

Chapter 3

Methods

Setting

Two different school sites were used for the setting of this action research project. One of the schools was a two-year junior high and the classroom was a computer lab, designated as School J. The other was a four-year high school and the classroom a physics lab, designated as School H. The synchronous sessions for the high school students were conducted in a shared school computer lab at School H. The computer labs at both schools have sufficient computers for one-to-one access. Both School J and School H were public schools located in Orange County, California.

At School J the classroom chosen for this intervention study was a 6th period Business Technology class. This class took place after lunchtime with a total of 31 students. Out of the 31 students only 23 participated in the intervention study. The class met on average 45 minutes daily, except on late-start Tuesdays when the class only met for 37 minutes. The Late Start Tuesday is a District-wide policy for all schools within the district to accommodate for staff development time. On average, the total instructional time per week is 217 minutes for each class period. The classroom at School J is a one-to-one computer lab dedicated to single teacher. The computer lab at School J is not shared with any traveling teachers or roving teachers on campus.

Although the Business Technology class is considered an elective class at School J, the administration had been attempting to place as many 7th graders into this class as possible so they would have some preparation for the new Common Core State Testing on the computer.

For this study, the students in the Business Technology class were all 7th graders. The demographics of this class were approximately 94% Hispanic and 6% other.

According to school-ratings.com, School J is a rank 2 school with an Academic Performance Index of 726 as of 2013. School J had the following demographics:

- GATE: 18%
- English Learners: 25%
- Reclassified as English proficient: 53%
- Migrant education program participants: 1%
- Eligible for free/reduced price lunch: 87%
- Special education students: 10%

According to school-ratings.com, School J had the following for parent education level:

- Parents have graduate school education: 7%
- Parents have a college graduate education: 8%
- Parents have some college education: 24%
- Parents have high school graduate education: 24%
- Parents does not have a high school education: 37%

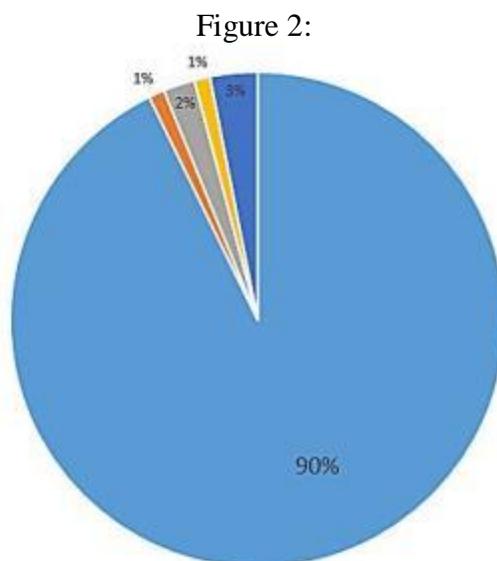
The medium home prices around School J (see Figure 1) at the end of 2014 were \$525,000:

Figure 1



According to the school staff report, the breakdown of the ethnicities (See Table 1 and Figure 2) for 2014 to 2015 for School J were:

Table 1 – School J - Ethnicities	
Hispanic/Latino	90%
White, not Hispanic	1%
Asian	2%
African American	1%
Other	3%



According to school-rate.com, School J was ranked 3 compared to other similar junior schools with the same demographics and socio-economic background. All teachers had full credentials with 1% of the teachers on emergency credentials at the time of this action-research study.

At School H, the classroom chosen was a Physics class composed of 26 advanced placement physics students enrolled in period five. School H operated on a rotating schedule therefore the time the class met varied throughout the week. The Physics class met for approximately 55 minutes per day except for Wednesday when the periods were shortened (approximately 39 minutes) to accommodate staff development time and the students were released early.

School-wide the students were 97% Latino, with a small percentage of White, African-Americans, and Asians. In the 2013-2014 school year, 100% of students received free meals. The student population had 49% English language learners and 43% reclassified Fluent English proficient students in the 2013-2014 school year. The class involved for the purposes of this study was primarily reclassified Fluent English proficient.

