THE EFFECTS OF GOOGLE CHROMEBOOKS IN THE 21st CENTURY CLASSROOM

SECTION I

INTRODUCTION

For several years, classrooms have been changing from teacher-centered to student-centered. The role of the teacher has evolved from the sole instructor of the classroom to being the facilitator and monitor for classroom activities. At the same time, the students have shifted from a being passive learners to directing their own learning experiences. One way that schools are facilitating this change is through implementing one-to-one (1:1) programs. Many schools have started using Chromebooks because they allow for students to actively participate in the learning process. John Dewey (1944) stated it best when he said, “if we teach today’s students as we taught yesterday’s, we rob them of tomorrow” (pg. 167).

Technology has created a change in the classroom and how students are learning. Not only are the schools providing Chromebooks, they are also allowing students to take these devices home, giving students access to information and tools outside of the school day. As a result, teachers are using the Chromebooks within each lesson, whether to complete an individual activity or for the entire lesson. The traditional ways of completing assignments in the class have become digital, with some classrooms being completely paperless. Furthermore, students are using the Chromebooks to communicate and collaborate in real time during the school day. Since the 1:1 programs have rolled out, there have been those who question if Chromebooks truly help students and the academic program of schools. This study is focusing on the incorporation of 1:1 programs using Google Chromebooks in the classrooms.

AREA OF FOCUS STATEMENT
The focus of this study is to determine if incorporating 1:1 Google Chromebooks into classrooms will increase student learning, motivation, and engagement.

RESEARCH QUESTIONS

1. Does each student having a device help or hinder student learning?
2. Does student engagement increase with 1:1 Chromebooks?
3. Does the quality of student collaboration increase with 1:1 Chromebooks?

RELATED LITERATURE REVIEW

As technology uses and expectations have increased in classrooms, many schools have already initiated 1:1 technology programs. There are several studies that can be found that show the impact of these programs; however, there is not a lot of information yet written about the implementation of the Google Chromebooks. Many schools have started incorporating Google Drive, so the Chromebooks have been an easy implementation in the classroom.

The Gulek & Demirtas (2005) study noted that in the early 2000’s, schools in South Carolina, California, and New York all utilized laptops as instructional tools to improve student learning. The programs in the schools examined the link between technology use and its impact on student motivation, classroom participation/engagement, students’ interaction with their peers or their teachers. Middle school students were followed in cohorts and were evaluated on their overall GPA, writing test scores, and standard achievement tests. In this study, it found that using students who participated in the initiative tended to have higher scores, achievement tests, and overall GPA. The study also found evidence that students with their own laptops spent more time in collaborative work, participated more in authentic learning opportunities with project-based instruction, produced higher quality writing, and had stronger research skills. It was also
shown in the research that students were in charge of their own learning, had stronger problem solving and critical thinking skills, and demonstrated a deeper understanding of technology use.

This Google Education case study (2012) looked at schools in a South Carolina district. The school district invited teachers, school administrators, and others for a conference discussing the benefits of a 1:1 program. Once the school district put into place the 1:1 program and used Google Apps for Education, they noticed improvements in the areas of student collaboration and the atmosphere within the classroom. They also found that teachers were spending less time lecturing and more time providing feedback to students, as well as more teamwork and collaboration within the classrooms.

The Rosen & Beck-Hill (2012) study compared four classrooms from two different districts in the state of Texas. Two classes incorporated the Time to Know program (experimental group) while two other comparative classes (control group) did not. The Time to Know program had specific criteria which included a 1:1 laptop program, full-time IT support, curriculum activities that incorporated technology, a digital learning platform for teachers, and professional development. The study found that the Time to Know program greatly impacted the experimental group versus the control group. Within the experimental group, absences and discipline issues were reduced, differentiated instruction increased, improved teacher feedback, better teacher modeling, more lessons were adjusted, and student motivation increased.

For the Berkshire Report (2010), five Massachusetts middle schools started a program where a wireless 1:1 program was initiated over a three year period. In order to learn how to incorporate technology into the curriculum, teachers were supported with technology and professional development. The main focus areas were student achievement, classroom management, collaboration, teaching practices, and independent research. Interestingly, once the teachers had incorporated the program into the classroom, they noticed that their teaching
practices changed. The study showed that student engagement, motivation, research skills, and collaboration all increased due to their access to computers, which enabled the students to have more opportunities for creating projects and improving a broader range of skills. It was also stated in the research that a small minority of teachers did not look at the program favorably and preferred their previous instructional format.

