model should make changes in the larger culture and climate of the school and community. Whitaker and Gruenert (2015) describe climate and culture in this way, “If culture is a school’s personality, climate is its attitude” (p. 11). If we can successfully change teacher’s attitudes towards the power of technology in creating authentic, relevant and student-centered classrooms, then the culture will learn to value that method of instruction. In so doing, we can shape the entire organizational culture of teaching and learning. What follows is a summary of how the needs and concerns of all the major stakeholders are met by this pedagogical shift.

Students

The group most impacted by a pedagogical shift is students. Learning in an authentic environment that cultivates curiosity and harnesses the power of technology to create meaning learning tasks will engage students differently with content, peers and teachers. Wendy Ostroff's 2016 book, *Cultivating Curiosity in K-12 Classrooms*, outlines how curiosity compels learning:

1. Curiosity jump-starts and sustains intrinsic motivation, allowing deep learning to happen with ease.
2. Curiosity releases dopamine, which not only brings pleasure but improves observation and memory.
3. Curious people exhibit enhanced cognitive skills (p.3).

Students responding to curiosity and not compliance will learn more deeply, enjoy the process, and engage more meaningfully with content. Students will stop finding answers, and start asking questions. They become less dependent on the teacher and more dependent on their own ability to identify issues and solve them. Though still needing adults to frame the learning and shepherd them through it, students in this kind of learning environment are better prepared for “the complexities of ill-defined real-world problems” they will face as professionals (Lombardi, 2007, p. 10)

Teachers

Shifting pedagogical practice from a teacher-centered to student-centered model requires risk taking and a willingness to change from traditional classroom structures. A 2007 study of authentic 21st century learning identified ten design elements common to authentic learning environments, regardless of subject matter:

1. Real-world relevance
2. Ill-defined problems
3. Sustained investigation
4. Multiple sources and perspectives
5. Collaboration
6. Reflection
7. Interdisciplinary perspective
8. Integrated assessment
9. Polished products
10. Multiple interpretations and outcomes

Lombardi, 2007, p. 4

Each of the above elements combine to create lessons that allow students to transfer meaning from inside classroom walls to the larger learning community. This requires teachers to renegotiate the roles of the teacher and student by shifting from a “sage on the stage” classroom format to one where the teacher is the facilitator of student learning. The recommended policy includes the allocation of resources to professional development and to personnel who can support teachers during this pedagogical transformation.

This change process will be neither fast nor easy. As Hargreaves and Fullan (2012) suggest, “at the beginning [of an initiative], it will be a broken front with a few brave souls from different quarters operating in semi-independent packs, widening and growing the appetite for the new order, and eventually coalescing in a majority force that

carries the day” (p.150). But, with continued support and time to plan and reflect as teaching teams, the power of a transformed classroom will be apparent.

Administrators

As the visionaries, strategists, and financiers of this initiative, building and district-level administrators must dedicate time to develop a purpose and a plan for this program and write policy to support that vision and uphold our fiduciary and educational responsibilities. Furthermore, administrators are responsible to communicate the plan, get feedback on its progress, and adjust accordingly.

Families and Community Members

The transition to a 1:1 model represents a shift for all stakeholders. Not only are families asked to directly contribute financially to the cost of the program, it is taxpayer dollars that go to support the rest of the program as described in this study. We have a duty to communicate the plan to all stakeholders with transparency and share in the financial commitment this program requires

In addition to the financial obligation this program brings, family dynamics could be impacted by this instructional shift. Students will likely be on their computers more, submitting assignments and communicating electronically with teachers and peers. While having such a device in the home may allow other family members technology access heretofore unavailable, it also raises questions about appropriate amounts of screen time and increases the importance of parent awareness of their student’s digital footprint and appropriate internet use. Finally, not all families have internet access, so a 1:1 may force families to find ways to access free Wi-Fi.

Appropriateness of the Policy and Values Addressed

Schools have a responsibility to prepare students with the skills necessary for post-secondary pursuits. As discussed earlier in this study, a recent survey by the Partnership for 21st Century skills revealed that Americans do not believe schools are preparing students with the skills they need to be successful in today's economy (Partnership, 2015). Those needed skills include problem solving, collaboration and technological savvy (Critical, 2012). Access to technology, used as a means to transform classroom environments, is critical in developing those skill sets in students. Therefore, this policy is an appropriate solution to achieving that goal.

