EVALUATING PROFESSIONAL DEVELOPMENT ON EDUCATIONAL TECHNOLOGY INTEGRATION FOR ENGLISH TEACHERS IN JAPAN

By

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Dedicated to the SE₂C who are with me all the way, every day. They LIGHT my life. I wouldn’t have reached the final BELL without them, and they are my true HEART. Most esteemed props go to my first Girl Scout leader, my first teacher, my first coach, my first best friend, and my ultimate cheerleader – in other words, my Mom. Oh, and Dad… you too! (Look, I did it!).
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The impetus for this study was the need to provide effective training for English teachers on the use of Google Drive-related apps at a Japanese school. This training was necessary as the school embarked on creating a Japanese government-required information and communications technology (ICT) educational environment at the school. To address this situation, a professional development (PD) experience was designed for the teachers at the school. This involved a 12-week lesson study cycle with weekly planning meetings, and 5 sessions of technology classes focused on Google Drive apps.

The design and evaluation of the PD incorporated adult learning theory, literature on traditional Japanese PD, non-native language speaker research, literature on barriers to technology integration, research on educational technology PD, instructional systems design, and theory on appropriate PD evaluation. This study examined the design, development, implementation, and evaluation of the technology-based PD experience. This study used qualitative methods for collecting and analyzing data, within a designed framework based on Guskey’s Five Levels of PD Evaluation (2000), to
assess the effects of the professional development on the participants. Data-collection methods included interviews with the participants at the beginning and end of the 12-week cycle, reflection logs from the weekly meetings, artifacts collected that were produced by the school and the participants, and field notes from class observations.

The findings revealed that the PD helped the participants and supported them in the use of Google Drive apps in their classes. It also provided information for developing future professional development programs at the school. Additional outcomes point to future research in designing a system of long term support for the teachers as they continue to use technology at the school, and for development of PD for other Japanese teachers outside of the English department. This work is significant in that there are no other studies of Google Drive PD for teachers, or integration of the technology in Japan. Also, the study evaluates the effectiveness of the PD beyond the participants’ perceptions of the experience, and contemplates creating an extended experience to support teachers over the long term.
CHAPTER 1
INTRODUCTION

What is true for life itself is no less true for the universe: knowing where you came from is no less important than knowing where you are going. —Neil deGrasse Tyson

"In the Beginning", Natural History Magazine, 2003

Background

The current revised Japanese National Curriculum, released in 2008 by the Ministry of Education, Culture, Sports, Science and Technology (MEXT), contained a new set of competencies for its students dubbed “the 21st century competencies.” These competencies included “information and communications technology (ICT) skills” (Kuno, 2014, p. 129). MEXT is part of the executive branch of the Japanese government, and the Minister is a member of the Prime Minister’s Cabinet. MEXT manages the national curriculum for all Japanese schools and regulates most aspects of the educational process in Japan. In 2013, the second phase of the plan for education in Japan was introduced by the MEXT, to be implemented during the years 2013-2017. In this plan, there were again mandates for “ICT use”, as well as the establishment of an “ICT educational environment” at schools (MEXT, 2013, p. 3).

ICT is a very broad term. However, in terms of education in Japan, it refers to different educational technology options. The school where I worked decided that they needed a technology solution for their students which would provide them not only with the software they needed to complete projects, homework, and classwork, but also to create such an “ICT educational environment.” The MEXT guidelines were not specific about what this should look like, but the school felt the need to establish such an environment.
The first reason they wished to establish the “ICT educational environment” was, of course, because of the MEXT guidelines. The second reason was that the school had been designated a Super Global High School (SGH) as well as a Super Science High School (SSH) by MEXT. Both research and development programs came with guidelines and stipulations as well. Part of the SGH and SSH designed goals for my school included broad statements about the use and integration of ICT at the school. Every year a report on these research and development programs is written, and we, as a school, must show that we are working towards establishing an effective “ICT educational environment.”

However, no budget was available in regular school funding for technology expenses, so the money would have to come from research and development monies allocated for the SSH or SGH program or another special research and development budget. The program also needed to be as inexpensive as possible.

Before the technology implementation described in this study, the only devices at the school were 88 Windows computers, and a set of 45 iPads. All the teachers used chalkboards as the primary delivery method for content in their classrooms. Occasionally a teacher brought a projector and computer to class, and occasionally a class was scheduled in the computer lab. But with the number of devices available then, only slightly more than 13% of our students could be on a device at any given time.

After reviewing many options, it was determined that, for our school, the technology solution would be the use of G Suite for Education (formerly Google Apps for Education or GAFE) by the staff and students. This program was chosen for many reasons. First, menus were available in Japanese and English, both of which were
needed at the school. Second, the amount of storage space that students would have access to would be sufficient. Also, the software is free and students wouldn’t have to purchase any new products. Additionally, open accessibility, being able to log in at home and at school, would be helpful. And, finally, because I was at the school as a Google Certified Educator, I would be able to help deploy the system, and we did not need to pay anyone for training or to set it up. In order for the G Suite deployment to be successful, the teachers at my school needed professional development (PD) to learn to use it effectively in their classrooms and to instruct their students in proper use.

The purpose of this study was to develop and evaluate a PD experience that would help English teachers use some G Suite tools, specifically apps related to Google Drive (or simply “Drive”), within an English course at the school. Prior to this program, the teachers did not receive any professional development for technology use in the classroom other than an initial training in Word use, and Excel use for inputting grades given by the BOE when they first started (Hitomi, Post Interview, December 24, 2015). The overall research question explored was: How does an educational Professional Development experience on Google Drive Apps impact teachers of a communicative English course in a Japanese high school?

In order to support the participants throughout the G Suite deployment, a series of technology-based Drive Apps sessions were created as the core PD offering. The experience was then extended throughout a 12-week lesson study cycle. By embedding the technology training within a traditional lesson study format, with teachers planning together and meeting together weekly, I hoped to create a collaborative environment where teachers could learn together and support each other. The lesson study spanned
weekly course curriculum planning meetings and class observations, all related to Drive implementation in one specific English course. This course, called “Global Interaction” (GI), will be described in greater detail in the next section.

PD comprises a broad range of activities, interactions, and events that are designed to enhance a teacher’s practice and contribute to their growth personally, socially, and emotionally, by enhancing their knowledge and skills (Desimone, 2011). PD is necessary in a variety of situations and is utilized in order to improve instruction (Desimone, 2009). Effective PD enables participants to succeed and feel confident using the new knowledge in their courses. This type of assistance takes into account the types of PD that exist for specific topics, the learning styles of the target audience, and instructional design principles (Desimone, 2009, 2011; Knowles Holton & Swanson, 1998; Reiser & Dempsey, 2002). The literature review for this study focuses on educational technology PD, PD specifically for Japanese teachers, and instructional design, in order to develop an effective PD experience for the target audience.

This study outlines the design and evaluation of an entire PD experience. The initial desire was for the teachers to learn how to use the technology. However, I thought a long-term roll-out, while slowly learning different apps together within Drive in sessions, as well as planning the curriculum together in planning meetings, would allow the transition to be easier and smoother for the participants.

The technology focus reviews various Drive application software programs or “apps.” Drive is a free, web-based, authoring suite that includes a variety of apps. Users can create documents, spreadsheets, drawings, presentations, and more. Drive is included in G Suite. All work on Drive can be done collaboratively in real time; i.e. users
can all be working on the same document, at the same time, on different devices, from any location that has Internet access. Since Drive can be accessed from any location, students can access it from their computers at home, on their phones during their commute, or from a computer lab at school. Teachers can also provide feedback and corrections to their students from any place, at any time (Rowe, Bozalek & Frantz, 2013). These features make Drive an effective and useful tool for teachers. However, like any new innovation applied to the classroom, there comes a need to provide PD for teachers to effectively use Drive and understand the benefits of the new technology (Borko, 2004; Guskey, 2002; King, 2013).

The PD experience was developed using Desimone’s (2011) five core features of effective professional development. The content focus was on the GI course curriculum and how Google Drive (referred to in this research as just Drive) and the various Google apps could support or be embedded within the GI course. The entire study encompassed the first cycle of a lesson study. Within the lesson study cycle, teachers experienced planning meetings, a Drive Apps series with five sessions, and a set of classroom observations in the form of simulated open classes. The Drive Apps series provided educational technology content.

The first class of the Drive Apps series covered the basics of Google Accounts (both teacher and student accounts) and use of Accounts within Google Apps. Then the three middle sessions taught the participants about Google Docs, Google Slides, and Google Forms. The final session was on Google Classroom, and exemplified how the participants could embed their created projects, assignments, and student activities
within Google Classroom. After several weeks of planning, the participants observed each other within the open classes.

Drawing on research specifically related to Japanese teachers, Japanese PD, adult learning theory, and effective technology PD aided my delivery of the training to help teachers learn how and why they could use Drive in their classrooms. A successful PD would be one in which the teachers effectively learned the new knowledge and then used it in the classroom to benefit their students.

However, the final challenge was to determine through evaluation whether or not the PD was effective. Thus, there had to be a system in place for thorough evaluation (Guskey, 2002). PD must be evaluated in order to determine whether teachers’ attitudes have changed, to verify that they learned the knowledge presented in the PD, and if the PD affected student achievement (Guskey, 1994). More comprehensive evaluation results in more effective design of future PD and continuous improvement of PD sessions. By comprehensively evaluating the PD, one can determine whether knowledge gained was effectively translated into student achievement in the classroom (Guskey, 2002).

The PD experience in this study was evaluated using Guskey’s Five Levels of Professional Development Evaluation (G5L) and was done to try to exhibit the value of the PD in supporting teachers within their sessions, in the context of a lesson study. This evaluation was then extended into the classroom (Guskey, 2000, 2002). This study displays how research can inform the development of a PD experience to support teachers in the implementation of educational technology in their courses and how that PD can be evaluated to demonstrate the ultimate effects on student engagement and
achievement. Using evaluation data, future sessions of PD can be made more effective. An effective evaluation would provide the opportunity to reflect deeply on the PD experience and allow for an in-depth reflection on the program. The PD experience design and evaluation is discussed in more detail later in this document.

Significance

Public education in Japan is moving towards a more aggressive implementation of technology in the classroom. As the total population of Japan continues to decline, the government’s emphasis has been put on investigating best practices and successful implementation of technology with the desired end result of preparing students to participate in the global marketplace (Arimoto, 2015; Lifelong Learning Policy Bureau, 2013). Effective educational technology implementation must be achieved as the Japanese educational system and educational policy continues to evolve, and it has been mandated by the government through MEXT (MEXT, 2013). There are currently no other published studies about Google Drive PD for teachers or integration of Drive or G Suite in Japan.

Since teachers serve as “gatekeepers” for technology, technology implementation must begin at the teacher level. The teacher effectively models the technology for students and then students begin to adapt to and adopt the technology for themselves (Knezek & Christensen, 2002; Salinas & Sánchez, 2009). This study is an inside look at how the teachers participated in and reacted to the Drive Apps series and the overall PD experience. It contributes to the base of knowledge about how Japanese teachers cope with, work with, and learn to understand technology through this type of PD at their schools.
My Role in Educational Technology and EFL

I have been a teacher for more than a decade and have taught a variety of subjects in various contexts. These subjects included elementary school technology and media classes, middle school English as a foreign language (EFL), and integrated and life science classes, high school biology, EFL, and science EFL classes. In America, I taught in Title I middle schools in a small neighborhood and in both a Title I district and a middle-class neighborhood. I also taught in a middle-class neighborhood middle school. In Japan, I taught at an elementary school and a junior high school in a small neighborhood and at a high performing Japanese high school in a large city. In these various K-12 school settings, administrators and district level professionals provided me, and the other teaching staff, with a plethora of PD experiences—from poverty training based on the program of Ruby Payne---to Math, Science, and Engineering workshops, and classes and training on effective Team Teaching in the EFL classroom.

As I participated in these training sessions, I often felt that I benefited. But other times I felt the PD could have been better. Effective presenters knew the context of our practice and how new ideas presented could be used in our curriculum. They offered us time to brainstorm and plan. However, more often than not, the PD felt very short term. Those one-shot lessons often introduced great ideas but had neither practical connections nor time built in for students to learn how to effectively apply the ideas to their work.

Eventually I volunteered to teach my own PD sessions on various topics to the teachers at my different schools. I started out teaching a variety of simple technology topics, such as how to use mp3s in the classroom, and later I started developing some of my classroom successes into PD, such as the use of novels and literature circles to
engage students in middle school science class. In one district, I was also assigned to the district level educational technology team. My role was to deliver educational technology PD to the teachers at the school, based on the topics we learned at district level meetings. Topics ranged from specific efforts to use new programs the district was launching to special interests such as how to use digital photography to engage students. I enjoyed teaching PD, and this eventually led me to become a media specialist, a job that required me to teach PD sessions on educational technology to all the staff at the school. I have a passion to help teachers learn about technology; I want to help the teachers with whom I work become comfortable with the technology around them so that they can integrate it into their own classes.

While I enjoy teaching teachers about technology integration, I also have a long connection to ESL and EFL. My first time teaching EFL was in Japan, where I appreciated the cultural aspect of teaching English not only as a language but as a cultural experience.

After returning to America, I started working at one of the Title I schools mentioned above. At this school, approximately 85% of the students were classified as non-native speakers of English, and they all participated in the district’s ESOL program at various levels. Teaching science to these students was rewarding because we worked not only on the science but on English as well. I was able to integrate a lot of cultural interaction and reading activities into the programs.

Eventually my combination of interests in technology PD and in EFL/ESOL education led me back to Japan, where I am currently working. My family and I wanted a change and the timing seemed good for my career goals as well. I wanted to teach
teachers how to use technology, and Japan is now taking steps to include more technology at the public school level (MEXT, 2014).

At the same time, the English education system is moving from a translation-based system to more of a communication-based system. This shift means that the traditional “lecture with memorization” system is changing and teachers are looking for new ways to teach active, collaborative, and communicative classes (Aspinall, 2010; Lifelong Learning Policy Bureau, 2013). My school was designated a “Super Global High School” (SGH), which is a research and development program aimed towards using both more communicative English in classes as well as using more technology. These two paradigm shifts provided me with the opportunity to teach EFL teachers to effectively use technology in their English classes.

I also have a lot of current experience in the use of Google for Education products. As mentioned previously, I am a Google Certified Innovator (formerly Certified Teacher). This is a program in which Google provides free training and then support in completing action projects and other “innovation projects” in the local educational community. I am also a Google Certified Educator, a certification program where you must pass two tests and then achieve certified status, with re-certification needed every 2 years. With this certification, my school felt they had someone who could help support the deployment of G Suite and provide training and support for the teachers.

My current multiple job duties happened to intersect with all these interests. I am currently developing curriculum and teaching five different kinds of communicative EFL classes; three of them are culture or topic-based and two are science-based. Another part of my current job description is to provide teacher training sessions to the staff of
the English department. For this task, I specifically focused on providing this training with the hope that, in the future, more PD could be delivered to the rest of the staff. That PD could be designed using all the information and data I learned from this study.

Summary

My school needed PD in Drive integration and classroom use. My role in educational technology was to find ways to help teachers become comfortable with the use of technology in their classrooms. At the request of the administration, I developed a series of PD sessions on Google Drive and delivered them to some of the English teachers at my school within the context of a lesson study cycle with open classes. Then I used G5L to evaluate the entire PD experience and to make suggestions for future PD sessions (Guskey, 2000, 2002). This study actively contributed to the knowledge base of PD on educational technology for English teachers in Japan as well as educational technology PD in general, and PD on Google Drive.
CHAPTER 2
LITERATURE REVIEW

I don’t know anything, but I do know that everything is interesting if you go into it deeply enough.

—Richard Feynman
"The Smartest Man in the World", Omni, 1979

This literature review will explore the different research elements that were essential for the development of this study. The topics of the literature review include: professional development for Japanese teachers, educational technology professional development, instructional design, and professional development evaluation. Figure 2-1 exhibits the conceptual framework and illustrates how all of the literature reviewed relates to the purpose of the study, from the original design of the PD to its evaluation and eventual modification.

Professional Development for Japanese Teachers

As with all teachers, Japanese teachers are adult learners. This section will focus first on adult learners, but then move into typical PD in Japan. Finally, teacher barriers to technology integration will be discussed, focusing specifically on issues that have been researched for Japanese teachers.

Adult Learners

What is meant by “adult learners?” Adult learners are different from young students. They have a need to take responsibility for their learning, and therefore must be given the opportunity to make their own decisions about what they learned. Because of this more active role, adult learners need to be clearly told what items are important, and why they are important, to help them make informed decisions (Knowles et al., 1998). In a very constructivist way, adult learners learn by making sense of their
experiences (Mezirow, 1991). Because they have unique and varying background experiences, the designer of the instruction should account for these experiences. The way an adult learner perceives an event is directly related to previous background and experience (Cranton, 1994; Knowles et al., 1998; Mezirow, 1991). Demographic, social, cultural, and technological experience and background affect how teachers learn and how they accept new information on different subjects (Cross, 1981).

Adult learners also benefit greatly from reflection. Reflection after an experience not only helps to reinforce the learning, but it helps to make sense of what the learner went through in order to make the knowledge transformative. In this way, the experience creates a change in how they perceive future events from that point on (Brookfield, 1986; Mezirow, 1991). Even though adult learners can learn in ways that distort their prior perceptions, their experience can be directed so that those changes in their perceptions are meaningful and transformative, guiding their learning and allowing them to accept and appreciate the new knowledge (Cranton, 1994; Mezirow, 2000). Reflections are also useful for teachers to assess their own level of learning after an activity (Marzano, 2003). In completing the reflection process, more themes may develop to create a better understanding of their overall PD experience.

The teachers at my school were all adult learners and their different backgrounds and experience needed to be taken into account to reach them as adult learners. This led to the need to gather more information on what typical PD experiences are for Japanese school teachers in Japan.

**Non-native language adult learners.** All but one of the participants in the study were non-native English speakers. Therefore, in the study design, it was important to
consider the impact the language of the PD would have on the participants. Recent research has shown that using a foreign language can reduce biases in decision-making (Keysar, Hayakawa & An, 2012). As Keysar et al. (2012) have discovered through various experiments, when a person has discussions and then makes decisions in their native language, they are naturally risk-averse; however, when the same people make decisions in a foreign language, the risk-aversion is lessened.

The reason for this discrepancy is thought to be associated with the reduction in the emotional effect of risk-taking that occurs when a person makes a risk decision in a foreign language (Keysar et al., 2012). It is well established that a variety of emotions can affect the decision-making process and the consideration of risks, even in one’s native language (Quartz, 2009). However, the emotional connection is lessened in the secondary language.

**Typical Professional Development in Japan**

In this section, I will start with some brief details on education in Japan that are important to the design of this study. Of those considered educational staff in Japan, 80% percent are classroom teachers. Teachers not only have classroom (and possibly homeroom teacher) responsibilities, but also have other roles in school management, subject area departments, or leadership roles (Collinson & Ono, 2001). After a few years of teaching at one school, teachers are often moved to different schools in their district. This is done to allow them to develop their skills for teaching a diverse group of learners. National government funding supports approximately half of school expenditures, so the government has a deep interest in the quality of teachers at each and every school. Because of this, the disparity between districts and between richer or
poorer communities is reduced compared to countries like the United States where such a system is not in place (Lewis, 1995).

The word for professional development in Japanese is 研修, Kenshū, which essentially translates to “training." Japan has a long history of collaborative, school-based PD. While often not directly required, the teachers in Japan are expected to participate in continuing PD activities (Lamie, 1998). There is an intensive and required amount of PD during the first probationary year of a teacher’s career. In addition to this, since 1987, MEXT has recommended a variety of formal PD experiences for every teacher throughout their career (Collinson & Ono, 2001). However, the final design, implementation, and goals of the PD depend on the district and school (Akita & Sakamoto, 2014). Many prefectures have an “education centre” where teacher researchers work on different projects and provide a wide variety of PD activities for the teachers in the prefecture. These centers are separate entities from the schools and are based in their own facilities. Each prefecture also has at least one national university. These universities not only train new teacher candidates, but also send lecturers out to give PD sessions at the local schools (Collinson & Ono, 2001).

In addition to the PD opportunities provided at various levels, teachers are also allowed to apply for a sabbatical to study at university for a period of one or two years. During this time, the teacher’s position is held within the district and they are still paid their normal salary. However, these programs are highly regulated by the Board of Education (BOE), and require that the courses the teacher takes directly benefit the development of that teacher within the district (Collinson & Ono, 2001).
Despite these additional opportunities, most of the PD a veteran teacher experiences occurs at the school level (Collinson & Ono, 2001). Teachers have to renew their teaching credentials every 10 years, and the renewal is dependent upon several factors, including having up-to-date PD experiences (MEXT, 2008). Two of the most common types of school-level PD activities found in Japan are the “lesson study” and the “open class.” Both activities are designed to help teachers have a more student-centered classroom and to provide an opportunity for teachers to observe and learn from each other (Lewis & Tsuchida, 1998; Takahashi, 2000).

**Lesson study.** Lesson study has gone on in Japan for many years. The advances in understanding, knowledge, and learning that have come out of lesson study have played a vital role in many of the changes in Japan’s educational system and curriculum over time (Kuno, 2014; Saito & Sato, 2012). Lesson study can enhance schools, assessment, leadership, learning, and continuing teacher professional development (Dudley, 2014).

An ongoing lesson study operates in cycles. Within each cycle teachers consider their goals, plan, conduct research, and finally reflect. The information learned in that cycle will inform the goals and planning within the next cycle (Lewis, Perry, & Murata, 2006).