According to school-ratings.com, School H was a rank 2 school with an Academic Performance Index of 658 as of 2013. School H had the following demographics:

- GATE: 8%
- English Learners: 48%
- Reclassified as English proficient: 42%
- Migrant education program participants: 4%
- Eligible for free/reduced price lunch: 91%
- Special education students: 12%

According to Western Association of Schools and Colleges (WASC) report for 2013-2014, School H had the following for parent education level:

- Parents have graduate school education: 1%
- Parents have a college graduate education: 2%
- Parents have some college education: 6%
- Parents have high school graduate education: 19%
- Parents does not have a high school education: 70%

The medium home prices around School H (see Figure 3) at the end of 2014 according to city-data.com were around \$330,000.

Figure 3:

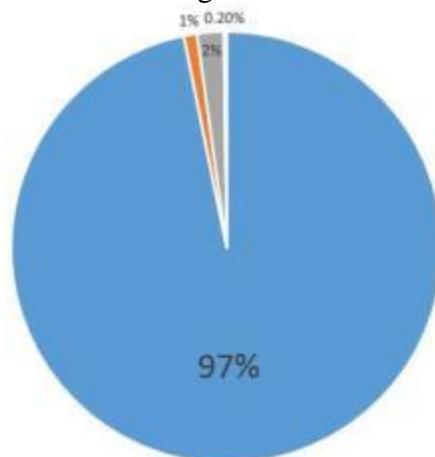


The breakdowns of the ethnicities for 2013 to 2014 for School H (see Table 2 and Figure 4) were:

Table 2 – School H - Ethnicities	
Hispanic/Latino	97%
White, not Hispanic	1%

Asian, Filipino, & Pacific Islander	2%
African American	0.2%

Figure 4:



According to school-rate.com, School H was ranked 7 compared to other similar high schools with the same demographics and socio-economic background. All teachers had full credentials with no teachers on emergency credentials at the time of this action-research study.

Participants

The participants for the intervention were 31 students from School J and 26 students from School H (18 of which chose to participate) in Southern California.

The students from School J were part of a period six Business Technology class, with all the students being 7th graders. The students ranged in age from 12 to 13 years of age, and represented a diverse ethnic mix. Twenty-nine students were Hispanic and two were Asian. Although 94% of the students self-identified themselves as white, their home language (Spanish) and surnames identified them as Hispanics. There were 15 girls and 16 boys in the class. In addition, 3 students were identified as special education students and had an instructional assistant that came to Teacher-researcher J's classroom to assist those 3 students with their instructions.

Of the period six students taught by Teacher-researcher J, 18 of them were considered reclassified English proficient or RFEP, 1 was determined to be initially fluent in English though Spanish was spoken in the home, and 6 were English speaking only. Six students were still designated as English language learner or ELL (see Table 3).

Table 3 – Period 6 Language Classification	
English Language Learners (ELL)	6
Reclassified English Proficient (RFEP)	18
Initially Fluent	1
English Only	6

Of the 31 Business Technology students, none of them were identified as gifted.

The participants for the intervention for School H were comprised of twelfth graders (seniors) and one eleventh grader (junior) enrolled in period five Advanced Placement Physics and consisted of 12 female students and 14 male students. With the exception of two females and one male who were Asian the students were identified as having a Hispanic heritage. American Indian or Alaskan native was the race 23 of the students identified with while two identified themselves as Vietnamese and one as Vietnamese and Chinese.

In the period five class taught by Teacher-researcher H, 20 of the students were considered reclassified English proficient or RFEP, 3 were determined to be initially fluent in English though Spanish was spoken in the home and 2 were English speaking only. One student was still designated as English language learner or ELL (see Table 4).

Table 4 – Period 5 Language Classification
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English Language Learners (ELL)	1
Reclassified English Proficient (RFEP)	20
Initially Fluent	3
English Only	2

Of the 26 physics students, 14 of them were identified as gifted.

Roles of the Researchers

The Teacher-researchers were responsible for implementing a Project-Based Learning (PBL) lesson that required students to use Google Drive to collaborate synchronously (during class-time) and asynchronously (outside of class-time). Both Teacher-researchers gave students a pre and post self-reflection survey of their technology skills and their work habits. Throughout the individual PBL lessons the Teacher-researchers also conducted surveys and collected reflective questions using Google Form, had students write reflective journal entries using Google Drive, and finally had a final project using Google Presentations. Each Teacher-researcher kept a daily log of student observations from the start of the PBL lesson to the very end. Each Teacher-researcher read through the reflective journal to evaluate changes in motivation and learner satisfaction throughout the intervention. During the duration of the study the Teacher-researchers were also performing the roles of the classroom teacher regarding attendance, discipline, grades, and assistance.