The plans for implementation are also appropriate to supporting a successful roll-out of the 1:1 program. Professional development, financial responsibility, logistical considerations, and student development in internet savvy, and safety and digital citizenship, are in place to support a smooth transition.

The values addressed through the recommended 1:1 policy include equity of educational access for all students, financial transparency and responsibility, and a commitment to offering all students the tools to prepare them successfully for post-secondary pursuits.

As a result of our earlier BYOT policy, we learned that when asked to bring their own devices, a significant technology gap existed between students. Some brought top-of-the-line laptops, others brought smart phones, and still others brought nothing at all. This not only made it difficult for teachers to plan lessons using technology, but left some students better able to access the curriculum and our district online Learning Management System than others. Very often, it was our most at risk students, those with

learning disabilities or from low socio-economic backgrounds, that were most affected by a lack of access to technology. We have a responsibility to ensure all students have the same equality of opportunity and access to needed resources. Shifting from a BYOT to a 1:1 technology model is one way to meet that responsibility. When all students have access to the same device teachers can plan accordingly and all learners can participate equally. In addition, reliable technology opens doors for students to learn in multiple modalities, increasing the likelihood that students learn material effectively. The ability to find content at multiple reading levels, in varied languages, which includes audio and visual components as well as writing and research tools, enables teachers to facilitate learning appropriate to the individual needs of each student.

As discussed earlier in this study, the District 123 community is taxed at a high rate. Increasing student fees to cover the cost of the 1:1 program has not been well received by district parents. The proposed policy includes a district contribution to offset by \$50.00 the total cost each family will pay toward the cost of a Chromebook. While only fraction of the overall cost of the device, this gesture by the district will communicate the importance of this initiative to the community and our dedication to supporting it. In addition, the proposed policy will include the dedication of financial resources to the professional development of staff implementing the devices as well as the cost of ongoing support and maintenance of the devices themselves. The details of the overall cost of the program were outlined in the budget portion of this study, the cost of which would be transparently shared with the Board of Education as a part of the yearly budgeting process. It is important that the community know, understand, and support the financial expenditures for this program.

District 123 has been recognized for excellence in recent years. The Washington Post, Newsweek, and Niche have all ranked the schools in District 123 amongst the best in the nation. To remain excellent, we must continue to provide a world class education responsive to the cultural, economic, social and political demands of the world in which our students live and work. The world has changed at a faster pace than the schools preparing students for it. If we do not embrace instructional models that prepare modern students, schools as we know them will become irrelevant. Making technology accessible to all students through a 1:1 model is a first step toward closing equality gaps and keeping open the doors of opportunity for the students of District 123.

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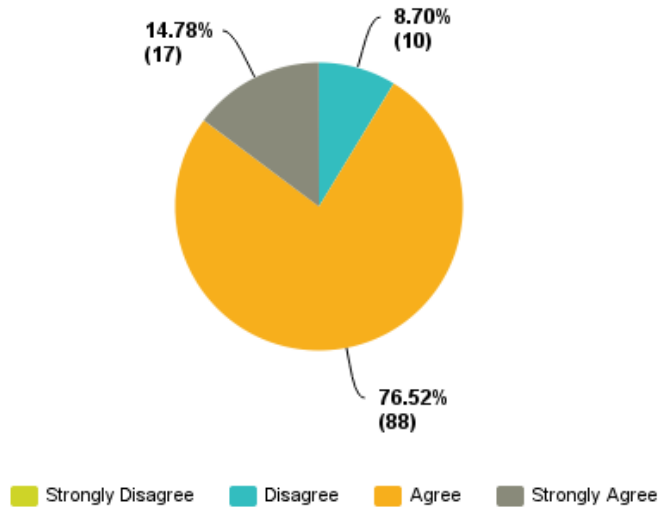
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Appendix A: Student Survey

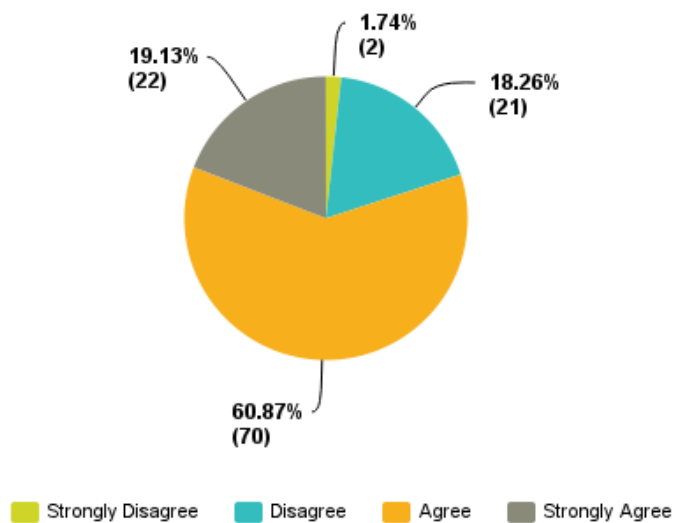
Q4 Using my Chromebook as a learning tool, I was more engaged with assignments.