In a lesson study cycle, teachers first collaborate to form long-term goals for student achievement and learning within the course they are examining and studying (Lewis, 2002). Due to the nature of the teacher-student relationship, during which elementary teachers tend to spend at least two years with their students, and junior high and high school homeroom teachers are with their students for all three years of high
school, the long-term goals developed in lesson study are very detailed and are critically important to practice (Lewis, 1995; Collinson & Ono, 2001). In the next step of the lesson study process, the participating teachers plan, and then conduct, lessons based on research and their previously constructed goals.

During the lesson, the participating teachers observed student learning, including student behavior and types of engagement during the lesson. Finally, they conducted post-lesson meetings and then revised the lesson for the future (Lewis, 2000; 2002; Lieberman, 2009). The goals of these final meetings were to evaluate what happened in the classroom together, to see what happened in the classroom from the students’ perspectives, and to challenge their own perceptions on teaching while they collaborated together (Takahashi & Yoshida, 2004). In Japan, the overall process is sometimes referred to as PDCA or “Plan-Do-Check-Action.” This process can affect pedagogy, impact the course design, affect curriculum, and give teachers an opportunity to continually improve their classes (Kuno, 2014; Lewis et al., 2006).

Lesson study has many benefits, but one important benefit gives teachers the ability to share their pedagogical practices with other teachers. Teachers are often isolated, and their own pedagogical practice of dealing with their multiple students, curriculum, and learning is on some levels an unconscious ability; these two factors make it difficult to transfer their knowledge of practice to other teachers (Kuno, 2014). However, with lesson study, not only do teachers have the chance to watch how other teachers work in the classroom, they may also have others observe them and give them a third person view of their own teaching practice (Dudley, 2014; Kuno, 2014).
The overall lesson study process is not rigid. There is no specific rule or format, no upper and lower limit to participants, and the program differs from school to school. The overall format and goal-driven agenda define it as lesson study (Lewis, 2002; Matoba & Reza, 2006; Kuno, 2014). What matters is that the teachers start to form a commitment to a community, which in turn, may lead to instructional improvement (Lewis et al., 2006). This idea of lesson study as a learning community began in Japan in the late 1990s and has influenced how lesson study is used by the entire school as an agent for change (Ose & Sato, 2000).

Lesson study has become popular in the U.S. and in other countries as well, and has been researched extensively in different subject settings in a variety of schools and settings around the world (Chokshi & Fernandez, 2004; Fernandez, 2002; Lewis, 2000). Lesson study has been found to help teachers transfer their learning directly into their classrooms. It is aligned with various learning theories, works well to establish professional learning communities, and helps promote teacher well-being and effectiveness (Dudley, 2014; Saito & Sato, 2012).

**Open classes.** The open class or study meeting stems from the lesson study. An open class is developed by a team of teachers or individuals who are in charge of that class or subject. Observers are invited to the teaching of that lesson. Oftentimes these observers are not only school faculty, but are invited guests from local universities and other schools in the prefecture; sometimes 50 or more guests may observe one class. The teachers plan for the class for weeks. The event is designed to showcase methods and innovative classroom ideas, and also to demonstrate student engagement (Lewis et al., 2006).
After the open class, there is a large meeting where the teachers, the subject area staff, and the guests all meet and discuss planning, the lesson, and long-term goals. These meetings can help teachers evaluate their classes and make preparations for changes in the future (Collinson & Ono, 2001; Lewis et al., 2006).

Teacher Barriers to Technology Integration

Overcoming such issues as anxiety and other teacher barriers had to be investigated for this study due to the PD being specifically focused on technology. Teachers at my school were reluctant to integrate technology into their classes. There was a language barrier present as well, as none of the teachers were native English speakers, and the instruction of the classes was in English. I included a variety of literature on teacher barriers specific to Japan and to non-native English teachers, and also included broader, common issues that affect teachers worldwide.

Many teachers in Japan have high levels of anxiety when it comes to managing technology within their classrooms (Sakai, 2008; Ono & Ishihara, 2012). Class sizes can be very large, and within one class period it is difficult to provide effective instruction for all students in the class (Jung & Kubota, 2006; Fujishiro, 2007; Fujishiro & Miyagi, 2009). For example, in the school where I worked, the smallest homeroom class had at least 40 students.

Teachers may be very reluctant to adopt new procedures or practices if they are nervous about making them work within their classrooms (Lortie, 1975). If they try to use technology, and then fail, they have risked something and gained nothing. This is embarrassing, and makes the teachers wary about trying to use technology again in the future (Pejouhy, 1990). In Japan, there is a culture of anxiety about embarrassment, especially in the school environment, and the desire to avoid mistakes is strong.
Therefore, if a person takes a risk and fails, they are less likely to repeat that effort (MacIntyre & Gardner, 1991, 1994).

It has been shown that while enthusiasm, acceptance, and belief in the usefulness of technology can be slow to develop, anxiety can be reduced quickly when there is meaningful exposure to that technology (Knezek & Christensen, 2002). A culture of respect and mutual understanding, where it is okay to have failures, must be established within the group of teachers participating in PD classes. Teachers must also be encouraged to become lifelong learners who continue to learn from PD as their career progresses (Darling-Hammond & Bransford, 2005).

Across various cultures in multiple societies, there are different attitudes and ideas about technology use. In Japan, studies and surveys conducted compare and contrast differently with other countries. In Japan and other countries, early exposure to technology increases the enjoyment and use of technology. At the first-grade level in Japan there are no gender differences between attitudes towards computers (Knezek & Christensen, 2002). From fourth to sixth grades, girls are more apt to enjoy computer use. But by seventh grade and onwards, boys are more likely to enjoy computer use than girls. If the technology is used effectively and often, students begin to understand the appropriate use of technology and its importance within the first three months of exposure. (Knezek & Christensen, 2002). However, teachers are not likely to introduce technology to students if they are not confident in using it themselves. Without an accompanying change in attitude, a teacher’s knowledge about technology advances only to a certain level of skill. Therefore, the attitude of the teacher must change over
time if successful technology implementation is to happen in their classroom (Knezek & Christensen, 2002).

Of course, if teachers know or believe their students have no access to technology at home or outside of school, they may be less likely to ask the students to use it. If there is a significant population of students who do not have access to computers at home, it is likely that teachers will integrate technology less often into their lessons (Knezek & Christensen, 2002). Thus teachers need to have a true description of the actual technology access and use at the homes of students to form an accurate picture of whether or not there is an issue.

One of the problems with implementation of new technology in schools is the lack of proper training (Kozma, 2005). Often new technology is introduced to a school with limited or no training on how to use it. The assumption is that technology integration will immediately follow; however, this is not usually the case (Ming, Hall, Azman & Joyes, 2010). Teachers are required to take part in PD throughout the year, but they do not receive PD specifically about technology. The PD must support learners in the use of a new, unfamiliar technology that they may be required to use in their practice (Collinson & Ono, 2001). Teachers have to believe in themselves and also believe that the technology is useful and important to their classroom and will transform their teaching. In order to successfully implement new technology, teachers must connect with socio-cultural, emotional, and pedagogical support, as well as with resources in the form of training and devices (Ming et al., 2010).

While MEXT made many declarations on how technology, specifically referred to as ICT, should be used as part of a 21st century curriculum, there was often no plan for
technology to actually be used by teachers in the classroom (Kuno, 2014; MEXT, 2014). The desire to be competitive on a global scale and to improve social conditions is a justification for governments to require use of ICT or educational technology in schools (Kozma, 2005). However, since there was no exact plan for the teachers to follow, it was difficult for them to interpret what their actions should be.

There was also no guidance from MEXT about exactly which technology should be available in Japanese classrooms and schools. For example, one public school may have a set of iPads and several Promethean boards, while another may have two computer labs with SMART Boards. A third might have a 1:1 device program with all students having Android tablets, and yet another might have no discernable technology whatsoever, save a few computers for teachers to type and email on. At some schools, each teacher had a computer to use (as was the case at my school); at others, they may have had only one computer per group of desks. There was no standard and, therefore, it would be difficult for MEXT to prescribe exactly what technology should be used and how it should be used at the school level. Frequently, no budget was available at public schools to purchase a large amount of technology. As was the case with the school where I taught, if the school wanted additional devices they had to apply for or use special funds. For example, the iPads at the school where I was employed were purchased with the Super Science High School (SSH) research and development budget, and the Chromebooks with the Super Global High School (SGH) budget.

The most important factor for determining effective use of classroom technology by students is teacher confidence and competence. Successful student use of technology and computers depends on the skill and determination of the teacher to
provide access to and demonstrate use of that technology in their classroom (Knezek & Christensen, 2002). There is evidence of many advantages to local, on-site collaboration between teachers, but also to having regional, national, and even international collaboration opportunities. Allowing teachers to collaborate encourages them to learn and share ideas with each other that improve their own practice (Knezek & Christensen, 2002).

Japanese teachers have more time than American teachers built into their weekly schedules for PD. However much of this time ends up being time spent alone on work or grading papers, or in individual lesson planning, rather than in a group or team collaborative effort. In these situations, the teaching profession becomes one of isolation; teachers initially choose not to work together, which then makes them feel more and more unable to collaborate or work with their peers (Bakkenes, De Brabander & Imants, 1999). Japanese teachers must be given time to work collectively, and also need to be placed in situations in which they can collaborate (Kato, 2013).

Desimone, Smith, and Ueno (2006) explain that teachers who are already familiar with a PD topic (in this case technology) are the ones who are most likely to want to join the PD sessions in the first place. Therefore, further steps must be taken to encourage other teachers to join the PD voluntarily and to feel like they are a part of the community. Also, research at the University of Tokyo has recently shown that conflicting messages and expectations from PD on how a lesson should be conducted properly have caused many teachers to feel like they work in a stressful environment. The message from PD that they receive at the national level focuses on developing problem-solving and critical thinking skills. The goal is to develop higher-level individual learners,
but only general guidelines are provided about how to accomplish this. However, local level politics then often emphasize more basic skills such as repetition and drills, which are in direct contrast to developing the higher-order thinking skills promoted on the national level (Reza & Matoba, 2006).

Therefore, the PD in this study had to have a very clear message. It had to be designed to accommodate all levels of learners, provide a reasonable amount of scaffolding to support the learners, and be built to align directly with our Google Drive implementation. The administration had to do whatever was possible to ensure high quality PD. They then had to support implementation by gently insisting that key teachers participate (Desimone et al., 2006).

**Educational Technology Professional Development**

In order to develop the PD experience for this study, two categories had to be researched and then combined. First, the concept of PD was explored specifically for educational technology. Second, the factors that create successful PD experiences, regardless of the subject, were outlined.

**ICT or Educational Technology Professional Development Methods**

Due to its very nature, technology can facilitate the learning of new knowledge, and can be the overall learning process. A variety of methods exist to train teachers in the use of certain technologies. There are four main ways teacher learners typically receive educational technology PD. First, they can be taught how to use the technology with the technology itself as the main focus. Second, they can be trained with the technology as part of the method of study. Third, technology can be completely utilized as the method of the study. And fourth, instructors can use the technology to wholly facilitate learning some other topic (Collis & Jung, 2003; Jung, 2005).
With technology as a main concept, the PD is directly about a specific technology. Many “traditional” types of educational technology PD are planned in this way. For example, the PD could consist of how to use a word processing tool or how to make a website with a certain program. This type of training is typically via demonstration only. The emphasis is on the technology or application, how the teacher should use it in their classroom, and it is mostly skill-based (Jung, 2005).

The next method utilizes technology as part of the teaching methods. In this type of PD, some form of technology is used within the PD, most likely with the purpose of demonstrating how teachers can use the technology within their own courses and curriculum. For example, the instructor could show teachers a video clip on how video clips can be useful for their classes; or have teachers play a game on an interactive whiteboard so they can see how interactive whiteboards would be useful in their courses (Jung, 2005).

The next application is when technology is the delivery method for the PD. For example, a university might train new professors on how to deliver an online course by having them take an online course themselves. Internet or otherwise digitally-based teacher PD has been shown to provide both a flexible as well as an interactive learning environment for teachers (Jung, 2003, 2005).

Finally, the last method is the use of technology that in some way facilitates a professional development experience on a topic. For example, some social media type of technology might network teachers together in order that they might complete PD activities (Collis & Jung, 2003, 2005). A school district might provide a website with links to modules that could be completed to earn PD credits, or a Google Educator Group
(GEG) might have a Google+ or Facebook community so that teachers could network and exchange ideas. If this type of networking is scaffolded and supported over time, it can be very effective for long term PD efforts (Pacey, 1999).

This study combined the concepts of teaching technology as the main model, using the target technology as part of the teaching methods, and the use of technology to facilitate networking and further professional development. By involving as many strategies as possible, it was hoped that participants would experience the technology in multiple ways as a learner, which would make them more likely to use the technology with their students (Collis & Jung, 2003).

**Successful Professional Development**

Desimone (2011) describes the five core features of effective professional development: content focus, active learning, coherence, duration, and collective participation. The first feature is content focus. To be content focused means that the PD will have the subject area of the teacher in mind. Science teachers would be grouped with science teachers and would learn how the new knowledge could be used in their specific classes. Having sustained, content-focused PD has emerged as one of the most powerful and important types of teacher PD and can be positively tied to student achievement (Desimone et al., 2006). As explained by Desimone, Porter, Garet, Yoon, and Birman (2002), PD has to be focused on specific instructional practices. In my case, this would be on the curriculum for the GI course.

The second feature is active learning. PD that is designed to be active has teachers not just sitting silently, watching a lecture; instead, the teachers are involved in hands-on activities, creating things, evaluating previously completed student work, and receiving feedback on the artifacts they create (Desimone, 2009, 2011). By giving
teachers the opportunity to use the PD to actively develop materials they can use in
class, this training provides a better overall PD experience (Desimone et al., 2002).

The third feature is coherence. Coherence is the extent to which new knowledge
the participants learn fits in with their pre-existing knowledge, beliefs, and understanding
of teaching philosophies and policies of the school (Desimone, 2009). The PD must
promote continual professional connections and support for the participants in order for
it to have coherence (Desimone et al., 2002). Any PD also has to be consistent in its
message over the course of the series in order to reinforce the goals (Desimone, 2011).

The fourth feature is duration. Duration details the appropriate length of time the
PD must continue to be effective for the teachers. This duration is variable depending
on the study and what is being taught. The total duration includes not only the number
of sessions, but also the actual number of hours of contact time (Desimone, 2009,
2011). All PD should be designed for the proper duration for the activity, learning, and
class it entails, and, finally, should be designed to be consistently thematic, not simple
one-shot exercises.

Finally, the fifth feature discussed by Desimone is collective participation.
Teachers participating in PD learn best when they are working with other teachers they
know, those who work at the same school and who are within the same grade level or
department. Within this environment, teachers can effectively build an effective,
interactive community of support (Desimone, 2009, 2011). These features were
included and then followed in the design of the PD for this study, which is described in
great detail in the next chapter.
Taking the design elements of Desimone (2009, 2011) into account, the PD design was also heavily influenced by Guskey’s Five Levels of Professional Development Evaluation (G5L) (Guskey, 2000, 2002). In the description of the five levels, Guskey not only discussed evaluation, but PD design as well. Guskey (1994) stated that the “powerful and dynamic influence of context” (p. 8) is the most important factor in PD, and that the context of each school in each situation is different. Guskey explained how researchers know more about what does not work with PD than what does, but he admitted that there are generalizations that can be made about the best types of PD.

First, similar to Desimone’s concepts of content focus and coherence, Guskey states that PD must be relevant to teachers and must help them to change and learn on an individual basis. Guskey (1994) states that in order for a paradigm shift to occur at a school, an “optimal mix” (p. 10) of the individual and the organization (i.e. school) processes must be found. The individual teachers must have initiative and be encouraged, but at the same time, there needs to be an acceptance at the school level that a change in practice is occurring. Then the individual teacher’s growth can be supported by administration at the whole school level (Guskey, 1994).

Second, Guskey (1994) points out that in planning changes at the school level, PD planners must “think big, but start small” (p. 11). A successful PD program would be one that is balanced—slowly easing teachers into big changes in a non-disruptive fashion that does not require extra work--so that they are accepting of the change. But the program must also move fast enough to keep their interest. This must take into account Desimone’s (2009) ideas on duration.
Third, Guskey (1994) describes teamwork and making sure that each individual in the group feels they have a voice in the group and are treated collegially as they collaborate together. Guskey (1994) requires that procedures be included to provide feedback on the overall results of the PD so teachers can see positive results and feel successful. Next, he recommends constant follow up and gentle pressure to encourage continued use of the skills learned during the PD (Guskey, 1994,). Finally, Guskey (1994) recommends that all programs be integrated across the scope of the teacher’s learning, so that they can apply all they have learned to their individual contexts. In order for the pupils to actually learn what the PD is intended to teach, everything must be designed so that they can actually succeed (Guskey, 2002).

**Instructional Design**

There are a variety of principles that must be followed within the instructional design of a PD that directly relate to providing reinforcement and an effective learning environment for the learners. As Morrison et al. (2007) discussed, sessions of PD should be planned to include continuous reinforcement within and between each session. The reinforcement should be immediate so that it can have a stronger effect on the learner. The PD can be designed so that the more difficult concepts are taught through interesting activities within the presentation. This is done in order to ease the tension felt by participants who are likely to have high anxiety levels when working in a medium that is new to them, such as technology (Ono & Ishihara, 2012). Tasks should be structured so that they are meaningful. In completing them, participants can discover and understand the new information and how it relates to them. This is important because, in order for participants to grasp new material, they have to be able to relate it
to their own prior knowledge (Cranton, 1994; Knowles et al., 1998; Mezirow, 1991; Morrison et al., 2007).

It is also important in a PD experience for the group of participants to work together. Working within a community leads to frequent learning for teachers. Learning in a community that challenges their understood “norms” can help them change their practice (Lieberman, 2009; Saito & Sato, 2012). By cooperatively learning, they can collectively advance as a group, and even the least advanced learners can learn and feel successful (Desimone, 2009; Morrison et al., 2007). Keeping with the principle that “people learn by modeling their behavior on those of others” (Morrison et al., 2007, p. 388), PD can be designed with modelling in mind. If the participants model the actions of the presenter, as well as others within the community, they can achieve the desired results. When PD participants are taught together in a group, participants have the opportunity to witness their peers achieving similar successes and will then make further progress themselves (Morrison et al., 2007).

Another important element of design is to follow psychological theory. In this study, several constructivist theory-based design principles were reviewed (Duffy & Cunningham, 1996; Vygotsky, 1978). To be successful with new information and skills over the long term, learners need to develop their problem-solving skills. Instruction can be centered on solving problems relevant to the participants’ work environment (Guskey, 1994; Knowles et al., 1998). By allowing learners to experience the use of the new knowledge and skills, they can construct their own understanding of the new information within themselves (Duffy & Cunningham, 1996; Vygotsky, 1978).
Morrison et al. (2007), explained that when “cognitive demands exceed processing capacity, [the] degree of learning is reduced” (p. 391). A PD experience must be designed in such a way that it will not overload the participants so they may continue to learn and remain positive throughout the process (Morrison et al., 2007). The new information should be presented over the duration in manageable chunks so that the learners have a chance to sort the information, process it, and make sense of it (Desimone, 2009; Morrison et al., 2007). This helps the learning process and helps develop intrinsic motivation, which is critical in adult learning (Knowles et al., 1998).

**Professional Development Evaluation**

Guskey (2002) explained that it is common practice at many institutions to believe that PD was effective, without evaluation. Desimone (2009) points out that as long as the teachers felt the PD was effective, the PD was indeed deemed effective. So, it was thought that the longer the duration, the better the class, and no extra thought was given to assessing the actual effects. However, PD programs must be assessed to determine whether it actually benefits the teachers and causes a change in student outcomes (Guskey, 2002).

Unfortunately, establishing a clear connection between PD and improved student achievement is problematic and complicated. In the end, PD is supposed to affect the way teachers teach their students. Hew and Brush (2007) discussed how most educational technology PD is directed at teaching the way a piece of technology is operated and not how the use of such a process or program can enhance teaching or student learning. When teaching PD on the use of Drive as a tool, the results had to be evaluated to determine whether the teachers learned to use Drive to enhance student learning and their own teaching. Teachers are far less likely to use new technology tools
and practice outside of structured PD times (Cifuentes, Maxwell, & Bulu, 2011). If the PD is effective, the evaluation will show that the new knowledge is ultimately being used in the classroom.

Guskey (2002) believed that good evaluations are planned with much thought and intent, with a meaningful purpose and care for each element. A variety of questions should be asked, and the answers reviewed in detail. There must be a systematic investigation into the PD program’s merit and worth. Guskey (2000) laid out a plan for evaluating a PD, pointing out that while much was spent on development and delivery, there was very little focus on evaluation. He therefore developed five levels of PD evaluation.

The G5L starts with “Participants’ reactions” (Guskey, 2000, 2002). At this level, evaluation seeks to discover whether the participants were satisfied with the PD itself, if they felt they learned something, and if the PD would be useful to them in the future. Using this information, future PD design and delivery can be improved.

The second level is used to evaluate the “Participants’ learning.” This level addresses whether the participants actually learned the new knowledge and skills that were presented to them during the PD experience. By evaluating this level, future PD content, organization, and format can be improved.

The third level is “Organization support and change” which helps to evaluate whether the school advocates, supports, accommodates, facilitates, and recognizes the new innovation and practices presented within the PD. This information can be used to show whether or not the organization supported the program and can inform future efforts for change at the school.
The fourth level is “Participants’ use of new knowledge and skills.” In evaluating this level, the degree and quality of the participants’ implementation of the new knowledge within their practice is assessed. Using this information, the program content of the PD can be changed and improved in the future.

Finally, the fifth level seeks to assess “Student learning outcomes.” At this level, the impact of the participants’ involvement in PD on their students is evaluated. This level evaluates how student learning and participation are affected. This information helps to improve program design and implementation and can show the overall impact of the PD (Guskey, 1994, 2000).