Intervention Plan

Both Teacher-researchers used the collaborative technologies of Google Drive as their main intervention plan. Students from both School J and School H had their own district

approved Google Drive accounts. These accounts were created by the district and the students are identified only by their student ID numbers for their usernames.

All the students involved in the intervention participated in a pre and post baseline survey (Appendix D) using Google Form so the Teacher-researchers could assess the students' technology skills, motivation and engagement in school, and their interest in collaborative activities (Busch & Turner, 1993; Köksal, Ertekin, & Çolakoğlu, 2014; Rotgans, 2010). Both teacher-researchers kept observation journals throughout their PBL units (Appendix S for Teacher-researcher J and Appendix T for Teacher-researcher H). Students participating in the interventions also kept their own daily reflection journals detailing their individual experiences and their group collaborative experience.

Teacher-researcher J's intervention plan. Before the PBL lesson was introduced to the students, Teacher-researcher J shared with the class the premise of the intervention and the students' roles within. Students were given parent permission forms (Appendix A) to complete weeks prior to the Day 1 of the intervention. All students in period 6 participated in the pre-baseline survey (Appendix D). However, data was only gathered from students who completed their student consent forms and who returned their signed parental consent forms.

In Teacher-researcher J's Business Technology class, a collaborative Google Drive project was given to the students called "Mythbusting". The "Mythbusting" project was based on the Project-Based Learning (PBL) framework (BIE, 2014). This PBL lesson was mapped out in a summary format in Appendix E as well. Students were randomly assigned a student project identification number based on the number drawn from a basket (Appendix I). All numbers were collected and destroyed after the class was over for the day. Only the student knew what his or her project identification number was.

Teacher-researcher J began Day 1 with an entry event to grab the students' attention regarding the concept of "mythbusting" (BIE, 2014). The entry event was a YouTube Video titled "25 Popular Myths Debunked". The video set the pace and format for the "Mythbusting" project. The myth opened with a question of a popular myth, then it proceeded to answer it with a true or false format and evidence supporting its answer. Teacher-researcher J paused the video whenever the video asked if a certain myth was true or false. Teacher-researcher J asked the class to vote by raising their hands; then continued the video to proceed with the answer. This format continued for the first 10 popular myths debunked by the video and it engaged and motivated the students to watch and participate in the myth busting experience. Students were very excited to cast their true or false vote by raising their hands.

After demonstrating only ten of the twenty-five myths in the video, Teacher-researcher J proceeded to the essential question to help the students understand the purpose of the project and how it was relevant to their lives (BIE, 2014). The essential question was "What is the difference between a myth and a legend? Does it matter? How does knowing if something is true or false affect our lives?" Then Teacher-researcher J directed the students to a Google Document (see Appendix E) which showcased two resources that explained the difference between a myth and a legend. It also contained a link to common myths and legends. As students looked at the link, Teacher-researcher J continued to gather examples from students' prior knowledge of myths and legends they already know, ranging from mermaids to aliens to Robin Hood to Hercules. Teacher-researcher J also explained the difference between a myth and legend and an urban myth and urban legend.

Then Teacher-researcher J began the PBL project by passing out a sheet of lined paper to each student. Students were then given time to individually research some urban myths online

and write down at least three myths or legends that intrigued them. After working individually for about 15 minutes, the students were allowed to collaborate with other students in the room to find commonalities between the myths or legends written on their lined paper (Bell, 2010; Lee & Lim, 2012; Vogel, 2009). From the informal collaboration, groups of four or five students were formed between students that shared the same personal interests and choice regarding their myths, thus giving the students a voice and choice option (Bell, 2010; BIE, 2014; Liu et al., 2010).

On Day 2, students were separated into the groups they formed from Day 1. The groups were given a chance to revise their myth to a different myth (Bell, 2010; Lee & Lim, 2012). The students also took the time to choose a group leader amongst their group of four or five students (Vogel, 2009). Once this happened the groups were finalized and all group leaders were required to turn in a paper regarding which myth or legend they were planning to prove true or false with their group Google Drive PowerPoint. Teacher-researcher J's approval was required before groups were allowed to proceed further on their project. Once students received approval for the validity of their legend or myth, the students proceeded with their online research to verify the truth behind the myth (Round, 2011). Teacher-researcher J approached each Group Leader and helped him or her create a Google Doc and assisted the Group Leader on how to share the Google Doc in "edit mode" to all their group members. By the end of Day 2, all group members were contributing their references inside the Google Doc. Each group leader was given the authority to divide the groups in half so two students in each group was working on five references proving their myth true, while the other two students in the group worked on finding five references proving their myths false (Bell, 2010; Vogel, 2009; Zafirov, 2013).