Answered: 115 Skipped: 2



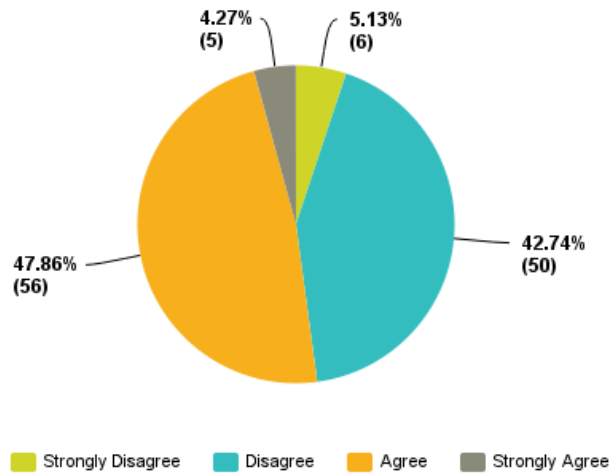
Q9 The Chromebook allowed me to work with other students on assignments.

Answered: 115 Skipped: 2



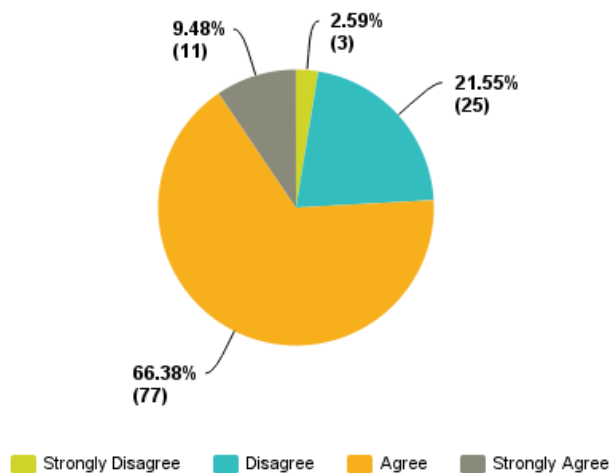
Q10 My writing improved as a result of having a Chromebook.

Answered: 117 Skipped: 0



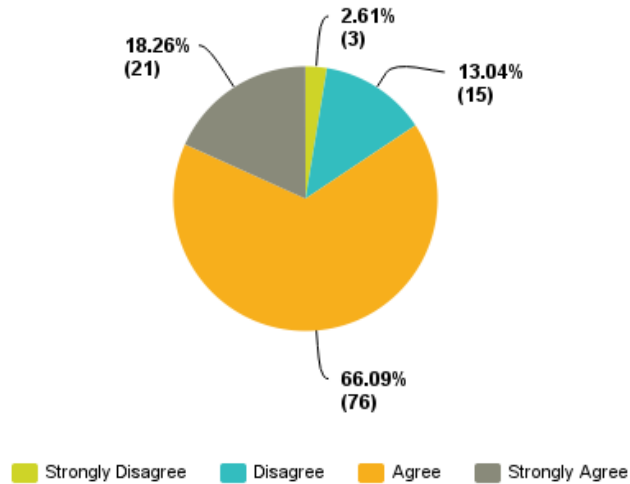
Q12 I took more ownership of my learning as a result of having a Chromebook.

Answered: 116 Skipped: 1



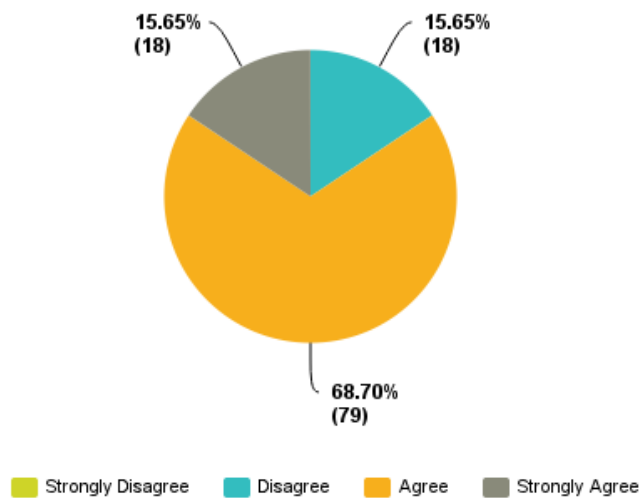
Q13 I remained focused, not distracted, with Chromebooks in the classroom.