Summary

Beile and Boote (2005) suggested that in a dissertation literature review the research should be synthesized, not summarized. In the previous pages, I have attempted to synthesize the research on professional development for educational technology, professional development for Japanese teachers, instructional design, and professional development evaluation in an effort to show how these all build the foundation for this study. Figure 2-1 demonstrates how the literature fits together, thereby producing a successful PD experience. A background in educational technology PD, PD specifically for Japanese teachers, and instructional design helped to create the initial PD session. Then research on PD evaluation helped review the PD and provide feedback to improve the material for future sessions in order to improve my practice and better enable the teachers at my school.
Figure 2-1. The Relationship Between the Literature and Purpose
CHAPTER 3
PD EXPERIENCE

I felt very honored, and I knew that people would be watching very closely, and I felt it was very, very important that I do a good job.
—Sally Ride
“Sally Ride Interview”, Scholastic, 1998

The first task in this study was to develop a PD experience that reflected relevant literature and research findings. As stated in the Introduction, the overall research question was:
How does an educational Professional Development experience on Google Drive Apps impact teachers of a communicative English course in a Japanese high school?

This chapter discusses the development and design of the PD and all its elements: the lesson cycle, a series of 5 lessons on Drive Apps, and open classes with observation. Figure 3-1 provides a brief overview of the PD experience that will be described in detail below.

Setting of Study

The setting of the study was a public senior high school, which is non-compulsory and comprises the last 3 years of secondary education (grades 10-12), in Kyoto, Japan. The school was designated as a “Super Science High School” (SSH) and “Super Global High School” (SGH) by MEXT. As a SSH/SGH school, there is a focus on research and development in the advancement of technology integration in order to enhance problem-solving skills of students. The goal is to develop their generation as global citizens (Arimoto, 2015; MEXT, 2008, 2014).

The school has a variety of international partnerships and exchange programs. It is partnered with four different Singaporean high schools. Once a year, a group of
English speaking Korean high school students comes to visit the school. There is also an eight-student ambassador group which is sent to Montreal, Canada for a week every year, as well as another group of eight sent to Florida, in the U.S.A. An additional two students are also sent to spend four months in Montreal and Florida as well.

**Students and Staff**

There are approximately 1,000 students at the school who are divided into Years 1 (10th), 2 (11th), and 3 (12th) by age. There are 330 students total in the 1st year class, all between the ages of 15 to 16 years. These 330 students are divided into 3 homerooms with 40 students, and 5 homerooms of 42 students. Of these, 246 (6 homerooms) are in the SGH program. These 246 students were the ones who took the GI course in this study. These 6 homerooms were each divided in half, making 12 sections/classes of the GI course, each containing 20 to 22 students. These facts are reviewed in Table 3-1.

More than 80 full-time faculty and staff members were employed at the school. We also had a variety of part-time specialists, including college science professors, various former textbook experts and editors who had moved into the teaching field with their expertise, and college-aged teaching assistants (TA), who came to the school to work with the students.

The school is the top-ranked public prefectural high school in Kyoto. Students must pass various difficult entrance exams to enter, and the exam results are then published in the newspaper the day after because of the school’s prestige. Some students travel several hours from their homes or live on their own near the school and only see their families on the weekend just so that they can attend the school. The school has an active Parent Teacher Association (PTA) that puts on a variety of events
and supports school activities. Parents themselves are very involved in their students’ education. Socioeconomic status (SES) data are not officially collected on families in Kyoto Prefecture, but most students come from middle to upper-middle class families.

The teachers at the school are selected based on merit and skill; the school is so highly ranked it can be difficult for some teachers to be placed at the school. However, the BOE limits teacher placement to only a certain number of years, so this means that teachers will be rotated out to another school after they have stayed between 5-10 years on average.

Technology

There were 88 student-use computers in two wired computer labs, as well as a set of 45 iPads. In addition, 40 Chromebooks were purchased with the SGH research and development funds, specifically for use in Academic Lab classes. These Chromebooks were open to use by other classes as well when Academic Lab classes were not in session. Approximately 85% of the teachers had Windows laptops issued to them by the Kyoto Board of Education (BOE). Many classrooms had recently been equipped with limited wireless Internet access and all students in the 10th grade had G Suite accounts with access only to Google Drive and related apps.

Google Drive

Drive is a suite of free applications (apps) provided by the Google Company and available over the Internet. Drive is a form of cloud computing, a name which alludes to the fact that the computing resources and software are located not on a user’s own computer, but on a remote server, accessed through a browser (Koury & Jardine, 2013). The field of cloud computing has great potential for teachers due to its very nature, as it can be accessed from any location and allows people from multiple and
distant locations to collaborate on the same document, at the same time, and to innovate together (Aaron and Roche, 2011).

Drive Apps include a document editor (Docs), a presentation builder (Slides), a spreadsheet editor (Sheets), an app that allows a user to edit images (Drawings), a website editor (Sites), and more. Google Apps for Education provides all of these Google Drive Apps through a management console, wherein schools can control the users on their domain, and restrict access to certain features that schools find unwanted or unnecessary. It also provides one additional app, Google Classroom. Google Classroom is a learning management system (LMS) platform from which a teacher can run a whole class (GAFE, n.d.).

A variety of schools and libraries have discovered the benefits of using various Drive Apps (Koury & Jardine, 2013). Drive Apps can help teachers design authentic learning experiences and use a blended learning approach. Students can express themselves, collaborate and share ideas, reflect on their learning, and develop critical thinking skills (Ghodrati & Gruba, 2011). By its very nature, Drive provides a flexible means of delivering content both synchronously and asynchronously. This allows a fundamental change in education and practice, a pragmatic means to connect and enhance learning and learners (Rowe et al., 2013).

Why Drive?

Google Drive was selected as the sole application within G Suite because the Kyoto BOE rules stated that students were not allowed to have personal computing devices at school and that students should not have social media accounts at home or at school. The cloud-based component of Google Drive allowed us to comply with the conflicting mandates to support technology integration but not allow students to have
personal computing devices or social media accounts at school. Even though all accounts come with email, YouTube, and other features, those features can all be turned off. The students could work in a computer lab at school and also access their Drive from their personal devices at home. Within Drive, the students did not have email enabled on their accounts, but the teachers and students were still able to collaborate on projects and documents. We were able to limit their account access to Drive and yet still allow them to collaborate with other users all over the world, as well as with the student sitting in the desk next to them. In addition, if a teacher had a calendar or website, the visibility of those services could be limited just to the domain our school was on, so this increased the level of security for those features as well.

**History of Drive Use at the School**

Google Drive was initially implemented for a trial use within two courses during the 2014-15 school year, and was then opened to all teachers for academic labs at the school during the 2015-16 year. Academic labs are courses taken by all second year (11th grade) students and are designed to focus, enhance, and guide the students’ overall research goals for their senior research project. There were approximately 16 students in each class. The classes occurred once a week and all members of each academic lab class were placed together in other subject area classes as well. In the senior year (12th grade) there was an event held at the end of the first semester (in June) during which students made a presentation in English on the results of their research. All their work was collaboratively done within Drive and then collected within a portfolio on the Drive as well.

Drive was initially adopted for use within these academic lab classes, but Drive use was not limited just to the academic lab classes. Use of the Drive also fits well
within a first year English course called Global Interaction (GI) that I and several other teachers worked on. Thus, during the 2015-16 school year, it was decided by the lead teachers of the GI course that Drive was also to be used in GI.

The overall goal for the school was for Google Drive to be used within as many classes as possible, to integrate technology as advised by MEXT in our SSH and SGH guidelines. It was also designed to allow the students a place where they could build a portfolio to use throughout their school years and possibly even beyond their time at our school if they so chose. This would provide students who did not have a computer at home, and those who had only mobile phone Internet access, a way to edit essays, homework, presentations, and take ownership of their work as they learned more about editing and producing their own products.

**Course Setting – Global Interaction**

All the participants in this study were teachers in the Global Interaction (GI) course. The GI course was a relatively new English course (begun in the 2014-15 school year) designed to follow the guidelines from MEXT, including the class “more focused on communication and speaking in English” (MEXT, 2008, p.54).

**International Exchange**

At the school, there was already an international exchange program established with four Singapore high schools. Three times a year, small groups of students from Singaporean high schools came to our school to work with our students on projects. Also, once a year, all of our first-year students went to Singapore to attend classes.

Students, while being proficient in reading and writing, were often silent and shy in their interaction with foreign students. The administration decided that the GI class would be directly tied to all the different international exchange programs, predominantly
the January trip to Singapore, since all first-year students go on that trip. Thus, the original goals of the GI class were to prepare students to be proficient oral communicators by the time they participated in the Singapore exchange.

**Super Global High School**

With our designation as a SGH, the GI course became a required course for all incoming Year 1 students. The overall goals for the SGH program were to help students become effective communicators and problem solvers in the interconnected global community (MEXT, 2014). Therefore, the goal of the GI class was intended, through the teaching of various communicative English activities and experiences, to make the students effective “global citizens.” The course consisted of a variety of thematic units, from self-introduction and how to express opinions, to digital citizenship, tolerance, and more.

**Course Specifics**

Students had the two 50-minute class periods twice a week, on different days. One session a week was called “solo teaching” and was taught completely in English solely by a Japanese teacher of English (JTE). The other session in the week was called “team teaching” and was taught by the JTE and an assistant English teacher (AET). Unlike the students’ other English courses, which at our school focused more on reading, writing, and translating, the GI course focused on communicative activities. There was also the component for the Singapore high schools exchange, which included preparing a presentation on a Japanese culture point for the students in Singapore, as well as a research project in which the students investigated and researched Singapore.
Because of my heavy involvement in the curriculum development for this course, and the fact that all incoming Year 1 students were enrolled, the GI course seemed a logical choice for Google Drive implementation and for this PD study. This course was also a logical choice for me to use because I could work with a significant number of teachers in the English Department who taught the GI course (there were 12 sections). I would also be able to focus on how Drive could be used to enhance the curriculum of one course.

**Why Drive for GI?**

Google Drive was selected for the GI course in this study for several reasons. The first was the nature of the GI class itself: An English communications course to promote global citizens who had technology skills, and a background in digital citizenship. For this kind of class, something like Drive fit in very well because it allowed the students to develop their skills in using editing software in the forms of Docs, Forms, and Slides. It also allowed for development of their communicative social media skills in Classroom.

Second, this was a project-based course. In previous iterations, the course could only offer limited work on PowerPoint files. Those files couldn’t easily be collaborated on or taken home by students because they couldn’t email themselves the files due to school restrictions. They also could not download them since memory key/USB devices were banned for use at school. However, with the use of Drive, students no longer had these issues, and they did not need to purchase software to access their files at home. They could simply log in to Drive to work on their assignments with ease, collaboratively with their partners and teachers. The program was free for students and teachers, so it
was an inexpensive solution that gave access and collaborative tools needed for the course.

And third, as the course only met twice a week, teachers had little face-to-face time with the students. Through document sharing, Drive allows teachers to comment on student work and give feedback, saving valuable face-to-face time in class, all the while digitally increasing teacher contact time through interaction over Drive. This also applied to teacher face-to-face interactions as well. With 9 teachers working on one course, Drive enabled the teachers to collaborate together to make documents and share ideas asynchronously, as there were few times during the week when all the teachers could get together to talk about class and planning.

**Overview of PD Experience**

**Initial Concept and Design of PD Experience**

Desimone’s (2009, 2011) five features of effective PD were the guiding ideas for the development of the PD experience that I used for this study. Content focus was integrated into the design by keeping the content specific to the curriculum and goals of the GI course. Active learning was included in the plan through Drive app activities, as well as through planning meetings and implementation in the class during open class days. Coherence was accommodated by having the study designed to help with technology integration, something that was required by MEXT (MEXT, 2008). The duration was about 20 hours for each participant and included weekly planning meetings, the 5 Drive Apps sessions, interviews, and class observations. Collective participation was incorporated through the participants’ collaboration throughout the study and by the fact that they were all from the same department and taught the same
course (Desimone, 2009, 2011). The general application of each feature within the study is outlined briefly in Table 3-2.

Since Guskey’s (1994) ideas on PD were part of this study’s framework, I developed the questions for each level of G5L, so I could work backwards from the questions as a guide and map out how to accomplish the desired achievement for each level (Guskey, 2000, 2002; Muñoz, 2005). Level 1 dealt with the participants’ reactions to the PD experience. The evaluation questions were: “How did teachers react to the PD? How did the PD affect teachers’ attitudes towards using Google Drive in their classes?” Level 2 probed what the participants learned from the PD experience. The subsequent questions were: “What knowledge and skills do the participants believe they attained? Did the participants acquire the knowledge of Google Drive utilization that the PD was designed to teach?” Level 3 looked at how the school as an organizational whole supported the PD as well as changes made because of the PD experience. The evaluation question for this level was: “What support from the administration and school staff for the use of Google Drive do the participants perceive?”

Level 4 looked for the use of new knowledge and skills the participants gained within the PD experience for their practice. The questions I used for this level were: “In what ways do the participants use Google Drive in their classrooms in the section of the GI course? In what ways do the participants use Google Drive in their other classes? In what ways do the participants use Google Drive otherwise in their lives?” Finally, Level 5 examined the student learning outcomes that took place based on the participants’ learning through the PD experience. The question I used to evaluate this level was: “What kinds of projects have been completed by the students within Google Drive in the
various classes?” Table 3-3 briefly shows the alignment of the evaluation questions with G5L (Guskey, 2000, 2002).

In this PD experience, planning for the appropriate duration was especially challenging. As Desimone (2009, 2011) details, proper duration is important. The total duration of this project was around 20 hours for each participant, broken down into the 12 weekly planning meetings as part of the lesson study cycle, 5 drive sessions, interviews, time to fill out questionnaires, and classroom observation days. A graphic overview of this timeline can be seen in Figure 3-1, which shows all the meetings over the course of the entire 12-week lesson study cycle. It was extremely challenging to coordinate complete attendance at all 5 Drive Apps sessions.

Participants were volunteers and were all incredibly busy. It was important to ensure that the PD sessions were long enough to achieve the intended goals. However, I didn’t want to take too much of their time and cause them to feel reluctant to participate. As Guskey explained, a balanced PD that slowly introduced topics and eases the teachers into a big change in a calm and passive way will ease the change and make it less of a disruption to their professional lives. As a result, they will feel more comfortable with and accepting of the change (Guskey, 1994).

Therefore, I first designed the 12-week lesson study cycle to encompass the length of the study. Again, a brief overview of the whole experience is conceptualized in Figure 3-1. All the elements that the participants experienced would occur, to their perspective, within the course of the lesson study. Lesson study meetings would be conducted during their weekly planning meetings for the course. Goal setting within the lesson study occurred at the beginning of the cycle in the planning meetings, in order to
select long term goals, and after the Drive Apps series. There was also a session at the end of the cycle to set goals for the next cycle.

Next, I designed the Drive Apps series to consist of five one-hour sessions, which took place over a five-week period. In order to reinforce continual learning by the participants afterwards, scaffolding occurred through my presence and support during the rest of the weeks of the study within the planning meetings (Duffy & Cunningham, 1996). There was only one Drive Apps session within any one-week period, and at the same time the participants were able to use Drive in their classes. They therefore had the rest of the time to experiment with it, and could become comfortable with Drive on their own. Yet they would still have support and reinforcement within the meetings.

Finally, the open classes were designed to fit in near the end of the lesson cycle. At that point, there would be a project going on that would use Drive in class, which would facilitate my observation. By this time, participants had had time to plan how they wanted to use Drive and also to learn and practice use of the app as well. Together in the lesson study/planning meetings, the participants decided how they wanted to use Drive within the course for this particular project. Then, each teacher was observed in an open class teaching their students with the use of a Drive app. Administration and other staff were invited, but their attendance was not required. Afterwards, they returned to the planning meetings within the lesson study, talked about how the classes went, and then developed goals for the next lesson study cycle and for the course over the rest of the year.

As mentioned in the literature review, the participants were familiar with lesson study and open classes. Because of this, the PD was designed to have features from
both of these concepts. In order to provide the scaffolding to support the participants, a modified lesson study cycle was used. By attending all planning meetings and making myself available for any technical issues that arose, I ensured that there were as many interactions between myself and the participants during their GI course planning meetings as possible. By being there to support them, as scaffolding, I was able to help as they continued to grasp and understand Drive, while they retained the opportunity to learn on their own. This was reciprocal teaching, allowing them to learn by doing (Schuh & Barab, 2007). The participants needed to feel that the information was valuable, to themselves and to their students. It had to be authentic, so that they would continue to buy in to technology use and see how important it was to their students’ futures (Vygotsky, 1978).

By designing the lesson study to encompass the entire PD experience, I was able to be with the teachers in the planning meetings as they learned to integrate Drive into the class. Because they learned enough about it to teach with the program, this became knowledge that they were likely to integrate into their other classes in the future (Duffy & Cunningham, 1996; Cochrane & Narayan, 2012).

All members of the GI teaching team were included in the planning meetings, whether they were observed by me as a part of the study or not. As a result, they were able to maintain a cohesive, collaborative, content-focused group within one course, where everyone felt they were a member and had a voice (Desimone, 2009; Guskey, 1994). All the teachers collaborated to develop long-term goals for student achievement and learning within the GI course (Lewis, 2002). Figure 3-1 provides a brief overview of the entire process of the PD from beginning to end.
Because all the study participants had English speaking ability, all meetings and the study itself were conducted in English. Research shows that speaking and communicating in a non-native language decreases risk aversion. By conducting the study in English, I was able to ensure that all but the one native English-speaking participant would therefore be more likely to take risks and use technology that they might otherwise be wary of or uncomfortable using. This option allowed them to make decisions based less on emotional response (Costa, et al., 2014).

All of these concepts influenced the initial ideas for the study before the participants were selected. The details of these concepts and specific design of the Drive Apps series will be described later in this chapter.

**First Cycle of a Lesson Study**

Lesson study is a familiar element of PD here in Japan. Due to the time frame, however, this study only consisted of the first cycle of the lesson study. After the study was over, the participants advanced into the next cycle during the next part of this course for the rest of the school year.

The curriculum for the GI was developed completely by the JTEs and AETs who taught the course. One lead JTE was ultimately responsible for the entire class and had more responsibilities (such as coordinating special guests and room reservations), but for this lesson study, we decided to find a meeting time during the week when all 9 of the GI teachers could meet together. Starting with this lesson study, all the teachers had a general planning meeting once a week to discuss the course, how it was progressing, and to keep a focus on the overall goals. This provided an ideal setting to continue the PD beyond the 5 Drive sessions.
First the participants came together to plan within the lesson study and create goals for the short and long term implementation of Drive in classes. Then we began our weekly planning meetings. During the meetings, I took notes in my reflection log on the discussions of the study participants. I also answered questions, supported their ideas, helped solve problems, and gave them the support they needed as scaffolding in order to help them integrate Drive into the course, all of which I noted in my reflection log (Duffy & Cunningham, 1996). Finally, the participants had discussions at the end of the lesson study cycle and set goals for the next cycle for the next semester. All these elements are described in brief in Table 3-4. Figure 3-1 covers the timeline of events in the study.

**Open Classes**

The other familiar element that I included from Japanese PD was the idea of an open class. The final classroom observations built in to collect data were a part of the series and were designed to emulate open classes. So, as I was collecting data, the participants also collected data on their peers, using what they observed to guide discussions in the next lesson study meetings. In this way, the teachers could later give each other feedback and come up with ideas to improve their own lessons. We invited observers to come in and watch the class as well, trying to simulate a school-level open class. This type of observation is what teachers were used to, so ideally this did not stress them more than a typical open class would. Table 3-4 briefly reviews the components of lesson study and open class ideas.

**Drive Apps Series**

Development of the Drive Apps sessions considered best practices from research and stated goals for classroom use during the school year. The sessions went
through the basics of Google Drive use, from initial login to the Drive, through the school’s G Suite account and the basic menus. Extensive coverage was given for the main apps the class would be using: Docs, Slides, and Forms. There was also a focus on G Suite access through the schools’ iPads and Chromebooks.

Drive was used as a trial in two classes during the 2014-15 school year, and then was introduced to all the teachers in May 2015 for the 2015-16 school year. Chromebooks were introduced in August 2015. The school has had iPads since May of 2012. The PD for this study was designed to help GI teachers implement G Suite into their courses, no matter what device they accessed it through. In order to provide these teachers with PD for using Drive within the GI course, I developed a list of possible sessions for the Drive Apps series as part of the PD experience.

**Drive Apps series development.** The sessions of the Drive Apps series were designed strategically to encompass the five elements of PD as well as to answer the questions developed for different levels of G5L (Desimone, 2009; Guskey, 2000, 2002). The content focused on Google Drive specifically and how it could be used within the course, because this was new technology that participants would use in their GI class and their academic lab for the year. The sessions were designed to be practical and useful, with active, hands-on activities to help engage them and keep them positive about their participation.

The sessions were designed as a group event. All teachers of the GI course were invited to attend. Because of this group experience, the Drive Apps series could flow as a natural part of the lesson study cycle and planning meetings (Lamie, 1998; Lewis & Tsuchida, 1998; Takahashi, 2000). Within the lesson study meetings during the
series, teachers continued to develop and work on ideas, goals, and curriculum specific to the course they were all involved in (Lewis, 2002; Matoba & Reza, 2006). The teachers were able to collaborate within the hands-on activities in the Drive Apps sessions, and to talk about what went on during planning meetings within the lesson study. They knew they would be observing each other’s sections of the GI course once Drive was used in class (Lewis, 2002; Takahashi & Yoshida, 2004). All these factors tied together to make the Drive Apps an important part of the greater PD experience as a whole.