On Day 3, student group leaders detailed the experience from Day 2 in their reflective journals using Google Spreadsheet (Appendix E). All group members were given a brief Google Form (Appendix E) to survey their current motivation and engagement level of the project based on their current group collaborations. All groups continued to work on their online research as well. After roll was taken, all students divided into their group seats to work with their other team members on their research (Lee & Lim, 2012).

On Days 4 and 5, the students continued their online research. A Google Document was created by the team leader of each group. The team leader added every team member as an editor so the students could submit their research references online (Vogel; 2009). The Google Document was a shared document so students could collaborate and make comments to each other's findings (Miller, 2013). Each group researched at least five credible websites to prove their myth true and five credible websites to prove their myth false (Bell, 2010; Zafirov, 2013). When students researched both sides of the myth it gave their final presentation more validity and gave the students a more authentic PBL experience as they came upon research and sources that swayed their final decision (Bell, 2010; Blumenfeld, Soloway, Marx, Krajcik, Guzdial, & Palincsar, 1991). The team leader coordinated with all team members to make sure all team members contributed different resources to the Google Document. By the end for their online group research, each group had at least ten online references documented inside their Google Documents. A brief description was required to summarize each particular reference so other members in the team knew why that particular citation was used (Lee & Lim, 2012). Pictures were also allowed to be copied and pasted into this Google Document (Miller, 2013). Students detailed their experiences in their own reflective journals using Google Spreadsheet. In addition,

they also detailed how much they spent individually outside the group working on this part of the assignment.

At least ten references were submitted to Teacher-researcher J by Day 6. Each group then created a Google Form (Appendix E) with their myth and shared their link with Teacher-researcher J. Teacher-researcher J converted the long Google Form link to shorter link using bit.ly, a URL shortener. Teacher-researcher J then customized the bit.ly link so it was easy for students to type into their own mobile devices.

Since the students brought their own digital devices to use for Day 6 and Day 7, the two days were called “Bring Your Own Devices Day (BOYD Day)” (Round, 2011). An email (see Appendix E) was sent to the staff at the school to warn other adults that Period 6 students were carrying and using their own BOYD around campus during 6th period. The custom bit.ly link was posted on Teacher-researcher J’s Google Document (Appendix E) for all students to view and see. Each group spent Day 6 and Day 7 asking their peers or community to take an online poll to evaluate how others felt about the myth (BIE, 2014). A minimum of 20 individuals needed to be polled by each student group. Students were also encouraged to survey adults as well as students. Students were also asked to survey other people for homework. Students detailed their experiences in their own reflective journals using Google Spreadsheet (Appendix E). Students were also given a brief Google Form (Appendix E) to survey their current motivation and engagement level of the project based on their current group collaborations.

On Day 8, the student group approached the Teacher-researcher J with their findings and informed Teacher-researcher J of their group’s decision whether their myth was true or false (Bell, 2010; BIE, 2014; Liu et al., 2010). Each group used the information they gathered from their online research and their public poll. Once the students had taken a position on their myth,

Teacher-researcher J assisted the groups in creating a Google Presentation (Appendix E). This was a collaborative Google Presentation.

Starting on Day 9, the students were no longer allowed to sit next to their group members. Each student worked individually at their own computers and used the collaborative functions within Google Presentation to create their group presentation (Miller, 2013). This helped to simulate a real world experience of multiple people working in different offices while working on the same project (Cotungo, 2014). However, prior to the group members being separated to their own one-on-one computer, Teacher-researcher J gave students a Presentations Outline handout (Appendix E) so the students could plan out which slides they were responsible for. Team leaders oversaw this Presentations Outline handout to ensure each member was doing their share of the group work (Bell, 2010; BIE, 2014; Liu et al., 2010; Vogel, 2009). Each group was required to create a minimum of a ten-slide presentation defending the position they took on their myth while working synchronously and asynchronously on their Google Presentation.