Answered: 115 Skipped: 2



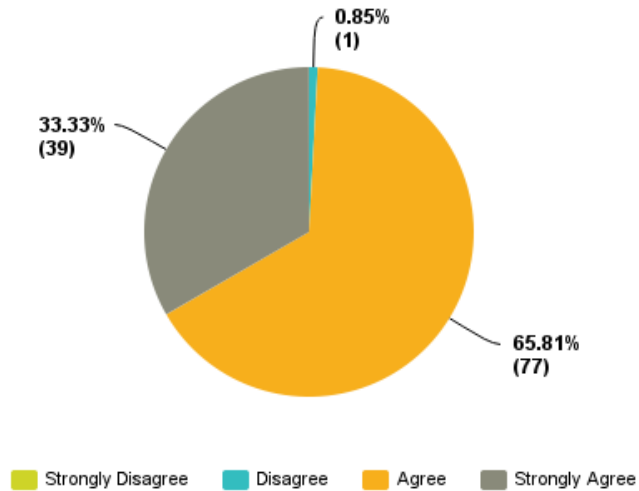
Q15 The classrom environment (structure, mood, atmosphere) improved during the 1:1 Chromebook pilot.

Answered: 115 Skipped: 2



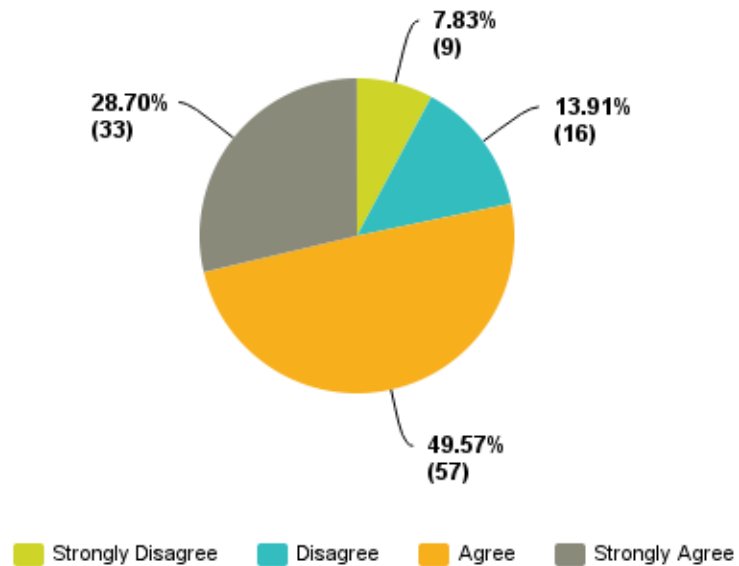
Q18 I followed classroom rules regarding technology use.

Answered: 117 Skipped: 0



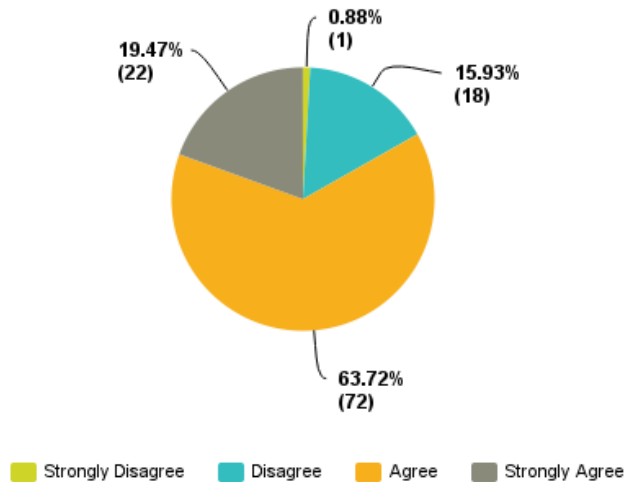
Q19 I used my Chromebook at home.