**Drive Apps series activities.** Each session in the series focused on a different aspect of Google Drive. These aspects were determined based on what the teachers would most likely use in their classes within the 2015-16 school year.

Since the teachers were unfamiliar with Drive, the first session was designed to provide background on what Drive is. This was presented with a short Google Slides presentation and talk. Then the lesson explored basic menus and functions in Drive, specifically within the Docs app. Participants followed along on their screens and we moved together slowly through the different menus. The last minutes of the class were spent collaborating on a document and coming up with ideas for class use in GI together. Every session ended with this same activity, developing ideas collaboratively for use in the GI class.

Sessions 2 and 3 then built on the basics introduced in the first session. Session 2 explored Google Slides. Session 3 covered Google Forms. Each of these sessions followed the same basic format:

- introduction of the app,
• guided walk-through of the app and its basic menus,
• opportunity to create a product within the app for practice (Slides) or use in class (Forms),
• time provided to collaborate together on plans and ideas for what to do in the GI course in the new school year using Drive overall.

The following sections describe in detail specific components that were included in these sessions. These are also outlined in brief in Table 3-4.

• Walk-throughs: Each lesson began with a brief walk-through about where the basic menus for the apps were. All of the Drive Apps have similar menus, but there are certain differences. For example, there are commands for adding new slides in the Slides presentation app that are not in the Forms app. After a brief look at the commands specific to each app, the teachers continued to the next part of the session.

• Cooperative activities and time to play: In each session there was a collaborative activity that the participants worked on to better cement their new understanding and knowledge of use of that app in their classes. During the Slides app session, a sample slide was shared, and then all participants had to re-create it on their own file. Through this process, they learned the menus, how to edit pictures, colors, and text, and how to use the research tool to add pictures that were legal to use and cited properly.

• Next, I shared a presentation that a student had made and the teacher/participants all worked together to proofread it and make changes to it. Through this activity the participants explored how to edit, comment, and make suggestions. When they felt they had suggested all the changes they needed to, the teachers went back and reviewed other teachers’ suggestions. Any leftover comments were discussed and decided upon amongst the group. In the Forms session they collaborated together to produce a form to use as the final end-of-the-year survey for class. Normally this survey is made by the lead teacher and takes many hours to create and assess afterwards. In team mode, however, the teachers could create the form in just 20 minutes and they then learned how the results would look afterwards.

• Finished with Collaboration: Finally, at the end of each session the participants discussed the use of Drive for GI and other classes.

Finally, the last two sessions, 4 and 5, were completed. Session 4 focused on Chromebooks. Although the Chromebooks had been present on campus since the beginning of the year, most teachers had not used them, and, in some cases, had not
even seen them. The session was designed for teachers to use the computers for their collaborative work for the day. First, teachers were shown how to power on the devices and log in. Next, they were shown the basic use of the Chromebook track pad, which is different from other trackpads in that it doesn’t have any buttons. Next, the unique keyboard was explored, including key commands that were most useful. The participants then accessed their students’ presentation files and spent time working on corrections and comments while I supervised and helped them learn the various functions (editing, commenting, suggesting, correcting). They had used these functions on PCs but they were different for the Chromebook. Finally, we discussed reasons and ways to use Chromebooks within the GI class.

Session 5 focused on iPads and the Drive Apps being used through iOS apps. iPad Drive use is very different from Chromebook or PC access since it is a touch-based device, but the difference in functionality in an app versus a browser is also a difficult point as well. Even though the school had the set of iPads since 2012, many of the teachers had not used or worked with them. During the year of this research, the school also purchased a set of keyboards to use with the iPads, so we used them during the training as well.

First, teachers were shown how to find the appropriate Apps and then how to log in to their G Suite accounts. Next, they were shown how to move through the Drive app in order to access the Slides, Docs, and other Google apps by opening files within the Drive app. Then, we specifically opened the Slides app and again worked on commenting and reviewing student files. By doing the same activities (editing, commenting, suggesting, correcting) that we had done during the previous Chromebook
session, the participants could experience the difference between the same functions on two different, distinct devices. In addition, they were also still working on something familiar to them and productive and useful for class. Next, they practiced logging out of their account on the iPads, which is a many-step process and can be difficult to remember. Finally, we discussed reasons for and ways to use the iPads within the GI class.

**Summary**

The PD experience was designed to emulate a Japanese lesson study and had three basic overall components: 1) the first cycle of a lesson study, 2) open classes, and 3) the Drive Apps series. The PD experience was designed to deliver new information on Google Drive and support participants in a way that would align with Desimone’s (2009) five components of effective PD. The PD experience could be considered effective when evaluated in terms of the G5L (Guskey, 2000, 2002). By planning these activities in detail, aligned with the literature, I aimed to deliver an effective PD experience for the participants that would not only affect their attitudes on educational technology but would also affect their students and cause a change in student outcomes.
Figure 3-1. Brief Overview of the PD Experience

Table 3-1. Class demographics as needed for the study

<table>
<thead>
<tr>
<th>School Facts for the 2015-16 School Year</th>
<th>Figures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grades at School</td>
<td>10-12 (“1st-3rd year”)</td>
</tr>
<tr>
<td>Number of students in the first year (10th grade)</td>
<td>330</td>
</tr>
<tr>
<td>Age of students in the first year (10th grade)</td>
<td>15-16</td>
</tr>
<tr>
<td>Number of homerooms students divided into</td>
<td>8 (between 40-42 in each)</td>
</tr>
<tr>
<td>Number of students in the Global Interaction (GI) class</td>
<td>246</td>
</tr>
<tr>
<td>Number of students in each GI class section</td>
<td>20 or 22 (1/2 a homeroom)</td>
</tr>
<tr>
<td>Essential PD Features</td>
<td>Expression of Feature within Study</td>
</tr>
<tr>
<td>------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Content Focus</td>
<td>Focus on the GI course content that will be supported by Google Drive use in the course based on course goals.</td>
</tr>
<tr>
<td></td>
<td>Activities within the sessions focused on hands-on use of Drive Apps and elements and their potential uses within the GI course; teachers planned and created goals together; teachers helped each other and witnessed each other's open classes.</td>
</tr>
<tr>
<td>Active Learning</td>
<td>Topics support the integration of technology, as required by MEXT, through the use of Google Drive at the school.</td>
</tr>
<tr>
<td></td>
<td>The total length was around 20 hours for each participant. The lesson study cycle covered the length of the study to provide scaffolding for the teachers and occurred over 12 weekly meetings. The Drive Apps series had 5 sessions; there was one open class for each teacher. The study was designed to fit into the busy teacher schedule of the participants and also designed to have time not only for learning but to complete hands-on tasks and planning.</td>
</tr>
<tr>
<td>Coherence</td>
<td>Teachers collaborated together on activities within the PD experience; teachers were all members of the same department and course.</td>
</tr>
</tbody>
</table>
Table 3-3. Alignment of Guskey’s Five Levels of Professional Development Evaluation (2000, 2002) with the study’s Evaluation Questions

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1 Participants’ Reactions</td>
<td>How did teachers react to the PD? How did the PD affect teachers’ attitudes towards using Google Drive in their classes?</td>
</tr>
<tr>
<td>Level 2 Participants’ Learning</td>
<td>What knowledge and skills did the participants believe they attained? Did the participants acquire the knowledge of Google Drive utilization that the PD was designed to teach?</td>
</tr>
<tr>
<td>Level 3 Organization Support and Change</td>
<td>What support from the administration and school staff for the use of Google Drive did the participants perceive?</td>
</tr>
<tr>
<td>Level 4 Participants’ Use of New Knowledge and Skills</td>
<td>In what ways did the participants use Google Drive in their classrooms in their section of the GI course? In what ways did the participants use Google Drive in their other classes? In what ways did the participants use Google Drive otherwise in their lives?</td>
</tr>
<tr>
<td>Level 5 Student Learning Outcomes</td>
<td>What kinds of projects have been completed by the students within Google Drive in the various classes?</td>
</tr>
<tr>
<td>Familiar Element</td>
<td>Application of Element</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Required knowledge</td>
<td>Teachers understood that this PD would cover information that would help them implement a technology they would have to use in their classes in the new school year, as designated by the administration.</td>
</tr>
<tr>
<td>Collaboration/Lesson Study</td>
<td>Teacher participants were all from the same course and developed course materials and new understandings together within the cycle of the lesson study; then they observed each other in the open classes.</td>
</tr>
<tr>
<td>Planning for long-term goals/Lesson Study</td>
<td>Teachers worked together to come up with ideas for the GI course, then designed activities for the course for the year. They carried out the activities, knowing they would meet later to assess the progression of their goals.</td>
</tr>
<tr>
<td>Observation/Open Class</td>
<td>Teachers watched each other’s successes within the GI course; teachers later conducted observations of actual Drive implementation during fellow teachers’ classes at the end of the lesson study cycle, followed by meeting and reflection.</td>
</tr>
</tbody>
</table>
## Table 3-5. In-depth description of the Drive Apps series

<table>
<thead>
<tr>
<th>Session of Series</th>
<th>Objectives (Participants Will)</th>
<th>Activities to Meet Objectives</th>
</tr>
</thead>
</table>
| **Session 1:** Google Drive Account Basics with Docs | – understand what Google Drive is, in terms of a cloud-based, online editing platform and file storage system  
– learn what the term “cloud” means  
– learn about security for students within Drive  
– learn how to log in to Drive  
– learn what they see when they first log into Drive (first within Drive, and then within the Docs app)  
– learn how to create a new folder or item  
– learn how to access an incoming shared item and move it into a folder | – watched a short presentation on Drive  
– went step-by-step through a guided Drive intro with slides and support to go through each menu, create their new items and explain how to access the shared file and locate it in their class folder  
– at the end of every session, teachers discussed how to use what they had learned in the course |
| **Session 2:** Google Slides | – understand the basic menus of Slides  
– understand how to create, edit, and share a Slide presentation  
– understand how to comment on, suggest, edit, and correct student documents through practice | – went step-by-step through a brief guided Slides intro with live demo  
– on their own, replicate a demo slide with all proper pictures, fonts, etc.  
– access the research feature to add pictures and properly cite files  
– at the end of every session, teachers discussed how to use what they had learned in the course |
| **Session 3:** Google Forms | – understand the basic menus of Forms  
- understand how to create, edit, and collaborate on a Form  
– understand how making a Form will create a Sheet with the data  
– understand how to access the automatically organized data and results | – went step-by-step through a brief guided Forms intro with live demo  
– teachers collaborated together to make end-of-the-year survey for class and then explored where they would find the results of the survey and how it would be organized  
– at the end of every session, teachers discussed how to use what they had learned in the course |
<table>
<thead>
<tr>
<th>Session of Series</th>
<th>Objectives (Participants Will)</th>
<th>Activities to Meet Objectives</th>
</tr>
</thead>
</table>
| Session 4: Chromebooks | – understand the basic functions of a Chromebook and their differences from PCs  
– understand how to use the different Drive apps on a Chromebook | – they were shown the basic use of the unique Chromebook trackpad, keyboard, and key commands  
– participants accessed their students’ presentation files and practiced using the Chromebooks by working on their corrections and comments  
– at the end of every session, teachers discussed any ideas they had about how to use what they had learned in the course |
| Session 5: iPads | – understand the basic functions of using G Suite on iPads that are different from PCs and Chromebooks  
– understand how to use the different Drive apps on an iPad | – found the appropriate apps and practiced opening files and accessing tools  
– again they accessed their students’ presentation files and practiced using G Suite on an iPad by working on their corrections and comments  
– practiced the logging out of a Google account on an iPad  
– at the end of every session, teachers discussed how to use what they had learned in the course |
CHAPTER 4
METHODS

One never notices what has been done; one can only see what remains to be done.

—Marie Curie
*Letter, 1894*

The purpose of this study was to develop and evaluate a PD experience. The PD experience needed to be designed to help English teachers of the GI class at my school use G Suite tools within Drive. The overall research question explored was:

How does an educational Professional Development experience on Google Drive Apps impact teachers of a communicative English course in a Japanese high school?

This study used a variety of methods to collect and analyze data using the five levels of G5L (Guskey, 2002). G5L processes are designed to provide not only a summative assessment of a PD program, but also to provide continual formative assessment during the duration of the PD experience to help create an overall effective experience. Each level builds on the previous level and also provides a guideline for types of assessment that can occur at each level (Guskey, 2000, 2002). By using G5L to help guide the development and assessment of the PD, I was able to design, develop, deliver, and then evaluate this PD experience in order to inform future PD sessions.

**Participants**

Convenience sampling was used to designate participants in this evaluation (Patton, 1987, 1990). This strategy is appropriate because the population was selected due to the convenience of the group being all part of the same course. The teachers who participated in this study worked at our school and would need to use Google Drive in their classrooms for the school year. They were, therefore, naturally present for the
PD experience and present for the setting of this study. As I was involved in the deployment of Google Drive at the school, I knew that these particular teachers would not only be using it within other courses they taught, but that they were in a convenient group as they all taught sessions of the GI course as well. And, finally, one final reason for the use of convenience sampling was because it is often used in evaluating PD in other studies (Patton, 1987, 1990).

I approached the participants before the sessions and asked if they would not only be part of the Drive Apps sessions, but if they would also be part of the whole study. In my meetings with them I explained the different parts of the study, including my purpose in studying the entire PD experience in order to improve future sessions as our school continued to delve further into Drive usage. The participants were also assured that they would remain anonymous in all the writing and discussion of the data. In order to maintain their confidentiality as much as possible, pseudonyms were used for each participant.

For a teacher’s data to be used in this study, they had to have attended all of the Drive Apps sessions. Prior to the study, each participant signed the consent form approved by the Institutional Review Board (IRB) (Appendix B).

**Data Collection Timeline and Overview**

The conceptual framework for this study was formed using G5L (Guskey, 2000, 2002) and this process also informed the data collection methods. The questions for each level are described in greater detail in the next section, and in Table 4-1. At each of Guskey’s levels, there is a guide for how data can be collected in order to evaluate that level. Having questions for each level helped me to assess how effective each of
the five Drive sessions were in the Google Drive series, as well as how supported the participants felt throughout the lesson study cycle.

In order to collect data for this study, I conducted two sets of interviews (at the beginning and end of the PD experience), performed class observations, and recorded observations during the weekly GI planning meetings. The study’s data collection progressed over the twelve weeks of the study. First, I attended the first of the twelve weekly lesson cycle meetings and took notes in my reflection log (Appendix B) as the teachers outlined the goals they would accomplish in the curriculum over the course of the next 12 weeks. During that same week, I conducted the first of two fifteen-minute interviews (Appendix C) which were recorded and then transcribed to be coded (Appendix D).

Then, in the second week the Drive Apps sessions began. After the sessions ended, I recorded many notes in the reflection log (Appendix B). I continued to attend the separate lesson study meetings and took notes in the reflection log on what the participant teachers discussed in these meetings as well (Appendix B).

For the next 10 weeks, I continued to attend the lesson study meetings and recorded notes in my reflection log on teacher comments and conversations during the meetings (Appendix B). Concurrently, the Drive Apps sessions continued during any free class periods I could find when all six participants were available.

Then, in Weeks 8-10, I conducted the six different class observation sessions during which I took observation field notes and looked for specific items for analysis (Appendix F). When the final Drive Apps session was concluded in Week 11, I began to
conduct the final fifteen-minute interviews (Appendix K) which were then coded (Appendix F) as well.

All of the interview transcripts and reflection log comments were input into QDA Miner for analysis and coding (Appendix G). I also compiled a collection of artifacts produced by the school at different levels (team level and administrative level) that in some way dealt with the use of Drive at the school (Appendix H). These were then compiled into a collection of student-created artifacts and work that showed the level of use of Drive within the G.I. course curriculum (Appendix I).

For the entire twelve weeks, I continued to attend the lesson study meetings and take notes in my reflection log (Appendix B) until the end of the lesson study cycle. During this last meeting, the teachers set their goals for the next cycle of meetings of the lesson study and for the course.

To review in brief, the instruments included two fifteen-minute interviews (Appendices C and E), collected artifacts from the school and from students (Appendices H and I), my own reflections from the Drive Apps sessions and lesson study meetings (Appendix B), and classroom observations (Appendix F). The overall timeline is detailed in Figure 4-1. How these are related to each question will be detailed in the next section and are related in Table 4-1 as well. Due to the large amount of information, the data were organized very carefully during the study, and were continually analyzed on an ongoing basis. These analyses will be discussed in the analysis section.

The following subsections will detail data collection for each level of G5L (Guskey, 2000, 2002). There are research evaluation questions from each of the levels
of G5L (Guskey, 2002) which helped to inform the design and evaluation of the PD and facilitate the collection of data for each level.

**Evaluation Questions for G5L Level 1: Participants’ Reactions**

For the first evaluation level, the two guiding evaluation questions were, “How did teachers react to the PD?” and “How did the PD affect teachers’ attitudes towards using Google Drive in their classes?” As reviewed in Table 4-1, I conducted a pre-Drive Apps series interview (Appendix E).

Finally, at the conclusion of the study, after the open class observation (discussed in the G5L Level 4 subsection) as well as the final Drive Apps session, I conducted a final interview (Appendix K). The reason for having two different interviews, one at the beginning and one at the end, was to see whether the perceptions and reactions of the participants changed as time went on throughout the PD experience.

In designing the interviews, I focused on collecting rich description aligned with the literature, specifically keeping in mind the themes associated with these adult learners and PD. The interview questions were then reviewed and modified until they were closely aligned with the goals of the evaluation level and the objectives of the Drive Apps sessions. Participants were asked to reply only in English and did so.

Additionally, to confirm data collected for Level 1 of G5L, I used my reflection logs (Appendix B) (Guskey, 2000, 2002). I wrote in the reflection log before and after each Drive Apps session, as well as during planning meetings in the lesson study cycle. To confirm data collected for G5L Level 1, I took notes in the reflection log on any comments, discussions, or questions made during the meetings and sessions.
**Evaluation Questions for G5L Level 2: Participants’ Learning**

As seen in Table 4-1, the evaluation for Level 2 involved two assessment questions. The first was, “What knowledge and skills do the participants believe they attained?” and the second was, “Did the participants acquire the knowledge of Google Drive utilization that the PD was designed to teach?” Data for these questions were collected through the first and second interviews (Appendices C and E) and my reflection logs (Appendix B).

The participants’ initial knowledge and belief about their skills was surveyed in the first interview (Appendix C). Their final belief and assessment of knowledge obtained from the PD experience was ascertained during the second interview (Appendix G). In that interview, the actual application of what they learned in the sessions was assessed and reported on, as well as how they felt at this point about what they had learned.

Finally, my reflection logs (Appendix B) were reviewed for data to confirm the results for Level 2 of G5L (Guskey, 2000, 2002). I took notes after each session during the Drive Apps series, as well as in weekly planning meetings with the teachers.

**Evaluation Questions for G5L Level 3: Organization Support and Change**

The evaluation for Level 3, as noted in Table 4-1, consisted of one assessment question; “What support from the administration and school staff for the use of Google Drive do the participants perceive?” This question was answered by questions in the first and second interviews (Appendices C and E) and in collections of documents from the team and school on our planning meetings and the use of Drive at school (Appendix H). All of these methods are appropriate to assess this level of G5L (Guskey, 2000, 2002).
Evaluation Questions for G5L Level 4: Participants’ Use of New Knowledge and Skills

This level entailed the most complex collection of data and came from observations (Appendix F) and the first and final interviews (Appendices C and E). Table 4-1 shows that the first question was, “In what ways do the participants use Google Drive in their classrooms in their section of the GI course?” This was answered by direct observations (Appendix F) as part of the lesson study cycle. The other two questions, also in Table 4-1, were, “In what ways do the participants use Google Drive in their other classes?” and “In what ways do the participants use Google Drive otherwise in their lives?” These were answered during the interviews (Appendices C and E) with the participants. These methods are appropriate for evaluation of this level of G5L (Guskey, 2000, 2002).

Evaluation Questions for G5L Level 5: Student Learning Outcomes

This final level of evaluation was assessed during the open class observations of GI classes (Appendix F) and by collecting examples of student work (Appendix I). Table 4-1 shows this in more detail. The assessment question was, “What kinds of projects have been completed by the students within Google Drive in the various classes?” A variety of examples of completed work were collected to show participation by the students (Appendix I). This is an appropriate method of evaluation for this, the final level of G5L (Guskey, 2000, 2002).

All of these evaluation questions can be seen in Table 4-1, which is tied to data collection and analysis. An overview of the timing of all these data collection methods within the course of the study can be found in Figure 4-1.
Data Analysis

The data were collected in every interaction during the entire process of the lesson study cycle that encompassed this study and were analyzed qualitatively. The data sources that were used for analysis were: the two interviews (Appendices C and E), the artifacts collected (Appendices H and I), the classroom observation sessions (Appendix F), and my own reflection logs (Appendix B). The reflection logs provided the data used for triangulation, which is discussed in more detail in the rigor and credibility section. The data analysis began as soon as the data had been collected, in order to compile the large amount of data collected during the whole course of study. First, audio from the interviews was transcribed into QDA miner (Appendix G), and then separated into sections for each question, for both interviews (Appendix D). Then, the coding process began for all interviews, reflection logs, and observations.

Answering the Evaluation Questions: G5L Level Analysis Coding Detail

Step 1. Organizing data by evaluation question. In order to answer each evaluation question, the data were organized for each level of G5L. All items from the interviews and observations, as well as the artifacts were sorted into G5L levels, so that the information could directly answer each level’s evaluation questions (Guskey, 2000, 2002). This sorting can be seen with each evaluation question in the next section.