The Google Presentation took five days to complete, synchronously and asynchronously. All group members had access to the same files and folders they created when checking on their references and their public poll (Miller, 2013; Round, 2011). If a group needed to hold an “emergency group meeting”, they were given an opportunity to meet together physically outside the room for five minutes (Bell, 2010). Every team was given three emergency group meetings. All emergency group meetings were documented in a Google Document inside Period 6’s Google Drive folder (Appendix E) so the students knew how many meetings they had left. Some students chose to work on their project at home as well.

Students were permitted to call each other on their cell phones if they needed clarification but they were not allowed to visit each other’s computers during the Google Presentation part of

the project (Round, 2011; Vogel, 2009). By splitting up the teamwork into individual computers the theory was to help with accountability (Bell, 2010; Liu et al., 2010; Zafirov, 2013). Students detailed their experiences in their own reflective journals using Google Spreadsheet (Appendix E). In addition, they also began detailing how much they spent individually outside the group working on this part of the assignment. Students were also given a brief Google Form (Appendix E) to survey their current motivation and engagement level of the project based on their current group collaborations.

By Day 13, groups were working on final changes to their Google Presentations. All groups were allowed to collaborate together on Day 13 to meet together to rehearse and make final changes to their Google Presentation as a group. A Google Presentation rubric (Appendix G) was given to the students on Day 13 so they know how they will be graded on Day 14 and 15 when they presented their findings. Students detailed their experiences in their own reflective journals using Google Spreadsheet (Appendix E).

Day 14 and Day 15 were the days of the group presentations (BIE, 2014). All groups presented their “mythbusting” Google Presentation via a wireless microphone and a wireless keyboard. The Presentations were also recorded via a digital camera and tripod so groups could review their own presentations. Three groups presented on Day 14 and three groups presented on Day 15. Students detailed their experiences in their own reflective journals using Google Spreadsheet (Appendix E).

On Day 16 the post-baseline survey (Appendix D) was given to the class and the intervention study was completed. Students detailed their experiences in their own reflective journals using Google Spreadsheet (Appendix E) one final time and then submitted it to Teacher-

researcher J for data collection. A total of 23 students consented to participate and completed the intervention study from Day 1 to Day 16.

Teacher-researcher H's intervention plan. Using a 21st Century Web-Based platform called Google Drive, Teacher-researcher H aimed for an increase in collaboration and communication between students. By doing so, the Teacher-researcher hoped it would also increase the students overall motivation and engagement in the classroom. Prior to the intervention the students were given a student and parent authorization form and privacy statement (Appendix B). Students who returned completed parent and student forms participated in the study.

By focusing on the collaboration and communication features of Google Drive, Teacher-researcher H created a PBL lesson plan revolving around the content area of physics and the societal aspects of climate change. This strategy supported the crosscutting philosophy of the Next Generation Science standards (NGSS) by integrating physics with technology and engineering as well as biology and the earth sciences (NGSS Lead States, 2013). By engaging the students with a 21st century tool that tapped into the students' prior knowledge of social media, Teacher-researcher H hoped the students who were disengaged would become re-engaged and the students who were unmotivated would become re-motivated. In other words, the end product would be happier students who were more successful and who rediscovered value in their 21st century education (Bell, 2010). Teacher-researcher H also wanted the students to be better prepared for online learning and collaboration which has become increasingly common in higher education (Bell, 2010; Cotugno, 2014; Covili, 2012; Johnson, Levine, Smith, & Haywood, 2010).

The first data instrument, the baseline survey (Appendix D), was designed to measure students' proficiency and attitudes toward technology use as well as to determine a baseline measure of student experience and attitude toward technology. These baseline values for motivation and learning satisfaction were later used for comparison purposes with the distribution of the same survey post-intervention. The data on prior experience and attitude toward technology was used to measure any correlation between technology experience and attitude with changes, or lack thereof, in motivation and learner satisfaction. This survey was distributed prior to beginning the activity portion of the intervention (Appendix C). The survey was distributed during class time during a regular class period after Teacher-researcher H explained the purpose of the survey and the voluntary nature of the survey. Students were also told they would receive no material benefit for their participation beyond the gratitude of Teacher-researcher H, but were asked to complete the surveys to the best of their ability and to answer frankly and honestly. Students were again informed their participation was voluntary and if there were any questions they were uncomfortable with answering they could skip those questions.