Answered: 115 Skipped: 2



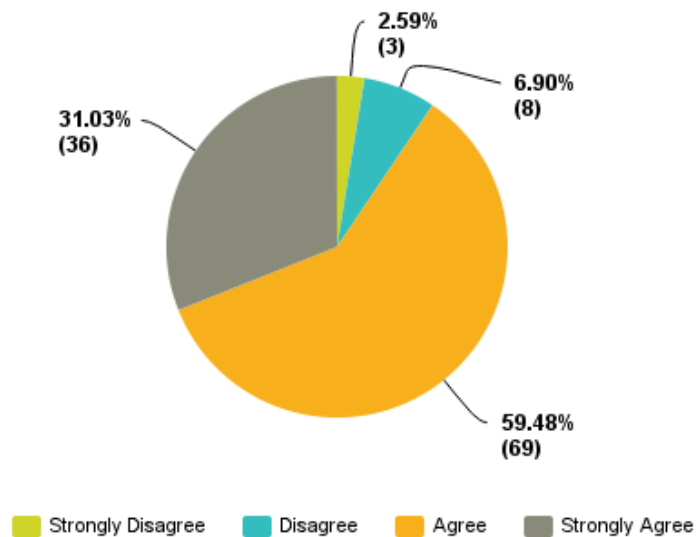
Q26 I accessed more and better resources because of access to a Chromebook.

Answered: 113 Skipped: 4



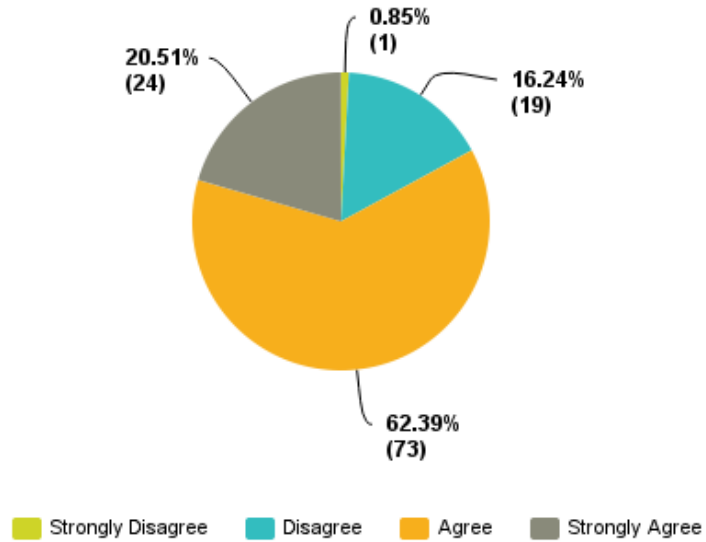
Q24 I was able to get work done during other times of the day using my Chromebook, like during lunch or a study hall.

Answered: 116 Skipped: 1



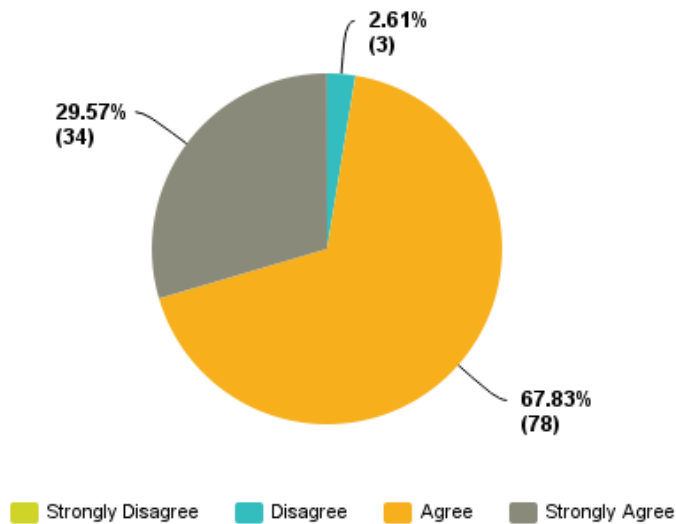
Q32 I am able to keep my materials and my work better organized when I have my own Chromebook.