Step 2. A priori coding and analysis. Each question was given an a priori code, and then the data were analyzed using a priori coding, which is described in detail below and in Table 4-2. A priori coding is used when the coding categories are chosen before the data analysis begins, and are based on a certain theory or framework (Stemler, 2001). Because this evaluation was designed from G5L, the codes came from the G5L levels. Before the study began, nine codes were designated, one for each
question within each of the evaluation levels of G5L (Guskey, 2000, 2002). All of the
different questions from the interviews (Appendices C and E), the data from the
observations (Appendix F), the data from my reflection logs (Appendix B), and the
artifacts collected (Appendices H and I), were organized so that I could easily look for
the codes within the data. A level-by-level description is reviewed below and is also
available in brief in Table 4-2.

   Level 1 was assessed using two different questions and each question had its
own a priori code. Question One was, “How did teachers react to the PD?” The code for
this question was “reaction” and the items that helped to assess this question included
Questions 3, 4, and 6 of the first interview (Appendix C); and Questions 3 and 6 of the
second interview (Appendix E). These were then corroborated with evidence and coding
from my own reflection logs.

   Question Two was, “How did the PD affect teachers’ attitudes towards using
Google Drive in their classes?” The code for this question was “attitudes” and the items
that assessed this question were Questions 1, 1b, 5, and 7 of the first interview
(Appendix C); and Questions 1, 1b, 5, and 9 of the second interview (Appendix E).
These were then compared with coded evidence from my own reflection logs.

   Level 2 was assessed using two different questions and each had its own a priori
code. Question 1 was, “What knowledge and skills do the participants believe they
attained?” The code for this question was “belief” and the items that assessed this
question included Question 1c from the first interview (Appendix C) and Questions 1c
and 1d from the second interview (Appendix E). This was supported with coded
evidence from my own reflection logs.
Question 2 was, “Did the participants acquire the knowledge of Google Drive utilization that the PD was designed to teach?” The code for this question was “knowledge” and the items that assessed this question were Question 1a of the first interview (Appendix C) and Questions 1a and 8 of the Post-Observation Interview (Appendix E), and information from the observation field notes (Appendix F). This was affirmed with coded evidence from my own reflection logs.

Level 3 was assessed using one question, “What support from the administration and school staff for the use of Google Drive do the participants perceive?” The code for this question was “support” and the items that assessed this question were Questions 1d, 1e and 2b of the first interview (Appendix C); and Questions 1e 1f, 2c, 4, and 10 of the second interview (Appendix E). These questions were also supported with coded evidence from my own reflection logs.

Level 4 was assessed using three different questions and each question had its own a priori code. Question 1 was, “In what ways do the participants use Google Drive in their classrooms in their section of the GI course?” The code for this question was “GI.” This question was largely assessed in the open class observations and recorded on the Observation Field Notes forms (Appendix F). Also, used were Questions 2a in the first interview (Appendix C) and Questions 2a, 2b, 7 and 8 of the second interview (Appendix E).

Question 2 was, “In what ways do the participants use Google Drive in their other classes?” The code for this question was “classes” and the items that assessed this question were Question 2a of the first interview (Appendix C) and Question 1g, 2a and 2b of the second interview (Appendix E).
Question 3 was, “In what ways do the participants use Google Drive otherwise in their lives?” The code for this question was “otherwise” and the item that assessed this was Question 1g from the second interview (Appendix E).

All three of these questions were also corroborated with supporting coded evidence from my own reflection logs.

Level 5 was assessed using one question, “What kinds of projects have been completed by the students within Google Drive in the various classes?” The code for this question was “students” and this level was primarily assessed by collected student artifacts (Appendix I) as well as observations recorded on the Observation Field Notes forms (Appendix F) during open class observations. Other items that assessed this question were Questions 6b and 7b of the second interview (Appendix E). This was additionally substantiated with coded evidence from my own reflection logs.

By using the program QDA Miner to designate certain a priori codes into colors, I could easily arrange the data to better understand the relationships among different a priori codes. It was then possible to see how the themes all came together and to develop an accurate understanding of how the participants experienced and learned from the overall PD experience in this study.

**Step 3. Identifying preliminary themes and patterns to answer evaluation question.** As I read through all the different data sets within each a priori code, I identified key words and ideas that participants mentioned or alluded to. In many cases, if they did not reference the word directly, I went back and asked the participant if that key word described what they were feeling when they were interviewed.
I then used these keywords to develop different categories that each set of keywords fit into. These categories were then sorted into overall themes from all data sources and levels of the G5L (Guskey, 2000, 2002). I could compare the different codes from various levels to see where the a priori codes, keywords, categories, and themes overlapped and deviated. As a result, commonalities and patterns found among the themes could then be further analyzed and described (Braun & Clarke, 2006). This gave the first results for each evaluation question. For example, all the Level 1 first question “reaction” codes were examined for themes and patterns within them in order to answer the first question. This data analysis was done as the data were collected throughout the 12-week process as well as afterwards.

Step 4. Open Coding. Once themes were developed from within a priori codes, I evaluated the data again using open coding in case I missed things in the data by using a priori codes. In many cases, answers coded to one a priori code also applied to another, and this had to be added to my description. Then the data could again be examined for overall themes, as well as any additional themes that were not expected, or were prevailing amongst the other themes. The interviews were also examined for each individual participant, to look for any key ideas that might be similar or different.

Step 5. Finalize themes and patterns to answer evaluation question. Codes identified during this final process were used to affirm or disaffirm the preliminary themes and patterns related to each evaluation question. When necessary, themes were modified, deleted, or added. Data excerpts and final quotes were also selected to support themes and patterns. The themes could then be analyzed and assembled into one overall rich description. By using thematic analysis this study will hopefully be more
accessible, which will help with credibility and transferability. In addition, the analysis should be useful to inform future policy decisions at my school (Braun & Clarke, 2006).

I examined my own reflections throughout the process to see if any new themes emerged separately from the interviews, or if similar themes recurred. If there were any new themes, they were then included in the overall thematic description. At many different stages, I took all of my keywords, categories, and themes back to the participants to see if they agreed with my findings.

Eventually all questions could be answered for each level of the G5L in this way (Guskey, 2000, 2002). Through this type of systematic approach, eventually a description of “how” the teachers experienced the PD emerged (Creswell, 2013). From the themes, I described the experience of this group during the PD experience that encompassed this study. This allowed for an understanding of whether the PD experience was successful for the teachers, based on whether the questions could be affirmatively and descriptively answered for all the levels of G5L (Guskey, 2000, 2002).

**Rigor and Credibility**

Credibility was verified through member checking, occurring during the interviews, as I worked on the themes and categories, as well as in a summary check at the end (Lincoln & Guba, 1994). Interview questions were developed to avoid leading the participants to a certain answer and to avoid the potential bias that comes from analyzing data from multiple similar interviews (Creswell, 2013; Patton, 1987). The questions from the interviews were used to confirm or negate the data collected during the observations. In turn the observation data helped to confirm or negate the data obtained from the interviews (Creswell, 2013). The observations themselves were
validated by observing the teachers before drawing conclusions about the overall effectiveness of the PD sessions (Creswell, 2013).

Transferability was enhanced by carefully describing the context of the entire PD experience and proceedings as well as the general assumptions and ideas that went into the development of the study (Lincoln & Guba, 1994). In writing down observations and reflection on each session of the Drive Apps series, I tried to determine whether the session had met the instructional needs of the participants. Certain interactions, questions and issues that arose during the session were noted, as well as any other relevant moments. Within each planning meeting, I took down notes when we planned and discussed projects and use of Google Drive in class, including questions, problems, and any support I provided. This information was formative, allowing me to modify my delivery and support throughout the PD experience. The information helped me consider the effectiveness of different activities and discussions on the participants’ learning. I could comment on what needed to be changed in the Drive Apps series and within the framework of the lesson study cycle in the future. These reflection logs were a reference source during the complete course of the study and after, allowing the opportunity to reflect on ways to improve PD delivery.

Overall credibility and transferability for the study was validated through triangulation (Creswell, 2013). After substantiating evidence was noted within the artifacts collected, interview notes, and reflections, triangulation of the evidence could be made. I collected information for triangulation within my own reflection logs (Appendix D). These reflections were not coded exactly like the other data; they were taken as a source of data for all levels of G5L but were my own observations (Guskey
2000, 2002). This type of methodological triangulation allows for the comparison of data across a variety of types (Denzin, 2006). It created greater confidence in the findings of the study and allowed for a certain level of confirmability (Lincoln & Guba, 1994).

Dependability was also established through audio recordings of the interview sessions which helped avoid misunderstandings, especially with occasional Japanese words (Patton, 1987). I also attempted to account for dependability through my reflection logs as I continually described how the study changed as time went by. In this way, I could see and describe how any unforeseen aspects changed or affected the research (Lincoln & Guba, 1994).

Limitations of the study were numerous. First, a much larger group of participants would have allowed for the collection of more data. There were 8 teachers besides myself involved in the GI class; however, only 6 agreed to be a part of the study. I also wished to include participants outside the English Department, as numerous teachers would be using Google Drive in upcoming years. Also, because of its short-term nature, the study only allowed for 5 sessions within the Drive Apps series and one cycle of a lesson study. If I were able to deliver more Drive Apps sessions, the participants might have been able to collaborate and experience more activities within Drive. Following them in a lesson study for a full year would allow for verification of the development of their Drive integration as they were supported through the lesson study over the course of the school year. Also, if I was then able to observe them the following year, when they may or may not be a part of the GI class, I could evaluate whether they continued to use Google Drive beyond the study.
Statement of Subjectivity and Bias

Qualitative research is often thought to be fraught with bias or, in the least, something that can bring out biases (Fitzpatrick, Sanders, & Worthen, 2004). As I was the researcher, the designer, the PD facilitator, the observer, the data collector, the data analyzer, as well as the person who desires the successful implementation and launch of G Suite at my school, bias was inevitable.

Not only was I the staff member deploying Google Drive at the school, I helped to design and present all of the trainings and meetings. Therefore, I naturally wanted the teachers to succeed and I wanted the PD experience to successfully help them better understand and use Google Drive Apps. Also, all of the participants were my co-workers, some of whom I had worked with for several years. I socialize with some of them often outside of school frequently. These factors may all influence my research and therefore the analysis of the data collected as well.

I was able to reduce the bias in the collection by employing researcher self-reflection, rich description, and by frequent member checking. To be objective about the data, I assessed my own interpretations of the data and tried to understand the limitations of the evaluation, increase the study’s trustworthiness, and limit my own bias (Glesne, 2006).

Also, neither my performance, my salary, nor my employment were dependent on this project, and the evaluation research was started through my own enterprise. All the information, not just what I expected to see, was reported to help evaluate the value of the themes that developed (Feynman, 1998). I strove to reduce bias by employing researcher self-reflection, rich description, and by implementing member checking in
this study (Lincoln & Guba, 1994). By accepting that I had biases and by actively trying to eliminate them, I could remove bias as much as possible.

**Timeline**

The timeline as described above for the study can be found pictorially in Figure 4-1 and descriptively in Table 4-3. This focuses on the study in a week-by-week fashion, showing how the PD progressed, when specific observations took place, and when the student work was expected to be accomplished. The timeline was designed to complete the study in an orderly, timely fashion. The Drive Apps sessions were taught during Weeks 2, 5, 8, 10, and 11. The interviews were conducted during Weeks 1, 11, and 12. Because of teacher schedules, some flex time was required for both the sessions and the interviews, which is why the Drive Apps sessions were spread out and Interview 2 took place over a two-week period. The timeline was flexible in case unknown issues occurred and also to facilitate the collection of as much data as was feasible. The classroom observations occurred during Weeks 8, 9, and 10. As soon as a data source was collected, in order to save time, I started analyzing it.

**Summary**

The participants for the study were six teachers who attended a series of PD that I developed on Google Drive. I designed the series of five PD sessions to incorporate research on adult learners, PD in Japan, and teacher barriers to technology integration using principles of instructional design and effective Educational Technology PD. The PD experience of a lesson study cycle, Drive Apps session, and open class observations were evaluated using G5L as a model for continual formative assessment of the PD before, during, and after the process, as well as for collecting data on how to improve my PD in the future (Guskey, 2000, 2002). I developed a data collection
strategy and evaluation questions for each level of G5L (Guskey, 2000, 2002). A variety of qualitative techniques were used to analyze the data that was collected.
### Overall Timeline of Elements

<table>
<thead>
<tr>
<th>Week 1</th>
<th>Week 2</th>
<th>Week 3</th>
<th>Week 4</th>
<th>Week 5</th>
<th>Week 6</th>
<th>Week 7</th>
<th>Week 8</th>
<th>Week 9</th>
<th>Week 10</th>
<th>Week 11</th>
<th>Week 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning meeting/ Goal Setting</td>
<td>Planning meeting</td>
<td>Planning meeting</td>
<td>Planning meeting</td>
<td>Planning meeting</td>
<td>Planning meeting</td>
<td>Planning meeting</td>
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</tr>
<tr>
<td>Drive Element Class 1</td>
<td>Drive Element Class 2</td>
<td>Drive Element Class 3</td>
<td>Drive Element Class 4</td>
<td>Drive Element Class 5</td>
<td>Drive Element Class 6</td>
<td>Drive Element Class 7</td>
<td>Drive Element Class 8</td>
<td>Drive Element Class 9</td>
<td></td>
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</tbody>
</table>

Continual Lesson Study Cycle. Continual Planning meetings with scaffolding/support.

- First Interviews
- Open Class
- Reflection Logs
- Observations
- End Interviews
- Continual Analysis of Data

**Figure 4-1. Overall Timeline of Events**
Table 4-1. Alignment of Guskey’s Five Levels of Professional Development Evaluation (Guskey, 2000, 2002) with the study’s Evaluation Questions and Data Collection Methods and Details

<table>
<thead>
<tr>
<th>G5L</th>
<th>Evaluation Questions</th>
<th>Data Collection and Confirmation</th>
<th>Details</th>
<th>Data Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1 Participants’ Reactions</td>
<td>How did teachers react to the PD? How did the PD affect teachers’ attitudes towards using Google Drive in their classes?</td>
<td>interviews, reflection logs</td>
<td>The interviews (Appendices C and E) explored their own thoughts on their reactions. The reflection logs (Appendix B) described my thoughts on how they reacted.</td>
<td>transcription coding thematic analysis triangulation confirmation</td>
</tr>
<tr>
<td>Level 2 Participants’ Learning</td>
<td>What knowledge and skills do participants believe they attained? Did participants acquire the knowledge of Google Drive utilization that the PD was designed to teach?</td>
<td>interviews, reflection logs</td>
<td>The interviews (Appendices C and E) explored their own thoughts on their skill levels. The reflection logs (Appendix B) described my thoughts as well as notes on their knowledge acquisition.</td>
<td>transcription coding thematic analysis triangulation confirmation</td>
</tr>
<tr>
<td>Level 3 Organization Support and Change</td>
<td>What support from the administration and school staff for the use of Google Drive do the participants perceive?</td>
<td>interviews, artifacts, observation</td>
<td>The interviews (Appendices C and E) with participants went over their perceptions on how they felt at the school concerning support from the administration. Artifacts collected included a collection of various materials created by the school on the new use of Google Drive (Appendix H). Classroom observations provided data to show participant application of knowledge gained within the PD sessions.</td>
<td>transcription coding thematic analysis triangulation confirmation</td>
</tr>
<tr>
<td>G5L</td>
<td>Evaluation Questions</td>
<td>Data Collection and Confirmation</td>
<td>Details (what is measured; how information was used)</td>
<td>Data Analysis</td>
</tr>
<tr>
<td>---------------------</td>
<td>---------------------------------------------------------------------------------------</td>
<td>----------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td><strong>Level 4</strong></td>
<td><strong>Participants' Use of New Knowledge and Skills</strong></td>
<td></td>
<td>The classroom observations provided data for evaluating the effectiveness of the PD, showing participant application of knowledge gained within PD sessions as well as integration of this new understanding into the classroom. Observations were recorded on the Field Notes Forms (Appendix F). Interviews (Appendices C and E) covered the participants' own understanding of how their new knowledge was applied.</td>
<td>transcription</td>
</tr>
<tr>
<td></td>
<td>In what ways do participants use Google Drive in their classrooms in their section of the GI course? In what ways do participants use Google Drive in their other classes? In what ways do participants use Google Drive otherwise in their lives?</td>
<td>observation, interviews, artifacts</td>
<td></td>
<td>coding</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>thematic analysis</td>
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<td></td>
<td>triangulation</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>confirmation</td>
</tr>
<tr>
<td><strong>Level 5</strong></td>
<td><strong>Student Learning Outcomes</strong></td>
<td></td>
<td>Observations collected in my Field Notes forms (Appendix F) covered evidence of student work. Interviews (Appendices C and E) went over participants' thoughts on student work before and descriptions of student work after as well as thoughts on that work. Artifacts collected were examples of student projects created during the semester (Appendix I).</td>
<td>transcription</td>
</tr>
<tr>
<td></td>
<td>What kinds of projects have been completed by the students within Google Drive in the various classes?</td>
<td>observation, interviews, artifacts</td>
<td></td>
<td>coding</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>thematic analysis</td>
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<td>triangulation</td>
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<td>confirmation</td>
</tr>
</tbody>
</table>
Table 4.2: Alignment of Coding Details for Each Level of G5L (Guskey, 2000, 2002).

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Participants’ Reactions</th>
<th>Evaluation Questions</th>
<th>Codes</th>
<th>Analyzed Items</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>How did teachers react to the PD?</td>
<td>Reaction</td>
<td>Questions 3, 4, and 6 of the first interview (Appendix C); Questions 3 and 6 of the second interview (Appendix E); corroborated with evidence and coding from reflection logs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>How did the PD affect teachers’ attitudes towards using Google Drive in their classes?</td>
<td>Attitudes</td>
<td>Questions 1, 1b, 5, and 7 of the first interview (Appendix C); Questions 1, 1b, 5, and 9 of the second interview (Appendix E); compared with coded evidence reflection logs</td>
<td></td>
</tr>
<tr>
<td>Level 2</td>
<td>Participants’ Learning</td>
<td>What knowledge and skills do the participants believe they attained?</td>
<td>Belief</td>
<td>Question 1c from the first interview (Appendix C) and Questions 1c and 1d from the second interview (Appendix E); and was supported with coded evidence from reflection logs</td>
</tr>
<tr>
<td></td>
<td>Did participants acquire the knowledge of Google Drive utilization that the PD was designed to teach?</td>
<td>Knowledge</td>
<td>Question 1a of the first interview (Appendix C) and Questions 1a and 8 of the Post-Observation Interview (Appendix E), information from the observation field notes (Appendix F), and was affirmed with coded evidence from reflection logs</td>
<td></td>
</tr>
<tr>
<td>Level 3</td>
<td>Organization Support and Change</td>
<td>What support from the administration and school staff for the use of Google Drive do the participants perceive?</td>
<td>Support</td>
<td>Questions 1d, 1e and 2b of the first interview (Appendix E); and was supported with coded evidence from reflection logs</td>
</tr>
<tr>
<td></td>
<td>In what ways do the participants use Google Drive in their classrooms in their section of the GI course?</td>
<td>GI</td>
<td>This question was largely assessed in open class observations and recorded on the Observation Field Notes forms (Appendix F); also Questions 2a in the first interview (Appendix C) and Questions 2a, 2b, 7 and 8 of the second interview (Appendix E), and was confirmed with observations in my reflection log</td>
<td></td>
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<td></td>
<td>In what ways do the participants use Google Drive in their other classes?</td>
<td>Classes</td>
<td>Question 2a of the first interview (Appendix C) and Question 1g, 2a and 2b of the second interview (Appendix E) and was corroborated with observations in my reflection log</td>
<td></td>
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<tr>
<td></td>
<td>In what ways do the participants use Google Drive otherwise in their lives?</td>
<td>Otherwise</td>
<td>The item that assessed this was Question 1g from the second interview (Appendix E) and was corroborated with observations in my reflection log</td>
<td></td>
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</tbody>
</table>
### Table 4-2. Continued

<table>
<thead>
<tr>
<th>G5L Level 5 Student Learning Outcomes</th>
<th>Evaluation Questions</th>
<th>Codes</th>
<th>Analyzed Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>What kinds of projects have been completed by the students within Google Drive in the various classes?</td>
<td>Students</td>
<td>Collected student artifacts (Appendix I) as well as observations recorded on the Observation Field Notes forms (Appendix F); Questions 6b and 7b of the second interview (Appendix E); and was substantiated with coded evidence from my own reflection logs</td>
<td></td>
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<tr>
<td>Timeline</td>
<td>Component</td>
<td></td>
<td></td>
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<tr>
<td>--------------</td>
<td>---------------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week 1</td>
<td>Conducting first interviews with participants</td>
<td></td>
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<tr>
<td>Week 2</td>
<td>Google Drive overview class</td>
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<tr>
<td>Week 5</td>
<td>Google Slides class</td>
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<tr>
<td>Week 8</td>
<td>Google Forms class</td>
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<tr>
<td>Week 10</td>
<td>Google Drive on Chromebooks class</td>
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<tr>
<td>Week 11</td>
<td>Google Drive on iPads class, finish all second interviews, collect student made products from classes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weeks 1-12</td>
<td>Lesson Study/Class planning meetings weekly (reflection logs within meetings); analysis of data collected; collection of artifacts produced by administration and school</td>
<td></td>
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</tr>
</tbody>
</table>
CHAPTER 5
RESULTS

How wonderful that we have met with a paradox. Now we have some hope of making progress.

—Niels Bohr

*Niels Bohr: The Man, His Science, & the World They Changed, 1966*

This chapter reports the results of the data obtained by implementing the G5L (Guskey, 2000, 2002) during the evaluation of the PD experience I conducted at my school. This chapter reviews the particulars of participation within the study as well as the findings for each level of the G5L. The majority of the narrative in this chapter is given to discussion of overall themes that emerged and can be found in the latter part of this chapter.