In the research report compiled by Bebell and O’Dwyer (2010), the authors looked at different studies and summarized their findings. Overall, 1:1 device programs changed teacher practices, student engagement, and student achievement. One study examined by the two indicated that student achievement in English related exams increased when there was a 1:1 device policy in place by a school division compared to those divisions that did not have a 1:1 device policy. In the area of teaching practices, teachers used more technology within the classrooms where there was a 1:1 device policy in place. However, the use of technology by teachers in a 1:1 school division is impacted by the amount of professional development completed and collaboration with teachers. This professional development and preparation for the use of technology allowed teachers to use the devices in their classrooms more. Bebell and O’Dwyer found that student engagement increased because students liked creating presentations, browsing the Internet, and completing assignments on the computers.

The Doran & Herold (2016) study used statistical techniques to analyze already-completed studies. This study took place over a 15 year period and included multiple studies in the meta-analysis of 1:1 computer programs. It was found that 1:1 laptop programs had a significant positive impact on student test scores in English/language arts, writing, math, and science. The team also reviewed other studies of laptop use and found that there were positive benefits in the classroom including increased technology use, prevalent student-centered and project-based instruction, student engagement, and student and teacher connections. In an
additional 86 studies, the 1:1 laptop environment found that technology use, research skills, writing, note skills, and communication skills with the teacher improved from the participation in blogs, chats, emails, and wikis. Students that used laptops were found to have a much higher participation rate and were more motivated.

One research study results were contrary to the others in terms of achievement. The Williams & Larwin (2016) study was conducted in 48 high schools to determine if 1:1 programs significantly impacted achievement scores. The high schools were broken into two groups, schools that had 1:1 programs and schools that did not. The overall results indicated that there was not a statistically significant difference between the two groups. The study noted that possible factors that needed to be considered were different implementation methods, not having aligned goals, access time to devices, and instructional practices.

In many of the studies, overall improvement was shown with the 1:1 devices that were implemented. Student achievement, motivation, engagement, teacher practices, classroom environments, and collaboration increased. In many cases, the studies also showed that by implementing 1:1 devices, the classrooms had shifted from teacher-directed to student-centered. It seems that the greatest impact on successful 1:1 programs are those that are well organized and had support for teachers in the areas of professional development, curriculum, and IT.

**DESCRIPTION OF THE INTERVENTION OR INNOVATION**

Many school districts are beginning to implement Chromebooks in a 1:1 initiative. Data will be collected in order to determine whether Chromebook initiatives actually benefit the students motivation, learning process, engagement, and achievement.

**SECTION II**

**OVERVIEW OF DATA COLLECTION STRATEGIES**
Three data sources will be used for the research. These include teacher surveys, student surveys, and classroom observations.

The validity of the data will come from comparing classrooms from two different schools in the same district. One school has purchased enough Chromebooks through their PTO to initiate a 1:1 Chromebook program. The other school did not receive PTO funding and has limited Chromebooks in their classrooms. Each school will be responsible for covering the same curriculum, but in different ways. We will be looking at how students and teachers are teaching similar material with and without the Chromebook devices. Students and teachers from each school will be given the same student or teacher survey and will be observed in the same manner.

When looking at the ethical issues, some things we will need to consider include our own exposure to a 1:1 program and the outcomes. We need to keep in mind that not all schools and teachers will have the same funding and training as the schools we have been exposed to, realizing that technology experiences can differ greatly based on budgets and experience. We can also present ourselves as biased toward teachers who are using Chromebooks or those teachers who have more technological skills.

**DATA SOURCES**

In order to gather information, we have decided to utilize teacher surveys, student surveys, and classroom observations of parties that are involved in a 1:1 initiative. Surveys will be given to teachers toward the end of the school year to determine if the Chromebooks are beneficial to the students in the classroom. The teacher survey will measure numerous characteristics of teachers and their use of the 1:1 Chromebooks within the classroom. The survey will also allow teachers to complete free response questions to explain the biggest obstacle when it comes to implementing the 1:1 devices within the classroom. In addition, items on the survey will seek to measure all factors and background questions being considered for our
research, including the expertise of the teacher completing the survey. Students will also be given a survey to complete at the end of the school year to develop how students perceive the 1:1 program and whether they have learned from having Chromebooks in the classroom. Lastly, observations throughout the school year will be used to record real time data on teachers and students using devices in the classroom.

**DATA ANALYSIS PLAN**

The results of the teacher surveys will be analyzed to find the mean percentages of student engagement and achievement when using the Chromebooks. The Likert Scale will also be used to determine the skill level of teachers. The rest of the survey questions will be categorized by frequency of responses.