Answered: 117 Skipped: 0



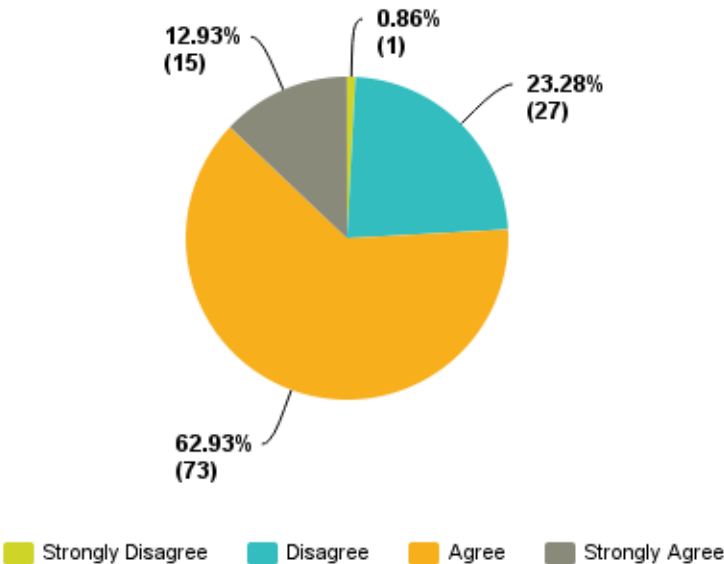
Q27 I had a positive experience with the 1:1 pilot of Chromebooks.

Answered: 115 Skipped: 2



Q33 I learned better when I was able to have regular access to a Chromebook.

Answered: 116 Skipped: 1



Appendix B: Existing BYOT Policy

6:220 - Bring Your Own Technology (BYOT) Program; Responsible Use and Conduct

The Superintendent or designee shall establish a *Bring Your Own Technology* (BYOT) *Program*. The program will:

1. Promote educational excellence by facilitating resource sharing, innovation, and communication to enhance (a) technology use skills; (b) web-literacy and critical thinking skills about Internet resources and materials, including making wise choices; and (c) habits for responsible digital citizenship required in the 21st century.
2. Provide sufficient wireless infrastructure within budget parameters.
3. Provide access to the Internet only through the District's electronic networks.
4. Identify approved BYOT devices and what District-owned technology devices may be available; e.g., laptops, tablet devices, E-readers, and/or smartphones.
5. Align with Board policies [4:140](#), *Waiver of Student Fees*; [5:125](#) *Personal Technology and Social Media; Usage and Conduct*; [5:170](#), *Copyright*; [6:120](#), *Education of Children with Disabilities*; [6:235](#), *Access to Electronic Networks*; [7:140](#), *Search and Seizure*; [7:180](#), *Prevention of and Response to Bullying, Intimidation, and Harassment*; [7:190](#), *Student Discipline*; and [7:340](#), *Student Records*.
6. Provide relevant staff members with BYOT professional development opportunities, including the provision of:
 - a. Classroom management information about issues associated with the program, e.g., technical support, responsible use, etc.;
 - b. A copy of or access to this policy and any building-specific rules for the program;
 - c. Additional training, if necessary, about [5:170](#), *Copyright*; and
 - d. Information concerning appropriate behavior of staff members as required by State law and policy [5:120](#), *Ethics and Conduct*.
7. Provide a method to inform parents/guardians and students about this policy.
8. Include the program in the annual report to the Board as required under policy [6:10](#), *Education Philosophy and Objectives*.

The District reserves the right to discontinue its BYOT program at any time. The District does not provide liability protection for BYOT devices, and it is not responsible for any damages to them.

Responsible Use

The District recognizes students participating in the program as responsible young adults and holds high expectations of their conduct in connection with their participation in the program. Teachers may encourage students to bring their own devices as supplemental in-class materials when: (a) using the devices will appropriately enhance, or otherwise illustrate, the subjects being taught; (b) the Building Principal has approved their use and found that their use is age-appropriate; and (c) the student's parent/guardian has signed the *Bring Your Own Technology*

(BYOT) *Program Participation Authorization and Responsible Use Agreement Form*. A student's right to privacy in his or her device is limited; any reasonable suspicion of activities that violate law or Board policies will be treated according to policy [7:140](#), *Search and Seizure*.

Responsible use in the program incorporates into this policy the individual's *Acceptable Use of Electronic Networks* agreement pursuant to policy [6:235](#), *Access to Electronic Networks*. Responsible use also incorporates the established usage and conduct rules in policy [5:125](#), *Social Media and Personal Technology; Usage and Conduct* for staff and [7:190](#), *Student Discipline* for students. Failure to follow these rules and the specific BYOT program student guidelines may result in: (a) the loss of access to the District's electronic network and/or student's BYOT privileges; (b) disciplinary action pursuant to [7:190](#) *Student Discipline*, [7:200](#), *Suspension Procedures*, or [7:210](#), *Expulsion Procedures*; and/or (c) appropriate legal action, including referrals of suspected or alleged criminal acts to appropriate law enforcement agencies.