**Participation in the Study**

I asked all of the teachers involved within the Global Interaction (GI) course to participate, and 6 teachers involved in the class agreed. Part of the requirement to be a participant of the study was for each member to attend all five of the Google Drive-related classes. This was almost impossible to schedule and led to many rescheduling attempts throughout the semester, but eventually all five classes were completed. Each participant was absent at some point from at least one of the 12 planning meetings, but all participants attended the majority of the meetings. Even though I knew all of the teachers before the study, I had not worked with all of them personally on a one-on-one basis.

The participants consisted of five Japanese Teachers of English (JTEs), 4 of whom were new to the use of Google Drive in the classroom, one who had used it as a student, and one who had used Google Drive as part of the curriculum within 2 classes.
during the previous year. All five JTEs were certified English teachers who grew up in and attended university in Japan, and all were native Japanese speakers. The other participant was an Assistant English Teacher (AET), bringing the total number of participants to six. These teachers were chosen for the study because they were all teaching sections of GI and were all a part of the curriculum development for that class for the 2015-16 school year.

Of the six participants, half were female, half were male. Among the participants, 100% had a bachelor’s degree, and one participant had a master’s degree. The participants’ mean years of teaching experience was 15.5 years, with a frequency distribution of 2 teachers with 1-2 years and 4 teachers with 15-21 years of experience. All of the teachers were English teachers and taught only courses within the domain of Japanese English as a Foreign Language (EFL) Education at the school.

**Individual Participants**

Each participant had unique characteristics, as noted in the following section. Names have been changed for privacy purposes. The first participant, “Chris”, was the only participant without a teaching degree. He was from Canada, was in his second year at our school, and had a background in Biology. He was an AET, was a native English and fluent French speaker from Canada, and team taught with the JTEs in four different courses. This was his first full time job after graduating college and was his first-time teaching. He had some experience using Google Drive in the past for his own studies.

“Keisuke” was a younger teacher and this was his first year at this school. His background was in English literature and he had been an English teacher at another
school before coming to our school. He had had no experience using Google Drive before we began to use it in GI class.

“Hitomi” was an experienced teacher and had many years of experience teaching English at our school. Her background was in Psychology and Sociology. She was the head coordinator for the GI course. She had some experience using Google Drive for her personal use before beginning to use it for school.

“Mayu” was in her second year of teaching English and started her teaching career at our school. Her background was in American history. She had had no experience using Google Drive before we began to use it in GI class.

“Miaka” was another experienced teacher and had taught English at the school for many years. She was the head of the English department during the course of this study. Her background education was in linguistics. She had limited exposure to Google Drive in another class before we started using Google Drive in GI class.

And finally, “Ryo” was not only an experienced English teacher, but he had previously worked for the BOE as well for the Ministry of Education, before coming back to our school to teach again. He had many years of diverse experience in education and his educational background was in English literature. He had used Google Drive in two of his classes during the previous school year before the school moved to the new G Suite system, using regular Google accounts.

**Results by G5L Level**

**Level 1: Participants’ Reactions**

Reactions to the PD fell into two categories: (1) those who were focused inwardly on the teachers and how the PD influenced them overall and (2) those who were focused outwardly on how what they learned during the PD experience would influence
their students. (See Table 5-1 for details about code and categories developed for this level.) Inward, or teacher-focused reactions included reports of changes in how they viewed Drive in terms of its convenience and safety, changes in their confidence and their own expertise with the technology, and their own desire for future PD. Outward, or student-focused reactions included their observations and feelings on student cooperation, engagement, and development, as well as their perception of student technology access.

**Inward (Teacher-focused Reactions).** The two most referenced codes within the teacher-focused reactions were that of convenience and teacher development. Hitomi was happy that for the first time all nine teachers could meet one set planning time every week so that all of the teachers could actually plan the class together. Previously the teachers were only able to have one meeting every semester. Basically, how the curriculum was planned, conducted, and received and performed by the students was different because of the PD experience.

The parts of the PD experience the participants reacted to the most were the addition of Drive to the class and the Drive Apps lessons. Many of the comments in the interviews for this level focused on their reactions to Drive. Half of the participants had never used Google Drive before, and the ones who had used it had not used it very much.

Many of the teachers commented that they felt Google Drive was very convenient. Mayu, however, felt that Google Drive was too convenient. She enjoyed how easy it was to access, but was upset that students asked her every day if she had checked their work. In the planning meetings, the participants discussed this issue and
as a team we came up with the idea of telling students which day we would be checking their work every week. The students would not expect updates until those deadlines, and the participants hoped that would create less stress for everyone.

Participants commented that they felt the PD experience helped with their own development as a professional. Each had a comment on how it affected them. Chris didn’t know exactly what his professional goals were, but felt the PD experience could help in whatever he did. Keisuke wanted to be able to give all of the teachers a little exposure to Drive because he felt afterwards they would say, “Okay, I want to learn.” He said a little exposure would cause a big change. Keisuke and Mayu both discussed how they didn’t know too much about the Internet, so they were able to learn a lot. Hitomi said that not only had she become more confident during the 12 weeks, but that she now uses Drive at least once a day. She believed that if other teachers had a similar exposure to Google Drive, learning by working together, they too would gain confidence and use it more readily.

Ryo mentioned that he was grateful for more exposure to the proper ways of using certain ICT, and that he wanted to learn more and become even more independent with ICT use. Hitomi talked about how much education had changed since she started teaching, and how technology was just another change. She mentioned that the role of a teacher seemed to be moving towards that of a “supporter” in learning, and through this technology, teachers could do that more easily. Miaka talked about how, in the past, she felt it was not necessary for teachers, especially in Japan, to use technology in the classroom, but now it was very important.
In addition, Ryo felt that it was good for all the teachers to experience this together. By seeing others working, they could get over their reluctance to start using technology in the classroom. Hitomi felt that this was her first really immersive experience in professional development and in using a new technology. Chris, however, pointed out that he felt that some of the other participants didn’t involve themselves enough in the PD experience, in using the technology, or in their overall participation. Some participants did not check student work online often or at all outside of class time. Several participants asked few or no questions and did not speak during the Drive Apps sessions and he felt they may not actually have understood the concepts covered in the sessions.

**Outward (Student-focused Reactions).** Participants felt that students positively developed their own skills more than in previous classes due to their increased computer use. Chris and Miaka reflected on the increased use of students’ computer skills, which they both found to be lacking beforehand. Hitomi felt that the students were much more engaged in class and their collaboration seemed to help them motivate each other. She pointed out that what she saw was a shift in the students’ thinking. By being able to see the whole presentation at once, and not just their individual parts, they were able to make a final presentation that was a whole, seamless piece and not just an assemblage of parts stuffed together. Hitomi also discussed how, in previous years, using PowerPoint to combine all the different students' work was very complicated. This time the group work was actually work done by a group at the same time, instead of individual student work all patched together.
Level 2: Participants’ Learning

The participants’ learning fell into two categories: (1) learning that was focused on the technology (Google Drive), and (2) learning to plan and run the class (GI) itself. (See Table 5-2 for details about code and categories developed at this level.) Tech (Drive-focused) learning included teachers learning how Drive was a useful tool, that it was good for both student and teacher collaboration and learning, that Forms was a very useful way to collect data, and that they wanted more PD experience with Google Drive. Class GI-focused learning included discovering ways of helping students do research, create presentations, and access legal pictures to use in their work.

Tech (Drive-focused learning). Many teachers talked about how their newly learned skills in Drive use made their work easier. The most frequent response to these questions was how easy and effective collaboration could be. They also commented on how convenient it was for teachers to access the Drive-based files after class and at any time. Many times, when asked what Google Drive was, the participants mentioned it was a tool that teachers could use. The participants felt that Drive was very useful to them because of all of the “good” features they learned about. Many of the participants felt that it was useful because of how students and teachers could collaborate easily over the Drive cloud platform; they mentioned not only collaboration with each other, but also with people all over the world via Drive.

Class (GI-focused learning). Participants most frequently mentioned how students in the GI class could learn how to appropriately locate copyright-free images for their presentations. They felt like they had learned this skill and then, in turn, they were going to be able to teach their students how to do so. The participants felt that
accessing pictures, specifically legal, copyright-free pictures, was a good skill for them to teach to the students in a class that was about being a good “Global Citizen.”

**Level 3: Organization Support and Change**

Support and change at the school level fell into three categories: (1) a focus on the available technology that was at the school and needed to be at the school, (2) a focus on the administration and the perceived support, or non-support that was perceived from them, and (3) a focus on the curriculum and the belief that the direction the class took was supported by the curriculum and vice-versa. (See Table 5-3 for details about codes and categories developed for this level.) The first section, titled “Available tech,” included participants’ reports on needed technology as well as present devices and Wi-Fi access. Participants also focused on the presence of the administrators themselves as well as a feeling of danger that came from technology. Specifically, some of the participants felt that cloud use could be dangerous and they felt the administration thought that as well. The curricular focus included how the new direction of the class due to the use of Drive was well aligned with the curriculum.

**Available Tech (focused on the amount of technology available to support the program).** When participants were asked what could result in greater use of Drive at school, more devices was the most common response. Keisuke even wished for a 1:1 program. As mentioned in the introduction, the school has about 1000 students, yet only has 88 computers, 40 Chromebooks, and 45 iPads for student use. The participants wished for whatever other devices they could get for student use.

**Administration (focused on perceived support by the administration at the school and Board of Education level).** Throughout the 12 weeks, the participants saw Google Drive used more and more in class and they occasionally saw the
administration take an interest or support a meeting on it. Overall there were 3 different feelings the participants described as their perception of administrative involvement. The first was that they felt the administration supported them. The second was that administration did not support them. And the third was that the administration was supportive of the technology implementation, but they were reluctant in their support. As the study went on, most of the participants changed their description of how they perceived administrative support (or lack thereof). Chris, Ryo, and Miaka all went from believing they reluctantly supported technology use at the first interview to feeling fully supported in their technology use by the last interview. When Chris was asked during the first interview whether he received support from the administration, he replied, “Reluctantly, yes” (Chris, Pre Interview, October 1, 2015). Then in the second interview, he said, “It seems like they [do]; I haven’t heard anything negative…” (Chris, Post Interview, December 18, 2015). Mayu went from feeling not supported at all to feeling completely supported. Hitomi didn’t change her opinion at all. She felt throughout the whole process that the administration supported technology implementation, but that their support was reluctant.

Keisuke, however, felt unsupported at the beginning, but by the last interview admitted he had no idea how the administration at the school felt. This was not what I expected, especially considering the principal had asked for us to use G Suite at the school and Keisuke was using Google Drive in at least two different courses on which the administration continually received updates. He felt he had never heard any of them directly comment on it, so he could not judge their feelings at all.
Curricular (focused on the belief that the direction the class took due to our PD supported and was supported by the curriculum). As mentioned in previous chapters, the GI class was part of the Super Global High School (SGH) program. During the Post Interview, participants were able to cite specific examples of how the PD was aligned with the SGH program. Reasons included the following: the PD supported the Singapore exchange; the PD helped to teach the students English; the quality of student work improved; students were learning ICT which was helpful to their futures and also improved their attitude towards ICT; the students learned how to research properly; the students were made more aware of the world; the students could use the Drive technology anywhere; and finally, the students learned how to cooperate and interact with people better through the interactive experience.

Level 4: Participants’ Use of New Knowledge and Skills

Participant use fell into three categories: use of new knowledge and skills (1) in the GI class itself, (2) use in the teachers’ other classes, and (3) use otherwise in their lives. (See Table 5-4 for details about code and categories developed at this level.) Knowledge and skills in the GI class focused on time saved and spent using Drive, whether or not they felt the other participants used or were going to use technology in their other classes, as well as actual projects the teachers were working on with the students. The focus on other classes included reports of use in their or other participants’ academic lab classes, solo English lessons, science English lessons, as well as use within other classes. Participants also commented on how Drive and other technologies could be useful in everyday life.

GI Class (use of new PD knowledge in the GI classes). Participants most commonly reported using knowledge and skills developed in the PD to support projects
in the GI class. I also observed the students working on slide presentation projects in class when I did the open class observations. The classes were conducted in the computer lab as the students worked on their projects. Normally four teachers were present during these large lab sessions and they each shared the responsibility equally. During my open class observations, the participants individually took a lead during the specific class I was observing, and the other teachers as well as teaching assistants (TA) observed and supported them.

Five of the six participants showed a level of comfort with the use of Google Drive during my class observations. They showed this through their use of specific words or concepts we had reviewed in some of the apps sessions, as well as through the assistance they gave to students working on their presentation files. Certain skills that we covered in the Drive Apps sessions that I saw often were their use of the G Suite research/explore tool, having students properly share files, and showing students how to manage script writing beneath their Slides. Many of the participants mentioned future poster projects as well as the desire to use Google Drive for presentations in the GI class.

Most participants reflected on a lack of time. Hitomi fretted that many of the other teachers never corrected the students’ work during the 12 weeks of the PD experience. She asked them to make even short comments, but they didn’t seem to have the time to do that. Keisuke mentioned that he never had time to check the students work on Google Drive.

**Other Classes (use of new PD knowledge in the GI classes).** Participants referenced Google Drive use in their other classes. Several times the participants
mentioned the growth in use of Google Drive in the Academic Lab classes. Miaka spoke in her pre-interview about how she wanted to use it in her Academic Lab class, and by the post interview she reported she was using it in that class. Some participants reported that they had discussed the option of students using Drive in their other classes, but that the students had yet to do any work for them on Drive. All 6 participants reported the use of Google Drive in the Science English course. As for other classes, teachers reported ideas on how they would like to implement it in the future, but they had not done so yet.

Outside of classes but still within school use, Ryo reported that several of the different school international exchange programs had been planned and worked on over Google Drive. Hitomi said that she used Google Drive to organize her files for her various work and classes.

There were different feelings on the use of Drive by other teachers. Ryo enjoyed using the different Drive Apps and felt that teachers should use it. He felt that in the future, more would. Mayu again felt personally uncomfortable with Drive, and believed that other teachers would probably not use Drive. Miaka felt it was useful and that all teachers should be educated on Google Drive and available technology. She believed that they should then be given the choice about whether they should use it in class or not.

**Otherwise (use of new PD knowledge in regular life).** Only one participant described use of Drive outside of school. Hitomi described how she actually had used Google Drive on her own for the first time to help out a professor at a university with some translation. She mentioned how useful it was. She also mentioned that she had
started saving a copy of her work on Google Drive so that she would be able to access her work anytime, anywhere and that this feature was very useful to her.

**Level 5: Student Learning Outcomes**

Student learning outcomes fell into two categories: (1) those results that were tangible, as in actual student completed work and products, and (2) teachers’ perceptions on that work and the learning that the students had achieved. (See Table 5-5 for details about code and categories developed at this level.) Student tangible creations encompassed actual presentations and documents the students created over the 12 weeks of the study, including those that were being created during my observations. Teacher perception included their beliefs and observations on how students cooperated, as well as their understanding of actual student access to the technology from grading student work and watching them in class.

**Teacher Perception.** Participants discussed how the students could learn to work together better and communicate instead of just working on their own on the computer. To the participants, students seemed much more engaged in the work with their groups. Chris felt that the students learning how to work together over the different files were probably also likely to share other files for other classes and other work as well.

The participants’ belief that the students were collaborating together was positively strengthened over the course of the 12 weeks. The participants felt that the students were thinking more, that they were becoming better at researching and were more creative. For example, Ryo commented “I think students are becoming more, maybe, creative,” (Ryo, Post Interview, December 18, 2015). Hitomi felt that all the collaboration would help students develop the skills to be able to work better with
others; “they [the students] need to know how to work with people, how to cooperate with people. I think this is a very good beginning for students.” (Hitomi, Post Interview, December 24, 2015). But I have no direct student data to support these ideas. I witnessed students doing a variety of web searches for information and for pictures, but I have no data to support whether they were doing that more than in previous years on other software.

The participants noted varying access issues for students. Keisuke worried that students may not have a PC or the Internet at home and that they couldn’t do their assignments on time. Mayu felt that most of our students had access to computers, but believed that Drive may not work for students from other schools where students did not have access at home. Hitomi was grateful that the students could access their work at home, as that would give them time to complete work if their time in class was too short or wasted.

Hitomi felt that one big problem for students was time. She said, “It’s very time-consuming for the students just surfing on the internet. It take[s] a lot for students to get to start their work… I think on time, time is a big matter” (Hitomi, Post Interview, December 24, 2015). For Miaka, her issue was the differences between Microsoft products such as Word and PowerPoint, and their Google counterparts, Docs and Slides. “Sometimes students and I have a same kind of confusion, like the way to type or to change the font, is different…” (Miaka, Post Interview, December 22, 2015).

All of the posters and presentations were observed, viewed, and graded by the teachers over the course of the semester. Teachers watched students create their
projects in class and some of them participated in leaving comments or messages for the students on their work outside of class time.

**Student Tangible Creations.** All of the students in the 6 classes I observed used Google Drive during their class to work on projects. On one occasion a student forgot the password, and they often needed assistance from the teachers for tasks such as how to change the spell check language to English, enlarge the area for typing their scripts, or access the research tool and turn on the copyright filter. All of them were working in teams of 3 or 4, and simultaneously worked on their files.

Chris said, "They all seemed to understand how to create files and share them and access them" (Chris, Post Interview, December 18, 2015). He felt that the students were still improperly taking pictures from the internet, but that otherwise they were doing well. During this semester, there was a focus on obtaining legal pictures as the teachers saw the students adding more and more pictures to their slides. Many students could often be seen accessing copyright-free pictures in the proper way. However, there were also pictures accessed inappropriately, and I did not keep data on how often either case happened.

The perception that teachers had about the students cooperating on their work more, as well as being engaged more in their work, was reflected in their projects. All but 2 of the 123 groups finished their posters for the poster session, and all but 2 of 32 presentations were completed with all the content that was assigned. Student technology proficiency also improved during the 12 weeks. Occasionally students would forget their passwords. Through the G Suite admin, I could go into their accounts to reset their passwords so they could continue to have access. By accessing my activity
records in G Suite admin, I could see that I had had to reset different students’ passwords on average 3 times a class during the first weeks of the poster creation sessions. However, this was down to just one password reset per class during the six observation sessions. In a review of file revision histories, I found that many of the students were logging in at locations outside of school to complete their work.

**Themes across all levels**

After going through all of the keywords, the codes, and the categories, eventually there were two overall themes that emerged. The themes that were evident across all levels were: Impact on Participants Professional Growth and Impact on the GI Course Overall. They will be detailed below as the main themes that emerged.

**Theme 1: Impact on Participants’ Professional Growth.** For all of the participants there was some level of professional growth that occurred from being a part of the 12-week PD experience. Chris talked about how learning about Drive came easily to him and that it was possibly because of his own background in using technology. The other participants positively commented on things that they learned over the course of the 12 weeks. However, all the other participants discussed varying fears they had before using technology and/or how difficult using technology was for them. There was change among some attitudes, however. For example, Ryo felt that while there may have been some resistance to cloud use at the beginning, the others were becoming more comfortable in their use.

During the open classes, everyone except Mayu seemed to become more confident in using the technology, and subsequently were comfortable working with students on their presentations. They moved about the classroom, helping the students with their work. I was most interested in noting the times when they asked for
assistance from myself or other teachers. There seemed to be no aversion to asking for help. When I later asked the participants if they were nervous about asking for help, they all replied that they felt comfortable in asking for help any time. Even Mayu changed her opinion. Vocalizing a lack of confidence in using the technology correctly, she originally said, “I don’t want to use it” (Mayu, Pre Interview, October 1, 2015). By the end of the twelve weeks, her opinion had changed to, “I want to use it so that feeling has changed” (Mayu, Post Interview, December 22, 2015).

Many commented that it was nice to learn a new skill and one that would be applicable to other jobs and other schools. All of the participants at some point mentioned how much they loved using Google Forms and how they wanted to make tests, surveys, and other assessments with it in the future. It seemed that overall, they appreciated the opportunity as a useful time for planning and learning together.

However, that did not completely translate into results. As mentioned before, Keisuke explained that he just didn’t have time to look at student work other than in class. He wasn’t the only one. In the end, when I reviewed the students’ files, the only participants who had commented on student work were Chris and Hitomi. While all the participants enthusiastically explained in their interviews how convenient it was for them to access drive from home, the evidence on the student work would indicate that they did not do so often, or at all. I discussed this in member checking sessions with the participants. Ryo and Miaka both talked about all the various meetings and other events going on in the semester, and just indicated that they did not have enough time. Mayu admitted that she still didn’t understand how to make the comments. So, she and I
made a plan to practice again in the future. However, she also indicated that even if she did understand how to correct the student work, she would not have the time.

Hitomi made a point about her learning to learn Drive as a user but not as a teacher. She said, "I am [learning] how to use Google drive, only [as] a user but not as a teacher yet," (Hitomi, Pre Interview, October 8, 2015). While many felt that they learned how to use Drive, they did not completely feel that they knew the best way to use it in their classrooms or as a teacher. As Miaka said, "I think I need practice in... a situation [where] I need to use Google Drive more and more" (Miaka, Post Interview, December 22, 2015).

It is also important to note how much they desired the technology situation at the school to change. They felt that neither they nor the school overall, could improve unless there was an improvement in the technology. Whether they wanted to use the technology in their own classes or not, they all wanted better access to Wi-Fi, more devices, and hoped for more support at the school. Their comments indicated that they felt technology use was in line with the curriculum and with the goals of the SGH program. Overall, their comments in the interviews indicated that they felt strongly that they needed to use technology in the classroom for their growth as teachers, and that using Google Drive was something good for the students, good for themselves, and good for the school. They enjoyed being able to plan out classes for the first time ever with the planning meetings, and they also felt that they could work together more as a group.