On intervention day 1, the students were given an additional opportunity to hand in consent forms prior to the beginning of data collection. Students were reminded no data would be collected from students without consent forms. At this point 18 of the 26 students had completed the consent forms. The students were then taken to a computer lab where Teacher-researcher H demonstrated to the students where to locate the online survey (Appendix D). Teacher-researcher H then went around the classroom to verify that each student involved in the study had accomplished this initial task. Students were asked to take as much time as they felt was needed to complete the survey. As students completed the survey, they were asked to

continue working on a regular assignment involving calculating periods for harmonic motion using an online simulation in preparation for the Advanced Placement Physics exam, the same assignment the students not involved in the study had already begun. At the end of the period Teacher-researcher H thanked the students for their initial participation.

On intervention day 2, the project based learning assignment (PBL) began with an entry event video regarding the impacts of climate change (BIE, 2014) titled ‘Six degrees that changed the world’; only the segment titled ‘Degree 2’ was shown. Teacher-researcher H then invited students to share comments and views regarding the video and climate change in general. After bringing the discussion to a close, Teacher-researcher H projected the collaborative assignment regarding an essay on climate change. Students were expected to research current and anticipated impacts of climate change in section one of the collaborative paper. In section two the students were expected to research different strategies that were available, or may have become available with further efforts, to mitigate the impacts of climate change either by decreasing the causative agents or in protecting communities. In section three, students needed to research and decide what, if any, mitigating changes governments and the societies they represent should implement and who should be responsible for the cost (Bell, 2010; BIE, 2014; Liu et al., 2010). In the final section the students were expected to make a personal statement regarding how climate change would directly impact them and what they are, or can do, in their own community to help.

Students were also told they must provide a minimum of 10 references that were to be cited throughout their paper (Bell, 2010; Zafirov, 2013). Teacher-researcher H explained the parameters of the assignment to the students with regards to content, research requirements, and the use of collaboration tools such as Google docs and Google slides as part of Google drive. Expectations for collaborative evidence during the assignment were also explained including the

time spent log (Appendix P) and reflection journal (Appendix R). The time spent log was requested as a daily item while the reflection log was requested only during days spent in the computer lab but could reflect on time spent outside of the computer lab as well. Students were given an opportunity to select their own partner for collaboration, in pairs, to avoid personality conflicts and maximize student choice (Barab et al., 2000; Bell, 2010; BIE, 2014; Covili, 2012; Helle & Olkinoura, 2006; Liu et al., 2010; Vogel, 2009, Zafirov, 2013).

Intervention day 3 was in a school computer lab. Students were informed the next class session would be conducted in the computer lab and the students were expected to sit on opposite sides of the lab from the collaboration partner. As a reminder to students who may have forgotten or who were absent, Teacher-researcher H placed a notice on the regular classroom door instructing students to meet in the designated computer lab. At the designated computer lab Teacher-researcher H greeted each student as they arrived and asked each student to take a seat with a computer and to turn on the computer. After the tardy bell, Teacher-researcher H took attendance by looking at the students and verifying the students by name.

After attendance, Teacher-researcher H displayed on the LCD projector the initial instructions for the day. These instructions referred students to go to the instructor's web page and follow the link titled 'Climate Essay Instructions'. Teacher-researcher H simultaneously projected the assignment on the screen. Teacher-researcher H walked around the classroom to assist the students and verify progress. After being assured students had achieved the initial starting point, Teacher-researcher H began to re-explain the nature of the assignment and the expectations for collaboration (Appendix F) using Google Drive. The assignment required the students to use Google drive to collaborate and create an essay in four parts regarding climate change. Part one of the essay addressed the evidence climate change is already occurring, section

two addressed what methods and technologies exist to remediate the impacts of climate change on human society and the consequences of each, and part three directed them to justify a selection of what remediation they recommend and what party or parties should be responsible for bearing the cost. Part four required a personal reflection from each student regarding how climate change is or could become an influence on their own lives and how they are personally contributing to climate change and what steps they are or could be taking to lessen the impact of climate change within their own community. Teacher-researcher H reminded students they would be observed for evidence of collaboration and would need to document their research, references, and complete the reflection form before the end of the period. Students were also reminded of proper computer lab behavior regarding what type of content was inappropriate for them to visit at any time (any content unrelated to their research but specifically pornography, drugs, any criminal activity, hate groups, and entertainment/sports websites). The basic apps in Google Drive were demonstrated and students were shown how to share documents for collaboration. Students were then asked to begin the collaborative assignment using Google Drive by communicating with their partner via Google drive, deciding how to divide up the sections of the task, and locating and submitting references. While the students proceeded to begin the task, Teacher-researcher H began to observe student behavior according to the teacher observation form for teacher H (Appendix L). Using this document, Teacher-researcher H recorded each student's on task behavior every ten minutes regarding was their head up or down, were they communicating with others and was the communication about the project, were they writing and if so was the writing project related. Teacher-researcher H also assisted students with any questions regarding clarification on the assignment, use of the computer, or suggestions on how to begin the research. Ten minutes prior to the end of the period the students were asked to

complete the student reflection sheet and reminded to complete the collaboration time sheet daily.