LEGAL REF.:

Children's Internet Protection Act (CIPA), [47 U.S.C. §254](#)(h) and (l).

Enhancing Education Through Technology Act, [20 U.S.C §6751](#) *et seq.*

[47 C.F.R. Part 54, Subpart F](#), Universal Service Support for Schools and Libraries.

Children's Online Privacy Protection Act (COPPA), [15 U.S.C. §§6501-6508](#).

[16 C.F.R. Part 312](#), Children's Online Privacy Protection Rule.

[105 ILCS 5/28](#).

CROSS REF.: [1:30](#) (School District Philosophy), [4:140](#) (Waiver of Student Fees), [5:120](#) (Ethics and Conduct), [5:125](#) (Personal Technology and Social Media; Usage and Conduct), [5:170](#) (Copyright), [6:120](#) (Education of Children with Disabilities), [7:140](#) (Search and Seizure), [7:180](#) (Prevention of and Response to Bullying, Intimidation, and Harassment), [6:10](#) (Educational Philosophy and Objectives), [6:40](#) (Curriculum Development), [6:210](#) (Instructional Materials), [6:235](#) (Access to Electronic Networks), [7:190](#) (Student Discipline), [7:340](#) (Student Records)

ADOPTED: May 9, 2013

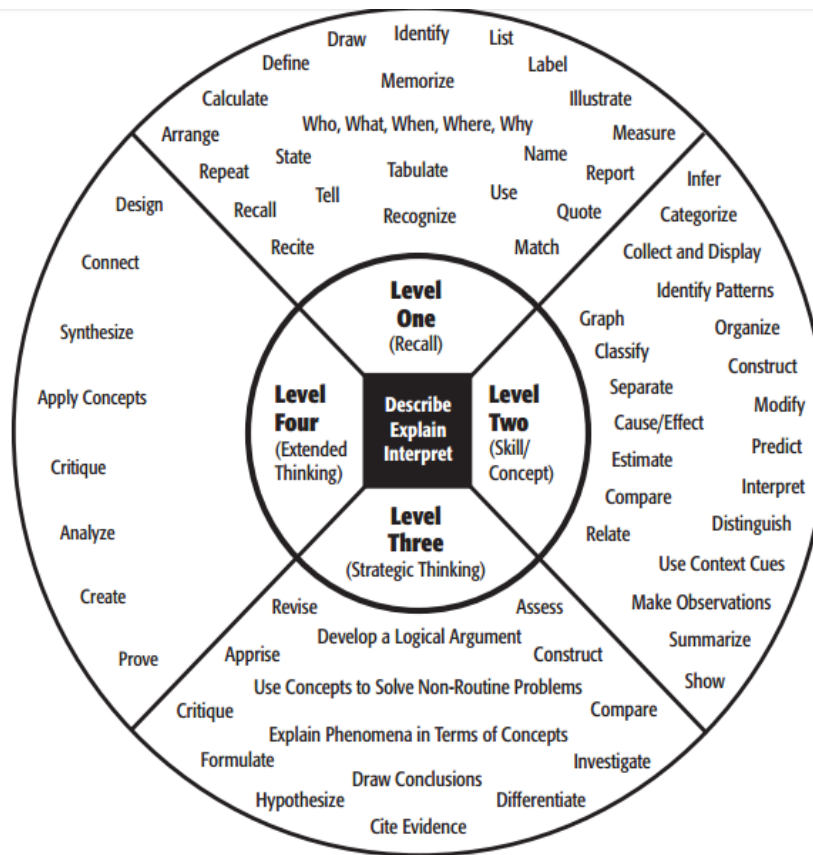
Appendix C: 1:1 Assessment Matrix

Area to be Measured	Assessment Questions	Assessment Instrument	Person(s) Responsible
Effectiveness of the Device	<p>Is this device durable and reliable?</p> <p>Is this device worth the cost?</p>	<p>Collect data on the number of times devices are brought to technology office for repair</p> <p>Keep track of what types of repairs are needed</p> <p>Research other devices available and used in other districts</p> <p>Get student feedback via survey</p>	Technology staff and Director of Technology
Technology Support	<p>Do we have a sufficient number of Technology support staff?</p> <p>Do we need different levels of technology support?</p> <p>Do we need to create a student help desk for daily drop in questions?</p>	<p>Install student ID scanners in the Technology office to track how many students need assistance</p> <p>Gather student feedback via survey</p>	Technology staff and district personnel who will distribute a student survey
Student Achievement	<p>What impact is the 1:1 model having on student academic achievement?</p> <p>Is work completion increasing?</p> <p>Is work product improving?</p>	<p>Compare end of year GPA of current sophomores to their pre 1:1 freshman year GP.</p> <p>Survey teachers and students about the impact of 1:1 on student academic skill sets and grades</p>	Director of Curriculum and Instruction