It is also important to note that many of the participants began to refer more to Drive with the word tool, as in a “tool” that they would use in class to help make not only
Gl but other classes better as well. As Mayu said, “I don’t know ‘what is Google Drive,’ but there are many useful tools on the Internet and many people can access to that Drive...” (Mayu, Post Interview, December 22, 2015). Miaka had her own idea of ICT as a tool even as we began, explaining, “I think the teacher who is good at using ICTs in class is also a good teacher without ICT equipment.” She added, “We have to use the machine, machine will not use us. If we know that fact, I think lessons with ICTs will help broaden possibilities” (Miaka, Pre Interview, October 7, 2015). Although they all felt they still needed more training in this “tool,” they all began to see a variety of ways that their classes could be more engaging, their work would change, and they would develop as they learned and used technology more.

They also commented in varying ways that through their use of Google Drive at school, as they showcased their successes and growth, the other staff and administration would become more supportive and comfortable using Drive and other technologies at the school, enhancing the professional growth of the entire staff. As Ryo said, “In the beginning there may be some kind of resistance [to] using [the] cloud, but now they’re now feeling much more comfortable about the use of [the] cloud” (Ryo, Post Interview, December 18, 2015). As they became more confident, they felt they could help others, such as the example in Appendix H, when Ryo created his own material and taught the other teachers.

**Theme 2: Impact on the GI Course Overall.** All of the participants noted in one way or another that use of technology was important for the class and that the use during the semester was aligned with the GI curriculum. They all hoped that they would have more time to use it in class and that others would use it in GI as well. Not only
were projects completed on Drive, but participants talked about how they could use it for other projects in the future.

The end of the year survey for the GI class was created by the participants within the Drive Apps session on Google Forms. All the study participants at some point referenced this class as being one of the most useful, or else that Forms was one of the most useful things that they learned. The survey they created in class was administered to the students, and they collected more data on student perceptions and reactions to the class than had been collected in prior years. During her interviews Hitomi discussed with me that she very much enjoyed the process of going through the data because it was easier than it had been before. Every year the school uses the data on students’ perceptions of learning in the class to write up the SGH report. During the year of this research, all the data was pre-loaded into the spreadsheet straight from the Google Form, and all of the pie charts and graphs were automatically generated. This, she said, made writing that specific section of the SGH report much easier.

All the participants in some way commented on how there needed to be more equipment, more time, and more Wi-Fi access for their work to be better supported at school. They felt that other teachers at school might be interested in using Drive in their own classes, but that there would be resistance and hurdles to overcome.

Factors Promoting or Inhibiting Success of the PD Experience

Promoting Success

Collaboration and Teamwork. Collaboration was one of the most frequently mentioned codes in this study, and I had many, many comments, examples, and descriptions of teamwork from my participants. This was the first time there had ever been weekly planning meetings for the class. From the participants’ perspectives,
Hitomi’s in particular, as well as from my own observations and reflections, the ability to collaborate was one of the key factors for the success of this PD experience. By having the meetings, we were able to plan classes together and make the entire experience similar enough to an official lesson study that the class was conducted with much more cooperation and communication among all the teachers involved. The class became a group effort, and everyone had more ownership of what was happening during all sessions. Some of the participants who were unlikely to have used Google Drive were supported in their use because of the team feeling that they had in learning together within the Apps sessions.

Collaboration over Google Drive was something new for my participants as well as for the students. The participants could access all the coursework, files, and pictures whenever they needed to. They worked together to make the class survey as well as other assignments and documents for class. The participants and I observed the students collaborating over Drive in and (through the admin console) outside of class.

**Support from Participants and Other Teachers.** By participating in the PD experience together as a GI course team, they were able to have the support they needed to feel more comfortable in their use of technology. Because of the nature of the GI class being taught by 9 different teachers, there was much support between the participants as well as with the other teachers They often looked to each other and to me for assistance, and the others enthusiastically helped when they could.

Also, because this class served the entire first year class of SGH students, there was support from other teachers at the school. In particular, the first-year homeroom teachers would help by meeting students during lunch times and after school to allow
them to use the computers if they needed more time to work on their projects. Other teachers who were involved in various courses that utilized Drive would ask questions of the GI teachers; this was one of the reasons Ryo ended up developing a class to teach on his own.

Belief in Technology Use. Overall, the participants were positive about the experience and genuinely wanted to try to learn the technology because, as they said in interviews, they believed that by using it in class they were achieving what was needed to create that “ICT educational environment.” The SGH program was a driving factor and was frequently mentioned by participants when they discussed the need for technology use. All of them felt that the use of technology, such as Google Drive, was something that needed to be utilized to fulfill the technology goals of the SGH program.

Even when the participants were reluctant, or said they did not have enough time to use Drive or didn’t know exactly what Drive was, they still said in the same interviews that they needed to use technology and that it was important. That genuine desire to do what they felt needed to be done was something that made them participate in the planning of class and in the use of technology in the class.

Factors Inhibiting Success

Time. All of the participants at some point indicated to me that they felt that time was limited. There was not enough time to learn more about Google Drive, there was not enough time to evaluate and/or comment on student work, the students did not have enough time to work in class, and they worried about them working on their own at home when they should be doing “real homework,” meaning paper-based work for other classes.
Visible Support. The participants were very supportive of the observation sessions and a few of them attended more than one of their peers’ observation sessions. I had designed the open sessions with the desire that more than just our department’s teachers would attend. However, other than several of the TAs (who were invited and did come) as well as a few other English teachers, only during one observation session did a vice principal come to view the session, and he only remained for 10 minutes. In addition, he came then only because he was escorting a school visitor to our class as a model class.

The administration only came by the class sporadically, and then only when some sort of event was going on or when there were school visitors. During our 12-week cycle, the principal and one vice principal came by during our poster sessions to view student work and ask them questions. However, this was not during a time when the students were actually working on Drive. I did not consider asking in the interviews if the participants felt that the fact that administrators often sent school visitors to visit the GI class meant they thought our class was worth supporting and was a good model class. However, when asked if they felt the administration supported the use of Drive in class, Keisuke said, “I have no idea, actually” (Keisuke, Post Interview, December 18, 2015) and Chris said, “I haven't heard anything negative about it” (Chris, Post Interview, December 18th). It seems that there should be more visible and felt support from the administration to make teachers feel sure they are doing the right thing for their classes.

Fear Factor. All of the participants at some point mentioned that either other participants or they themselves did feel or had felt fear about using technology in general, and the cloud, or Google Drive specifically. Some of the participants
progressed during the PD experience to the point where they felt more comfortable, but everyone besides Chris and Ryo still spoke hesitantly or unconfidently about their ability to use Drive or about their ability to use technology in their classes. Chris has been using technology in his own educational experience for a long time, and Ryo used Google Drive in the previous year in his classes.

There was also the interesting point that while all participants noted they felt comfortable asking questions, the only people they asked questions of while I was observing was myself or Chris, even when other teachers were in the class. I mentioned this to Hitomi during a conversation with her in which I was confirming some of her statements, and she indicated she felt that Chris knew a lot about Drive. Chris was just as new to most of the Drive features as they were, but there was a natural tendency to ask him questions and assume he knew more for some reason. I do not know if this is because of how he speaks, his youth, or the fact that he, like myself, is not Japanese, but it would be interesting to study this further in the future if there was another opportunity.

**Digital Divide.** There were two types of digital divide issues that affected the participants and the students at the school. The first type was an access divide, just device availability—many of the teachers and students at school did not have smartphones or computers. However, this blends somewhat into the second type of divide, which is cultural. Many did not have devices because, as I was told in different discussions, it was simply not seen as a necessity. Integration of tech in the classroom was something some of the participants said they did not have time to do, even though they stated they knew they needed to do so. Hitomi commented that teachers tended to
teach as they were taught, and so most teachers continue to teach using the chalkboard to lecture. MEXT continues to develop new standards to push towards technology integration. However, the school culture has to change if technology is to be successfully used by students and in classrooms.

Interesting Outcomes, New Discoveries, and Participant Conclusions

Due to the opportunity the lesson study of the PD experience provided, the participants were able to plan many class activities together that, previously, only one or two teachers had decided on. In the past, once the activities were decided on, the one or two teachers just informed the other teachers that such lessons would occur. This PD experience allowed them to plan together, to make the class run more smoothly by allowing all the teachers an opportunity to understand each lesson, to learn about an activity before it was taught in class. It also brought the group together in a more collaborative way. Over the course of the 12 weeks, some of the class changes they agreed on making included giving students the choice to make their poster projects with Google slides or by hand (previously it was always by hand), as well as having students make their presentations on Slides in class and at home (previously these were done with PowerPoint and only in class).

They also learned some things about assignment structure that I didn’t expect would occur, that we then had to discuss in meetings. For example, in previous years we always had students hand write their scripts and then we checked their English before they could start on the PowerPoint. However, this year, because we were doing it in Google Drive, we thought they could just write their scripts on Slides and then we could proofread them online. However, according to the participants’ observations, students wasted time searching for the perfect pictures, rather than writing their scripts,
with the resulting in no time for us to proofread many of their scripts. In the future, we decided they would always have to write their scripts first, then work on the slides. We discussed that they could either hand write them or type them on Slides, but either way they would have to finish the script first.

One interesting reflection I had was from Miaka. She came to the conclusion on her own before we even began that a “teacher who is good at using ICT in class is also a good teacher without ICT equipment (Miaka, Pre Interview, October 7, 2015). She felt that teachers needed to think and use the tools to help improve their classrooms, but that teachers had to learn how to use the machines; “Machines will not use us” (Miaka, Pre Interview, October 7, 2015). She realized that that the technology would broaden the possibility of the classroom, but teachers must be trained to use it.

Mayu’s observation during one of our planning meetings that Drive was “too convenient” caused an interesting conversation that I had not foreseen. At first I was confused by her statement. How could something be too convenient? Later, I had her explain what she meant. She reflected that she felt that she had to check students’ files daily since there was the possibility that they were working on it daily, and they would be upset if she didn't check it and they had worked. This was something I had never considered. So, we discussed it at length together, and with the rest of the participants at the next planning meeting, and decided that we would need to set a “teacher will look at your work” date and time for each assignment. For example, they would announce that the teacher would review work every Tuesday and Thursday after 4 p.m., so the students should understand, no matter when they worked, that the teachers would only look and grade at those times. That way, she and others wouldn’t have to stress about
checking the Drive for student updates too often, because they would know exactly when they were supposed to look at the students' work.

One interesting artifact that I didn’t expect was an agenda from a Chromebook training that Ryo created and delivered himself. We had intended to have professional trainers come in to teach some of the teachers in Japanese on use of Google Drive on the new Chromebooks that the school purchased. After the proposed cost by the trainer was revealed to be much too high for the school to afford, Ryo asserted to me that he had learned enough on the use of Chromebooks and Drive. With my help, he designed and delivered a few afternoon classes in Japanese to all the various teachers involved in the Academic Lab classes. In the document he explained how convenient Drive was and how useful it could be to students and teachers alike.

Summary

The data collected from the interviews, observations, and reflection logs all helped me to evaluate the PD on Google Drive Apps that I delivered to the participants over the 12-week study. The outcomes show that overall the PD experience was an effective beginning, but that much more work must be done. In the final and next chapter, I discuss the findings and the data's implications for my future PD and created PD experiences to be included in my work and future research.
<table>
<thead>
<tr>
<th>Category</th>
<th>Code</th>
<th>Mentions count</th>
<th>Exemplar Quotes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inward (Teacher-focused reactions)</strong></td>
<td>convenience</td>
<td>21</td>
<td>“Now just I feel learning a very new skill, I want to use it for [m]any chances, not only English, [in] other teaching,” (Keisuke, Post Interview, December 18, 2015).</td>
</tr>
<tr>
<td></td>
<td>teacher development</td>
<td>21</td>
<td>“I'm so glad to learn a new skill. Maybe if I didn't join GI or SE maybe I would never know what it is like... I want to use it for any chances, not only English, other teaching” (Keisuke, Post Interview, December 18, 2015).</td>
</tr>
<tr>
<td></td>
<td>safety</td>
<td>8</td>
<td>“I have no idea how to learn to use Google Drive” (Mayu, Pre Interview, October 1, 2015) “I feel very safe under the cloud.” (Hitomi, Post Interview, December 24, 2015)</td>
</tr>
<tr>
<td></td>
<td>future PD</td>
<td>5</td>
<td>“how to create new users” (Chris, Post Interview, December 18, 2015); “administration accounts” (Hitomi, Post Interview, December 24, 2015)</td>
</tr>
<tr>
<td></td>
<td>confidence</td>
<td>3</td>
<td>“… it’s very easy to use once you know what you're doing.” (Chris, Pre Interview, October 1, 2015)</td>
</tr>
<tr>
<td></td>
<td>cooperation</td>
<td>3</td>
<td>“Many GI's activities conducted by groups, so Google Drive is very good for group work because many students can access in one time and they can cooperate” (Mayu, Post Interview, December 22, 2015).</td>
</tr>
<tr>
<td><strong>Outward (Student-focused reactions)</strong></td>
<td>student development</td>
<td>15</td>
<td>“[T]hey have to think,” (Miaka, Pre Interview, October 7, 2015). “…acquiring ICT skills is one of the important skills for our education.” (Ryo, Pre Interview, October 1, 2015)</td>
</tr>
<tr>
<td></td>
<td>student engagement</td>
<td>9</td>
<td>“I think students are becoming more – maybe creative,” (Ryo, Post Interview, December 18, 2015)</td>
</tr>
<tr>
<td></td>
<td>access</td>
<td>2</td>
<td>“If students work here at school and all the data [is] in the school server, students cannot access from home” (Hitomi, Post Interview, December 24, 2015).</td>
</tr>
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Table 5-2. Categories and Codes for Level 2.

<table>
<thead>
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<th>Category</th>
<th>Code</th>
<th>Mentions count</th>
<th>Exemplar Quotes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tech (Google Drive focused reactions)</td>
<td>collaboration</td>
<td>13</td>
<td>“That it is a Cloud-based system for people to work together on various things…” (Chris, Post Interview, December 18, 2015).&lt;br&gt;“It’s like a computer which we can carry everywhere, all over the world…” (Hitomi, Post Interview, December 24, 2015).&lt;br&gt;“After the class, I can log in anytime I want to…” (Mayu, Post Interview, December 22, 2015).</td>
</tr>
<tr>
<td>more</td>
<td></td>
<td>7</td>
<td>“I think I need practice in… a situation [where] I need to use Google Drive more and more” (Miaka, Post Interview, December 22, 2015).</td>
</tr>
<tr>
<td>forms</td>
<td></td>
<td>4</td>
<td>“One thing is very useful, I feel, is a questionnaire…” (Keisuke, Post Interview, December 18, 2015).</td>
</tr>
<tr>
<td>tool</td>
<td></td>
<td>3</td>
<td>“I don’t know what is Google Drive, but there are many useful tools on the Internet and many people can access to that Drive…” (Mayu, Post Interview, December 22, 2015).</td>
</tr>
<tr>
<td>useful</td>
<td></td>
<td>3</td>
<td>“It’s very useful.” (Keisuke, Post Interview, December 18, 2015).</td>
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<tr>
<td>learning</td>
<td></td>
<td>1</td>
<td>“I am [learning] how to use Google drive, only [as] a user but not as a teacher yet,” (Hitomi, Pre Interview, October 8, 2015).</td>
</tr>
<tr>
<td>Class (GI focused learning)</td>
<td>pictures</td>
<td>2</td>
<td>“How to get the legal pictures is one thing.” (Chris, Post Interview, December 18, 2015).</td>
</tr>
<tr>
<td></td>
<td>presentation</td>
<td>1</td>
<td>“Working on their presentation, so that helped me a lot, too” (Hitomi, Post Interview, December 24, 2015).</td>
</tr>
<tr>
<td></td>
<td>research</td>
<td>1</td>
<td>“In the most important one is about how to research because the students are researching…” (Hitomi, Post Interview, December 24, 2015).</td>
</tr>
<tr>
<td>Category (focused on the amount of technology available to support the program)</td>
<td>Code</td>
<td>Mentions count</td>
<td>Exemplar Quotes</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Available Tech</td>
<td>devices</td>
<td>5</td>
<td>“Maybe we should have more PCs and more access point to the Internet around the school…” (Ryo, Post Interview, December 18, 2015).</td>
</tr>
<tr>
<td>Wi-Fi</td>
<td>3</td>
<td>“If they pay for those facilities (devices and Wi-Fi), if they do that, more teachers will start using these ICT systems” (Miaka, Post Interview, December 22, 2015.)</td>
<td></td>
</tr>
<tr>
<td>Administration (focused on perceived support by the administration at the school and Board of Education level)</td>
<td>admin</td>
<td>12</td>
<td>“In the beginning there may be some kind of resistance [to] using [the] cloud, but now they’re now feeling much more comfortable about the use of [the] cloud” (Ryo, Post Interview, December 18, 2015).</td>
</tr>
<tr>
<td>danger</td>
<td>2</td>
<td>“Do you remember that? No computer in teachers’ rooms connected to the Internet because it's dangerous. The best way was to just, you know, plug out.” (Hitomi, Post Interview, December 24, 2015).</td>
<td></td>
</tr>
<tr>
<td>Curricular (focused on the belief that the direction the class took due to PD supported and was supported by the curriculum)</td>
<td>aligned</td>
<td>18</td>
<td>“They (the students) need to know how to work with people, how to cooperate with people. I think this is a very good beginning for students.” (Hitomi, Post Interview, December 24, 2015).</td>
</tr>
</tbody>
</table>
Table 5-4. Categories and Codes for Level 4.

<table>
<thead>
<tr>
<th>Category</th>
<th>Code</th>
<th>Mentions count</th>
<th>Exemplar Quotes</th>
</tr>
</thead>
<tbody>
<tr>
<td>GI Class (use of new PD knowledge in the GI classes)</td>
<td>projects</td>
<td>8</td>
<td>“We are going to use there and students are going to make another poster this year.” (Hitomi, Post Interview, December 24, 2015).</td>
</tr>
<tr>
<td></td>
<td>time</td>
<td>4</td>
<td>“Actually I didn’t have time. A little bit I could correct, but I couldn’t check for their English” (Keisuke, Post Interview, December 18, 2015).</td>
</tr>
<tr>
<td></td>
<td>others</td>
<td>4</td>
<td>“I think some of them will, yes” (Chris, Post Interview, December 18, 2015).</td>
</tr>
<tr>
<td>Other Classes (use of new PD knowledge in other classes)</td>
<td>science</td>
<td>6</td>
<td>&quot;Yeah, Science English, we’re using [it].” (Keisuke, Post Interview, December 18, 2015).</td>
</tr>
<tr>
<td></td>
<td>others</td>
<td>5</td>
<td>“More and more teachers will be involved” (Ryo, Post Interview, December 18, 2015).</td>
</tr>
<tr>
<td></td>
<td>lab</td>
<td>4</td>
<td>“I myself would like to have our students use Google Drive in—especially in laboratory activity.” (Miaka, Pre Interview, October 7, 2015).</td>
</tr>
<tr>
<td></td>
<td>solo</td>
<td>3</td>
<td>&quot;If we used the cloud or Google Drive… I think we can share their writing, too.” (Hitomi, Pre Interview, October 8, 2015.)</td>
</tr>
<tr>
<td>Otherwise (use of new PD knowledge in the regular life)</td>
<td>useful</td>
<td>1</td>
<td>“It means that I can access any time, from anywhere, so it is very useful” (Hitomi, Post Interview, December 24, 2015).</td>
</tr>
<tr>
<td>Category</td>
<td>Code</td>
<td>Mentions count</td>
<td>Exemplar Quotes</td>
</tr>
<tr>
<td>--------------------</td>
<td>------</td>
<td>----------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Teacher perception</td>
<td>access</td>
<td>3</td>
<td>&quot;Many of our high school students have rich parents, so they can use [the] Internet at home.&quot; (Mayu, Post Interview, December 22, 2015).</td>
</tr>
<tr>
<td>cooperation</td>
<td></td>
<td>2</td>
<td>&quot;The students will learn how to work together with people...&quot; (Hitomi, Post Interview, December 24, 2015).</td>
</tr>
<tr>
<td>quality</td>
<td></td>
<td>1</td>
<td>&quot;I think the quality of presentation or at the poster is very high, so I’m really surprised to see it.&quot; (Mayu, Post Interview, December 22, 2015).</td>
</tr>
</tbody>
</table>
CHAPTER 6
DISCUSSION AND IMPLICATIONS

There is nothing more exciting than having a life devoted to fundamental knowledge and to contributing to advance the borders of knowledge.

—Fabiola Gianotti

*Cern physicist Fabiola Gianotti on hunting for the ‘God particle’*, *Financial Times*, 2013

This final chapter of the study is organized into several main parts. First, I will review how results of this study relate to existing literature. Next I will discuss the limitations of this study and how culture impacted this study. Finally, I will discuss the implications for my work and future research.

**Summary of the Study**

This study’s impetus was a need for my school to have an effective PD delivered to the English teachers who taught there. Google Drive was the technology solution that had been agreed on for use at the school. As the Google Certified teacher, as well as because it was part of my job description to provide training for the English Department at my school, I was asked to design a PD class for the English teachers. I began by designing a PD experience for the teachers in the GI class by using a framework I developed that included research on adult learners, typical PD in Japan, teacher barriers, instructional design, typical PD for Japanese teachers, educational technology PD, as well as Desimone’s (2011) five core features of effective PD and Guskey’s (2000, 2002) five levels of PD evaluation. My interest was in designing a positive PD experience that would allow the teachers to successfully use the technology in the GI class and feel positive about using the technology in the future.