In between computer lab sessions, students were asked to work asynchronously or synchronously with their partner, using Google Drive, since Teacher-researcher H was unable to have access to the computer lab every day and wanted to promote independent learning on the part of the students. During the course of the four week intervention, teacher researcher H spent 8 days in the computer lab. During computer lab days 2 through 8 Teacher-researcher H continued to make observations on student engagement and remind students to complete the student reflection form and the student collaboration time log. Each day in the computer lab the students were re-directed to separate themselves from their partner. Teacher-researcher H briefly reviewed the task with the students daily. Teacher-researcher H reminded students they would be observed for evidence of collaboration and would need to document their research, references, and complete the reflection form before the end of the period. Students were also reminded of proper computer lab behavior regarding what type of content was inappropriate for them to visit at any time. Students were reminded to complete the student collaboration form (Daily Time Sheet) daily by means of the application 'Remind' which sent a reminder to the students' phone or e-mail.

The final days of the intervention required the students to present their Google Presentation in front of the class. Students were scored on their presentations according to the grading rubric (Appendix H). The Google Presentation included the embedded video(s) the students made. After each group presented, a brief discussion followed to seek positive feedback from the other students regarding the presentation and to discuss the merits of the position taken.

The last day of the intervention, Teacher-researcher H once again checked out the iPads to each student and guided them to the post intervention survey. Following the same procedure as before students completed the post intervention survey completing the intervention.

Data Collection Methods

Both Teacher-researchers, at both schools, collected pre and post baseline surveys (Appendix D), student reflection journals (Appendix Q and R), student project samples (Appendix I and J), and teacher observation check list (Appendix K and L), student collaboration timesheets (Appendix P and Q). The pre and post baseline survey contained questions about students prior experience and skills using technology, questions 1-15, motivation, both intrinsic and extrinsic, questions 16-45.

Data collection to measure the primary research question, the impact of Google Drive collaboration on student motivation, and the secondary question, what is the impact of collaborating with Google Drive on learner satisfaction, consisted of several items. Teacher-researcher H students worked in a one to one computer lab for 8 days over a 4 week period to complete the project. At the beginning of the project the students took a baseline survey on Google forms to gauge their attitudes about the assignment, working with computers, motivation, and prior experiences. This form had the students express their experiences, skills and attitudes on a 1 to 5 scale. At the end of the project the students once again took the survey to measure their viewpoints after having worked with Google Drive.

Each day over the four week period, the students in Teacher-researcher H's class completed a Google Form for "Time on Task" or "Daily Time Sheet" (Appendix P) to document how much time they spent on the project either working alone or with their partner and how they felt about their progress. During computer lab days, students completed a reflection form

(Appendix R), similar to the one completed by Teacher-researcher J's students (Appendix Q).

The reflection form contained questions which allowed students to express themselves on a scale of 1 to 5 as well as expressing their viewpoints in paragraph form. This allowed for the collection of both quantitative and qualitative data.

This third instrument, the reflection form and/or journal, was for ongoing analysis of students' thoughts and behaviors. Students were asked to reflect on their activities during each intervention. Teacher-researcher J selected several students for more in-depth analysis of this data. One student was selected as high achieving student, one student was selected as a moderate achieving student, one student was selected as a low achieving student, and finally one student was selected as an English Language Learner (ELL). Teacher-researcher H asked all students to complete a reflection journal during each of the seven days spent in the computer lab. Two high performing gifted students, two non-gifted students, and two relatively low achieving students along with the one ELL student were chosen for more detailed data comparison. These reflection journals provided input on the students' motivations and engagement and learner satisfaction experienced during the collaboration time using Google drive.