		Compare Frosh/Soph PSAT scores with state and national averages	
Classroom Environment	<p>How does a 1:1 impact the classroom environment?</p> <p>Is there more student collaboration, is there less teacher lecture?</p> <p>How are student activities changing? Student and teachers survey</p>	Results of teacher evaluations on Danielson Domain 2 : Classroom Environment	<p>Principals, Associate Principals and Department Chairs who evaluate teacher formally and informally.</p> <p>Director of Curriculum and Instruction will survey staff and students</p>
Cost Sustainability	<p>Are we on budget?</p> <p>Are we spending more some areas and less in others?</p>	Review of yearly expenditures	Director of Technology and Business manager
School Culture and Climate	<p>Is there a rise in student visits to school social workers and counselors?</p> <p>Is there an increase in the reports of bullying?</p> <p>Is there an increase in dean referrals related to the 1:1?</p> <p>Has ongoing student access to devices changed student interaction in public spaces?</p>	<p>Social workers and dean's logs will be reviewed for numbers and nature of student referrals</p> <p>Student and staff survey will gauge climate in public spaces</p>	<p>Social workers and Associate Principals of Student Services will review logs.</p> <p>Director of Curriculum and Instruction will survey staff and students.</p>
Student Perceptions	How are students responding to the 1:1 initiative?	Student survey	Director of Curriculum and Instruction

	What are the challenges and what improvements have they seen as a result		
Curricular Implications	<p>Do students enter high school with the prerequisite digital citizenship skills?</p> <p>What research skills must students be taught?</p> <p>How do we infuse the instruction of these skills into the curriculum?</p> <p>To what extent are these skills addressed in middle schools?</p>	<p>Student and teacher survey</p> <p>Middle school articulation meetings</p>	Director of Curriculum and Instruction
Impact on Teachers/Need for Teacher Training	<p>How are teachers using these devices?</p> <p>Do teachers need additional training in how to effectively use technology in the classroom?</p>	<p>Teacher and Student Survey</p> <p>Review of conferences/ workshops teachers are attending</p> <p>Evaluation notes</p>	<p>Director of Curriculum and Instruction will give a survey and review workshop attendance. Those who evaluate teachers will collect notes classroom activities.</p>
Community Feedback	<p>How are parents receiving the 1:1?</p> <p>Are parents refusing to pay/participate in the 1:1?</p> <p>Are parents seeing improvements in student work/grades?</p>	<p>Parent survey</p> <p>Info from business office on refusals</p>	<p>Director of Curriculum and Instruction</p> <p>Business manager</p>

Appendix D: Webb's Depth of Knowledge Chart



Level One Activities	Level Two Activities	Level Three Activities	Level Four Activities
Recall elements and details of story structure, such as sequence of events, character, plot and setting.	Identify and summarize the major events in a narrative.	Support ideas with details and examples.	Conduct a project that requires specifying a problem, designing and conducting an experiment, analyzing its data, and reporting results/solutions.
Conduct basic mathematical calculations.	Use context cues to identify the meaning of unfamiliar words.	Use voice appropriate to the purpose and audience.	Apply mathematical model to illuminate a problem or situation.
Label locations on a map.	Solve routine multiple-step problems.	Identify research questions and design investigations for a scientific problem.	Analyze and synthesize information from multiple sources.
Represent in words or diagrams a scientific concept or relationship.	Describe the cause/effect of a particular event.	Develop a scientific model for a complex situation.	Describe and illustrate how common themes are found across texts from different cultures.
Perform routine procedures like measuring length or using punctuation marks correctly.	Identify patterns in events or behavior.	Determine the author's purpose and describe how it affects the interpretation of a reading selection.	Design a mathematical model to inform and solve a practical or abstract situation.
Describe the features of a place or people.	Formulate a routine problem given data and conditions.	Apply a concept in other contexts.	
	Organize, represent and interpret data.		

Webb, Norman L. and others. "Web Alignment Tool" 24 July 2005. Wisconsin Center of Educational Research. University of Wisconsin-Madison. 2 Feb. 2006.