The student survey will measure the impact of Chromebooks on their learning and collaboration in the classroom. First, the results from the questions pertaining to student learning will be calculated as a percentage to show how many students feel they have learned more from using Chromebooks. Then, student survey results will be calculated to show the percentage of students who indicated an increased level of collaboration when using Chromebooks in the classroom.

The classroom observation method of data collection will be used to observe students using Chromebooks in the classroom. We will observe different classrooms to allow for more data. We will measure the percentage of students engaged and learning in each classroom and those students who are not learning or engaged to compare results. Furthermore, we will create a list of common ideas and observations made in each classroom visited.

**SECTION III**
1. In the action research project other teachers and students will be involved. We plan to survey teachers and students to collect data. Their responsibilities will include completing a survey using Google Forms to answer questions about Chromebooks implementation. They will provide information on how the devices are being used in daily instruction, and how the devices are effectively impacting learning, student engagement and student motivation. There will also need to be teachers that allow for classroom observations, so that data can be collected from student interaction with the Chromebooks.

2. In order to begin our Action Research Project, permission from the building principals will be needed. Students will be involved in taking a survey, therefore we will have a signed permission document for each student participating. We will also send out emails to teachers asking for their participation in the projects and for classrooms that are open to observations.

3. The projected timeline for the 2016-2017 school year, will be as follows:

   ● First Quarter: Weeks 1-10
     ○ Weeks 1-5 - Introduce the study to the faculties of the participating schools
     ○ Weeks 6-10 - Beginning of the year survey teachers

   ● Second Quarter: Weeks 11-20
     ○ Weeks 11-16 - Survey students
     ○ Weeks 11-20 - Data collected through Google Docs from teacher’s feedback about Chromebook use by students in the classroom.

   ● Third Quarter: Weeks 21-31
     ○ Weeks 21-25 - End of year surveys given to students and teachers to compare to the beginning of the year surveys.
- Weeks 26-31 - Interpretation of data will be completed in order to determine our recommendations.

4. After analyzing and interpreting the data collected, we will develop recommendations in the fourth quarter. We will plan to hold a virtual meeting using Skype or Google Hangouts to share our results and recommendations with the faculties.

5. The overall strategy for implementation of recommended actions will be to keep teachers updated and enthusiastic through PD training sessions, either locally or virtually. It is important that teachers are aware of next steps in the implementation process. We would need the support from the principal and the teachers to create a positive environment for Chromebook implementation. If teachers do not have a supportive environment, or an environment that does not allow for ideas to grow, the potential impact of Chromebooks on student learning and engagement will fade. Extra mentoring support should be offered and used in schools that have a restrictive environment when it comes to innovations. Finally, opportunities to follow-up on the recommended actions would need to be provided.

6. Ongoing monitoring will be completed through classroom observations conducted by administrators and through teacher and student feedback. We will create an open document on Google Drive where teachers can share by posting ideas, success stories and failures.

REFERENCES


## Appendix A

**Literature Matrix**

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Year</th>
<th>Teaching Practices/PD</th>
<th>Collaboration</th>
<th>Achievement</th>
<th>Teacher Reluctance</th>
<th>Learning Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bebell, Damian; Kay, Rachel.</td>
<td>2010</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Rosen, Yigal; Beck-Hill,</td>
<td>2012</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td>X</td>
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### Appendix B

#### Data Collection Matrix

<table>
<thead>
<tr>
<th>Data Source</th>
<th>Research Questions</th>
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<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td><strong>1. Does each student having a device help or hinder student learning?</strong></td>
<td>Teacher survey</td>
</tr>
<tr>
<td><strong>2. Does student engagement increase with 1:1 Chromebooks?</strong></td>
<td>Teacher survey</td>
</tr>
<tr>
<td><strong>3. Does the quality of</strong></td>
<td>Teacher survey</td>
</tr>
</tbody>
</table>
student collaboration increase with 1:1 Chromebooks?

### Appendix C

#### Data Analysis Matrix

<table>
<thead>
<tr>
<th>Data Collection Technique</th>
<th>Data Analysis Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Teacher Survey</td>
<td>1. Compile the responses from student engagement and achievement questions and determine the mean percentages</td>
</tr>
<tr>
<td>2. Student Survey</td>
<td>1. Calculate the percentage of students</td>
</tr>
</tbody>
</table>
students who indicate that they learn more by using a Chromebook in the classroom who feel they collaborate more with peers because of the Chromebooks organize the data into categories or themes.