During the synchronous, in computer lab sessions of the intervention, Teacher-researchers J and H also completed a teacher observation checklist regarding student behaviors, time on task and engagement. For Teacher-researcher J, this was a daily activity during the intervention since Teacher-researcher J worked daily with computers. Teacher-researcher J used a teacher observation checklist (Appendix K) to observe the entire class period. Teacher-researcher H used the teacher observation checklist (Appendix L) to observe and record each student's behavior every ten minutes. Data was recorded regarding students' behavior using the following format; head up or down, listening or apparently daydreaming, writing off task or on

task, talking off task or on task. Teacher researcher H also kept a journal of observations for each day spent in the computer lab on the teacher observation checklist (Appendix L). Meanwhile Teacher-researcher J also kept a journal of observations for all days throughout the intervention (Appendix S).

Plan for Increasing Validity

Various qualitative and quantitative methods were applied throughout the study at School J and School H to ensure validity on the data collected.

The three types of validity we chose to focus on our study were:

1. **Democratic validity** - which “is the extent to which stakeholders have collaborated in the research process and/or the extent to which the researcher has taken into account their various points of view (Hendrick, 2013, p. 124).”
2. **Catalytic validity** - which “is the extent to which the research transforms or changes the researcher's views and/or practices (Hendrick, 2013, p. 124).”
3. **Neutrality/confirmability** - which shows “that results are an accurate representation of what occurred rather than the result of the researcher’s bias, motivation, or interest (Hendrick, 2013, p. 124).”

Part of our study involved the use of project based learning using collaborative strategies thus measuring the level of collaboration which was an essential component of our study. The members of the groups were expected to reflect on this experience. This is related to what is measured in Democratic validity. The students will completed a reflective journal for each day of the intervention activity.

Hendrick also stated that if the purpose of the study is to inform our educational practices we should focus on truth-value validity, outcome validity, and catalytic validity (Hendrick,

2013). But he also stated that if we were doing collaborative research we should include democratic validity as one way to establish the study's credibility.

Verifying as much as possible the impartiality and accuracy of our data, and the results or conclusions derived from them is essential to having a meaningful study. Based on this the Neutrality/confirmability component is essential to making this study one we can learn from and reflect on our future teaching practices.

The student collaboration timesheet and the teacher observation journal will corroborate the data from each, thus contributing to the validity of neutrality/confirmability.

The baseline pre and post surveys and the reflective journals of the students will help determine the extent of growth and transformation of the students' collaboration, motivation and engagement. This then lead us to determine how to alter our practices, hence catalytic validity.

Confidentiality and Informed Consent

This action research project began after each teacher received consent from the Institutional Review Board (IRB) of Concordia University in Irvine, California to proceed with the study. In addition, Teacher-researcher J received written consent from the principal at School J (Appendix C), while Teacher-researcher H received written consent from both the principal at School H and the district associated with School H (Appendix C).

Parental consent forms were given to all students participating in both interventions at School J (Appendix A) and School H (Appendix B). Families that needed Spanish versions were given a translated version of the consent forms (Appendix A and B). Both parents and students were given informed consent forms and photography consent forms that explained the purpose of the study, the nature of the study, and how the students' participation in the data collection was purely voluntary. The parents and students were both informed that there would be no penalty

for having the students' data withdrawn from the study at any time. Both parents and students received a copy of their photography consent form and their informed consent forms. Both Teacher-researchers kept the signed copies of the parent and student consent forms and photography consent forms in a safe place inside their classrooms.

Teacher-researcher J also gave an instructional aide consent form as well as a special education teacher consent forms (Appendix A) for the three special education students involved in the action-research study. The special education students were given the option of receiving a modified version of the PBL project or an option to be completely excluded from being in the action research and participating in the PBL project altogether.

All students were given numbers as to maintain their anonymity and confidentiality. The numbers were assigned to all students who received parental consent prior to filling out the pre-baseline survey. All students in the Business Technology classes taught by Teacher-researcher J were given the intervention but only the data from period six with parental consent were collected. All students in Physics classes taught by Teacher-researcher H were given the intervention but only the data from period five with parental consent were collected.

Student participants' names were coded to ensure anonymity of the students. All names of the schools and students were excluded from this action research study. The data collected from this action research were reviewed only by Teacher-researcher J, Teacher-researcher H, and their professor-advisor. The majority of the data collected were online. Other data such as grading of rubrics were collected on paper. All documents that contained student data and information were destroyed one month after the completion of the study.