3. Classroom Observation

| 3. Classroom Observation | Compile the results of classroom observations by similar ideas or themes | Calculate the number of students engaged and not engaged with learning and calculate the percentage of students in each category |

**Appendix D**

1:1 Chromebook Initiative and the Impact on Student Learning, Motivation and Engagement Teacher Survey


Dear Teacher,

Thank you for taking the time to answer this survey regarding the use of Chromebooks in the classroom. 1:1 Chromebook Initiatives are being used in classrooms in many school districts across the nation and this survey will be used to determine if the Chromebooks are effectively impacting learning, engagement, and motivation of students. Your responses will remain confidential and only used in this Action Research Project.

1. What subject(s) do you teach?

2. What grade level do you teach?
   - [ ] K-3
3. How many years have you been teaching?
   - 1-5 years
   - 6-10 years
   - 11-15 years
   - 16-20 years
   - more than 20 years

4. On a scale of 1-5 how tech savvy are you 1=not at all; all 5=Guru
   - 1 Not at All
   - 2 Just Beginning
   - 3 Some Knowledge and Training
   - 4 Substantial Knowledge and Training
   - 5 Guru

5. There is consistent and adequate funding in my school system for ongoing support technology infrastructure, personnel, digital resources, and staff development.
   - No Progress
   - Just Beginning
   - Substantial Progress

6. Regarding curriculum framework with Chromebooks; content standards and related digital curriculum resources are available in my school system.
   - No Progress
   - Just Beginning
   - Substantial Progress

7. How comfortable are you with integrating technology into your lessons?
   - Beginner
   - Intermediate
   - Above average
   - Advanced

8. Do you allow students to use the Chromebooks for academic purposes in your classroom?
   - Yes, on a daily basis.
   - 2-4 times per week
   - From time to time
   - Never in my classroom
9. If you have been using the Chromebooks in your classroom, what has been the primary purpose of the lessons/activities? (Check all that apply.)
   - games
   - research
   - complete online assignments/tests
   - Formative assessments
   - Communication with students
   - watch videos / examine images
   - Collaborate on a Learning Management System like Google Classroom
   - Tutorial videos

10. How have students used their Chromebooks in the classroom? (Check all that apply.)
   - to create artifacts
   - Digital portfolios
   - to collaborate with peers
   - Online Cloud storage
   - Online presentations
   - to communicate with experts outside of the classroom
   - to read/analyze information in order to think critically
   - Watch videos
   - Online tutorials
   - Communicate with other students
   - Communicate with teachers
   - Practice skills
   - Complete homework
   - Access digital content
   - Learning Management Systems

11. Which of the following ways assist you in ideas for technology integration? (Check all that apply.)
   - Reading educational technology literature / blogs
   - Collaboration with peers
   - The School Librarian
   - observing other teachers with their students
   - Professional Development/workshops
   - Instructional Technology Specialist
   - Twitter
   - Facebook

12. If you are not utilizing the Chromebooks in your classroom, what is preventing you from using them? (Check all that apply)
   - I don't know what activities to do with students
Students are not interested
☐ It is too distracting
☐ I don't know how to troubleshoot problems with devices
☐ There is no or inadequate infrastructure in place at my school
☐ The wifi signal is too weak and connecting to the internet is hit or miss

13. How do you feel the Chromebooks have affected student engagement?
☐ Positively- students are more engaged
☐ Negatively-students not engaged in the lesson because of distractions
☐ No impact

14. How do you feel achievement is impacted by utilizing the Chromebooks?
☐ Positively- test scores and grades are better
☐ Negatively-test scores and grades are worse
☐ No impact- I do not see a difference in achievement

15. What do you need in order to more effectively integrate the Chromebooks into your classroom? (Check all that apply)
☐ The opportunity to learn more about GAFE, Apps and Extensions
☐ Ongoing Professional Development
☐ Become a GAFE school
☐ A networked printer
☐ The opportunity to observe a class using devices effectively
☐ Improved internet connection in my classroom/school
☐ Online monitoring system like remote desktop

16. Please provide a brief description of a lesson or an activity you have used with the Chromebooks that you found to be engaging for students?
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Please indicate your skill level for the following:

High    Medium    Low    Didn't Use
Accessing Google Drive
Using Google Docs
Using Google Spreadsheet
Using Google Forms
Sharing documents
Uploading documents and other files to Google Drive
Converting documents to Google Docs format
Accessing and changing your Chrome preferences
Using the Chromebooks
Printing from the Chromebook
Accessing online resources

17. What do you see as the biggest obstacle of integrating Chromebooks, digital resources and instruction into your classroom?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________