Overall the results of the study show that the PD experience had a positive impact on the participants’ professional growth and on the design and implementation of
the GI course. Participants developed positive beliefs and attitudes about technology and benefited from the support, collaboration, and teamwork that helped scaffold them through the PD experience. The GI course itself was transformed over the course of the PD experience as well, not only because of the technology, but also because of the addition of the lesson study planning meetings. Despite these encouraging results, the PD experience was not without challenges. In particular, issues related to time, administrative support, participant fears vs. confidence, and participant concerns about the digital divide surfaced as major overall factors that would limit the success of the study.

Results Compared with the Literature

I learned much during the course of this study. The PD experience overall had an impact on the participants; their involvement in the class, the structure of the class, and their planning methods all changed over the course of the study. The PD had a positive effect on the participants’ professional growth. I learned that if the participants could be given the time to have a planning meeting every week they would become much more actively involved in the class and would support each other more in class. I saw their belief in the use of technology change over the course of the 12 weeks. I also discovered that time is one of the most important factors and obstacles in the integration of technology for this particular group of professionals.

The results from my study are related to the existing literature in several ways. The three connections that deeply resonated with me as important in my position as someone responsible for technology integration, and also charged with providing effective PD experiences on a regular basis, are discussed below.
PD Experiences Can Result in Professional Growth for Participants, Which Can Transform Teaching and Learning Practices

Overall, the themes show that the participants did have a change in attitude and acceptance in their use of the technology over the course of the 12 weeks. They commented frequently on how convenient and useful it was to employ and collaborate with. They started to use the technology in their GI class sections and planned for its use in class during our lesson study planning meetings. However, they wanted much more training and collaborative work in the future, especially in other G Suite tools such as the Admin console.

Birman et al., (2000) discuss how extended duration of PD will result in a high quality substance. By extending the PD throughout the 12 weeks, the participants were able to work together and reinforce their learning over a longer period of time. The PD was content focused on the GI course specifically, which is important for teacher development, and they were able to collaborate and develop the course successfully. The PD experience involved a lot of active learning, which is known to successfully help with teacher knowledge and skills, and it did change the participants’ classroom practice (Birman et al., 2000).

The participants did sense some change in attitude and acceptance from the administration in their use of the technology in class. The awareness of support from the administration is important to inspire teachers to implement practices learned in PD; hopefully this may translate into a change in their own professional growth (Desimone et al., 2006). They wished that they could be supported more by the school with more devices and access to Wi-Fi; this is something that must be addressed if they will be
able to successfully adapt to this new technology in their other classes which are held in different locations than GI.

They used Drive in the GI classes, and they had the opportunity to observe other teachers using the technology in class and to talk with them about it later in planning meetings. Having the chance to observe other teachers is important for teacher growth (Putnam & Borko, 2000). By being able to observe the other teachers, as well as myself, they were able to think about and act on their own use of Drive Apps in their section of the class. It provided the scaffolding they needed to be successful in their professional growth (Duffy & Cunningham, 1996; Desimone et al., 2006).

Ryo and Chris both seemed to be more at ease with the use of technology in the GI class and with the topics in the PD sessions. This was most likely because, as Desimone et al., (2006) discuss, they had previous experiences in using the technology. In reviewing a summation of interview responses and my observations in class, I realized that even more so than with Ryo, there was definitely a different experience between Chris and the other learners. This was possibly because of the cultural differences between himself as a Canadian and the rest of the Japanese participants. However it was also possible that it was due to his long term exposure to using technology in schools. The way adult learners perceive events, learn, and process experiences directly relates to their background, including cultural and technological experience factors (Cranton, 1994; Cross, 1981; Knowles et al., 1998; Mezirow, 1991).

However, the way adult learners learn also includes demographic factors (Cranton, 1994; Knowles et al., 1998; Mezirow, 1991). Mayu and Chris were the only participants in the study in their 20s, and both had a distinctly different experiences.
Chris was positive even from the beginning. Mayu, who was fearful at the beginning of cloud use, when asked at the end was still doubtful she would continue to use technology in classes in the future. It has been shown in other studies that Japanese teachers can have high levels of anxiety when using certain technologies in their classes (Sakai, 2008; Ono & Ishihara, 2012). Possibly it can be inferred that the cultural and technological experience differences affected them more than the simple demographic of their age.

To show true growth, however, there must be an exhibited change in student learning. The final level of the G5L is Student Learning Outcomes (Guskey, 2000, 2002). The goal of any PD, in the end, is to show a change in student achievement, as that is the goal of education. Guskey (2000, 2002) states that this can be assessed in a variety of ways. Since I did not study the students directly, and I am also not permitted to share their grades, the ways in which I could show the impact on the students was by showing examples of student work (portfolios), interviews with the participants who were the teachers of the students, and by commenting on student participation in the class (Guskey, 2000, 2002). I did observe the students during all of the open classes. The open classes were set up as prescribed by Lewis et al. (2006), to make it easy to observe student engagement, and the students all seemed to be engaged.

As for examples of student work and participation, as was stated within the results, all but 2 of the 123 groups finished their posters for the poster session, and all but 2 of 32 presentations were completed with all of the content that was assigned for them to have in their project. So there was a great degree of student participation.
Appendix I shows two examples of their work, a poster from one group, and several slides from another group.

Because we could not officially survey students on whether or not they had access to computers and the internet at home, teachers had to make assumptions on student access. When teachers have students who do not have access at home, they are less likely to incorporate technology into their lessons, so some of the participants’ anxiety could have come simply from not knowing for sure if students could use Google Drive at home (Knezek & Christensen, 2002). In the future we must find a way to deal with this issue if teachers are going to continue to be successful in integrating technologies into their classrooms.

**PD Experiences are Most Successful When Collaboration and Reflection are Embedded**

All of the participants were present in each of the Drive Apps sessions, which was required to be a part of the study. They were also present for most of the lesson study planning meetings. They planned together and played an active role in the process, which Knowles et al. (1998) have shown to be important for adult learners, and which contributed to the success of their learning. They all considered it to be a training, class, or PD, which, in Japan, is something that teachers feel they are expected to participate in (Lamie, 1998). By having the time to explore the experience together, they could observe, collaborate, and learn with each other, which most likely contributed to some of their feelings of success, as well as the feeling that they contributed to their students’ development (Lewis & Tsuchida, 1998; Takahashi, 2000; Kato, 2013). All of this collaboration helped them overcome isolation as well, which often occurs in Japanese schools, and helped them to share their own knowledge of practice with the
other teachers (Kuno, 2014). Together they formed a collaborative group, which is something that forms during lesson study and can lead to improvement in instruction (Lewis et al., 2006).

The post interviews, while designed as part of the study, also served as a reflection time for the participants. They reflected about the course of the semester as well as planned for the next class during the final planning meeting of the lesson study cycle. As discussed by Marzano (2003), reflections are useful for teachers to assess their own learning after an activity, and most of the participants reflected that, while they did learn, they wanted more training on Drive, on the different Drive Apps, and how to use them in class. Knezek and Christensen (2002) explained how this kind of meaningful exposure is useful to help teachers overcome their fears when it comes to technology use. In reviewing the participants’ comments in interviews, and in watching them within the open classes, it appeared that their initial anxiety had mostly been overcome with the exposure to the technology over the course of the 12 weeks, and they were confident about learning more in the future.

In the final meeting of the semester they decided to continue the lesson study cycle/weekly planning meetings for the rest of the year. At the end of the year they held a final meeting. At the final meeting, as is appropriate for lesson studies, they went over the entire year, charting what went well and what did not go well, and made plans for the following year (Lewis, 2002; Lieberman, 2009). This process affected the overall curriculum and design of the GI class, which were the main goals of lesson study (Kuno, 2014; Lewis et al., 2006).
Time is a Common Challenge During PD Experiences

Time was a limitation noted by all the participants. As discussed by Collinson and Ono (2001), teachers have a variety of roles other than teaching at the school, and the participants were no exception. Chris, as mentioned in Chapter 5, indicated that he felt other teachers weren’t very involved in the PD experience in terms of using the tech or in participating in checking student work outside the classroom. It is true that when I reviewed the logs, most of them were not logging in outside classroom time. Chris also felt that since they did not ask many questions in the sessions they may not have understood some of the concepts.

I myself wondered about the lack of questions in the instruction part of our sessions. However, my impression was they were often just waiting for the lecture or demo time to end so we could get to the active parts of the sessions where they could “get work done.” I did get questions from the teachers during the active parts of the session, but then they were actually working on something tangible for class, so that was productive time.

Most of the major problems or issues within the study that I and the participants in the GI course recognized all seemed to stem from a lack of time or a perceived lack of time. Both Ryo and Miaka were in charge of different large programs, Keisuke was a homeroom teacher, Mayu was part of the curriculum section, and Hitomi was part of the school counseling and career guidance section. Chris ran an after-school club twice a week, but other than that he had no responsibilities other than his classes. This may have contributed to the fact that he seldom mentioned his own issues with time as much as he mentioned others having problems.
One of the biggest impacts to the GI class in terms of time came from simply designing the lesson study cycle around weekly planning meetings. Lesson study has had a vital role in Japanese education over time, but it is predominantly used in elementary schools (Kuno, 2014; Saito & Sato, 2012). By having that weekly planning time, the participants were able to plan in a way that they had not done before. Hitomi said once in the planning meetings that it was easier to explain the details of each lesson to everyone when she only had to do it one time. In previous years she had to make most of the class curriculum decisions herself, but with the planning meetings all of the teachers could be involved in those decisions. She felt it was much easier to coordinate other activities that occurred within the class as well, such as international exchanges and preparations for the class trip. As described by Lewis et al. (2006), the proper lesson study format meant that at the end of the semester the participants planned out what they wanted to do in the third semester. By collaborating together, they could freely share ideas with each other, which was important to teachers who were usually isolated without such meetings (Kuno, 2014). Also, because the meeting was something that was part of the class design, was in a designated spot in the weekly schedule where everyone could attend, and was planned well in advance, it wasn’t something that impacted their time in the way a spontaneous meeting or a meeting after school would impact them.

Limitations

There are many limitations in this study. To begin with, as Rogers (2003) explains, any research on diffusion of innovation can be subject to a pro-innovation bias. To overcome this and limit the bias, data were collected both before and after the innovation process, as the implementation phase of G Suite was happening.
My own researcher bias has to be acknowledged. I was directly involved in the decision to use Google Drive at school, and I was instrumental in developing and presenting the PD on G Suite. Of course, I wanted to see the teachers succeed in using G Suite Apps and I wanted them to think it was a great system to use. I wanted to see them learn to use it in their other classes as well. In order to overcome this bias, I used my reflection logs from our meetings as well as frequent member checking, where I asked my participants again if I had interpreted what they said correctly. I reviewed my analysis as well as my notes often, and compared my logs with the interview data and the data from the observations.

The study was of course limited by the small number of participants; only 6 of the 8 teachers in this class participated. The study was also limited in that it was only done for the English Department, only English teachers from the Gl class participated, and only teachers from my school participated.

**Culture**

Something that must be discussed in this paper is culture. As Creswell (2013) explains, culture has no distinct shape or form and isn’t something you just find, but something that can be attributed to a group when you are looking for patterns in society. Culture was a huge theme in this study, including the fact that I was from the United States and my participants were from Japan and Canada. In addition, there was the issue of how culture influences thoughts on technology use in life and in education, and how women and men interact differently with technology. Then there was the comparison between the culture of the English Department when compared with the other teachers at the school, to the overall culture of the school itself, and more.
All these cultural factors then interacted in different ways with the PD experience. The participants reacted differently to me than they would have to a Japanese teacher. Five of the six participants were non-native speakers of English, and thus their risk-aversion was lessened, possibly due to speaking in a different language (Keysar et al., 2012). The five Japanese participants hadn’t used much if any computer technology during their own school experiences as children, while the Canadian participant had used technology daily in his student career and was much more comfortable in its use.

I don’t consider culture to be a limiting factor in this study, but I do consider it to be an important factor to acknowledge. There were so many different layers of culture at play here, and they were all entwined in the study. Therefore, the results of this study were heavily influenced by all these different cultural interactions.

One result of the study was, of course, a change in the technology culture of the school itself. Since this study, Google Drive and other G Suite apps are being used more and more. Some of this stems from the study, as Hitomi and Keisuke continue to inform other teachers on their grade level teams, Hitomi continues to lead the GI class which still uses Drive Apps, and Ryo and Miaka lead different trainings for as well as meetings with Google Drive. But, even beyond the members of the study, as more and more teachers use it and experience its functionality, use spreads farther and farther.

All of the students at the school have now used computers and devices in a subject (English) that, in Japan, does not usually involve computer use. So they are seeing that technology is important in a variety of subjects. They also had much more exposure and practice in using technology, which is important to their life in the future.
Thus, school culture, teacher culture, and student culture have all been affected. The ripples of cultural change continue to move outward.

**Impact on My Practice**

**Continuing the Lesson Study and the Next School Year**

Clearly in order to support these teachers, there needed to be more training. They learned in this first cycle, but the lesson study must continue to support them throughout the rest of the year. If they could continue to meet weekly to plan together, while also having occasional Drive skills-based classes together so that they could continue to learn together, they would probably continue to be positive about learning and would want to continue to integrate technology into their classes.

Since 4 of the 6 participants were still hesitant or unconfident about their ability to use Google Drive, I felt that the lesson study needed to be continued. I continued to work with the group and started another cycle of study with them in the next and final semester of the year. When surveyed in the Pre Interview, all the participants felt the use of Drive and the PD were aligned with the SGH program before we began. In our planning meeting at the end of the year as we discussed our goals for the new year, all agreed that Google Drive should be used again in the next year.

The new school year that began in April however, would bring change. The two other GI teachers who did not participate in my study, but who were involved in our classes and in the GI course and planning, were transferred to other schools. One of the participants left the school to pursue a graduate degree. Two participants were assigned to other classes for the new school year and left the GI course. The other participants and I continued to teach the GI class at the start of the new school year in April, however, one then left in August to be replaced by a new staff member. In
Japanese schools, this kind of transition and change is typical, and I was grateful that there were still four of my participants still involved at school somehow, even if only two now remained in the GI course with me.

The fact that the 3 of us are still teaching the same class, and that 5 of us are still at the school, has been beneficial to the school as a whole. One participant has taught two other Google Drive sessions at school, one with my assistance and one without. One participant has a leadership position at school and advocates use of Google Drive to the other Academic Lab teachers. Two participants are now homeroom teachers and help the other teachers in their section to use Google Drive with their classes.

One of the greatest impacts is simply in providing the students with experience. In the year we launched Google Drive at the school and I conducted my study, we had to teach both first and second year students how to use it. However, the second year, all of the new second year students had learned with us in GI class the previous year. When they began their Academic Lab classes that second year, we had far fewer complaints and issues with the use of the technology from the teachers of the Academic Lab classes. They did not have to teach Google Drive use; the students already had a year of experience.

**Developing a Method to Keep Knowledge at the School**

I continued to follow my teachers and supported their use of Drive in GI as well as in their other classes. I want to design more courses in Drive tools for them, but I want them, like one participant started to do, to develop their own methods of teaching others about Drive. This kind of core group, since they will continue to use Drive with all the students each year, whether they are teaching GI or not, may form the basis of a
larger group, a Professional Learning Community (PLC), that can support Drive use at school.

A PLC is defined as a group that supports teachers’ learning and then continuously learns together in order to enhance student outcomes. Teachers come together in their planning or other designated meeting time and share best practices and ideas for use of, in our case G Suite Apps, in their classes. They also share problems and support each other with use issues. The idea is that learning is continuous, and that being a member of the group is a key aspect of the teacher’s professional practice (Mundry & Stiles, 2009). In order to develop what Mundry and Stiles (2009) referred to as “human capital,” it is necessary to invest in humans rather than in objects and machinery to develop their skills and knowledge base. MEXT guides the curriculum at school, but they only advise that PD be implemented, so the final design for PD depends on the school. Therefore, the school has the freedom to further develop a program such as a PLC (Collinson & Ono, 2001; MEXT, 2008; Akita & Sakamoto, 2014).

**Finding a Way to Deal with Time**

Time was a challenge in this study. Whether it was finding a meeting day and time where I could coordinate a training session, or trying to coordinate on a day when the principal was on campus, or hearing from the participants that they just didn’t have time to look at students’ files outside of class, time played a key role in limiting actions and events in this study. The issue of time is a challenge that I will explore in future work. Teachers have, on average, only 15 classes a week to teach, with the rest being dedicated to other work and planning. With the students having a total of 35 class times a week, and teachers sponsor bowls for teaching less than half of that, I would like to
shadow a few teachers to learn where exactly they are using their time. Many teachers arrive at school at 7am and stay at least 12 hours a day, but they still always feel busy. I believe one of the reasons why they feel they don’t have time for technology use may come from the lack of experience and understanding in using it. I want to find out if, once they have more practice using technology, they will start to use it more, because it will take them less time to access and use it. However, there could be many other issues at play and I would like to investigate this issue further to help them be more successful.

**Achieving Administrative Interaction**

Some participants, even though they wanted to feel more supported by the administration, worried about the administrators themselves visiting, but I would like to find out if having a more visible presence would make a difference in their use, belief, and confidence. The G5L research itself suggests that it would make a difference, and that was my understanding and statement going in to evaluating Level 3 (Guskey, 2000, 2002). I would like to work more with the administration and get more interaction from them in the future.

If we were to start a PLC at the school, this might be a way for the administration to provide support. For a PLC to work effectively, time must be given or allotted to faculty members to provide them the opportunity to meet and to collaborate (Hord, 2009). The goal of the community is to support a group of teachers to become more effective. Along those lines, the principal or administrator must buy into the idea and support the community and its processes. Some research suggests that the having the principal or vice principal become a member of the community would be beneficial. However, this idea could lead to further research (Hord, 2009). It is true that principals
benefit from PD on technology as well, not only so that they can learn about it and its importance, but also to understand how it is being used in the classrooms at their school (Mcleod & Richardson, 2011). Teachers must be allowed to make critical, key decisions that will affect school policy. By allowing for these varying issues, administrators give power to the community and enhance their productiveness and efficiency (Kruse, Louis, & Byrk, 1995). Without the support of the administration, however, the community will not be able to exist within the school. Even if the teachers try to work outside of school, the community may not last or be effective (Becker & Riel, 2000). Thus, administration is a critical part and I feel it is important to obtain much more involvement from them in the future.

**Implications for My Context**

This study was completed with participants only from the English department at the Japanese high school where I worked. The English department is often held to a different standard from the rest of the school and they are made to do things differently. For example, the English department is a critical part of both the Super Global and Super Science High School programs because MEXT includes communication in the plan for both. However, other departments, such as Language Arts (Japanese) and the Social Studies, as well as the electives, are an integral part of student education, and they are often left out or not included in various initiatives and ideas at the school. These teachers would benefit from using G Suite in their classes as well as from a PD experience in learning about technology integration in their classes. I would like to develop different programs so they could be included in G Suite PD at the school.

I also would like to develop a program specifically for the Science and Math departments. They heavily rely on Microsoft Excel and PowerPoint in their classes.
They would probably benefit from a PD experience tailored to Google Slides and Sheets, as well as training in iPad use as the 45 iPads are actually designated to the SSH program, even though the SGH program tends to utilize them more. I would like to develop a PD series for them based on what I have learned from this study.

Since this study, several teachers in other departments have approached me to ask questions about G Suite and about classroom use. Ryo has led more classes, and Miaka supports the Academic Lab teachers in their use of Google Drive in classes. Our use of G Suite has been included in the yearly SGH and SSH reports, and classes where students are using Drive and Chromebooks in the classroom are often the classes the administration takes school visitors on tours to see. Use is slowly spreading throughout the school.

**Recommendations: Change is an Issue**

Teacher turnover is a real issue in Japan. Every March staff are surprised when teachers who are key players are rotated to other schools for one reason or another by the BOE. Teachers who have seniority often have some say in their move, but even they are susceptible. With large programs such as the SGH and SSH programs, sometimes a key organizer is moved and the job is then placed on someone else’s workload. As a result, they are shifted from their key position in some other area of the school.

With this constant dynamic of change, training only one group of teachers is futile. As I mentioned, in this study I lost two of my participants as well as two other teachers from the GI class when they left the school. While I was excited for them in their new opportunity, and their Google Drive skills may be transferrable to their new job, my goal is to keep technology integration happening. If I had only taught those four,
the knowledge would have left the school. Something like a PLC must be developed if
the knowledge is to remain at the school long term.

My PD experience was the beginning for this process. By having PD at the
school, the teachers were taught the necessary skills that they need for G Suite and
other technology use at the school. After the teachers have the PD, though, there needs
to be a system in place for them to continually feel supported. There must be a place
where they can share ideas for practice and ask questions of other users when they run
into problems. This is where the PLC comes in. All interested teachers could join PLC
meetings which could be held during and/or after school. At these meetings they could
support each other and teach each other. The PD provides the basic lessons on use,
the PLC provides the support system that is needed at the school to maintain that use
after the PD sessions are over. My PD experience in this study created a support
system for the GI teachers that were involved in this specific lesson study process, in
this specific course. But a PLC would have members from all departments, from many
different courses, from many different subjects. It would be much bigger than one
lesson study for one small group of teachers.

As new teachers come into the school, they can come to meetings of the PLC
and learn from the teachers who were there before. As the teachers in the PLC instruct
the new members, they in turn will become more confident in their own skills as they
transfer their knowledge. Then, even if they are moved from the school the following
year, they will have left their knowledge behind with the new teachers.

Of course, there have to be key players. There will always be designated
administrators of the G Suite system, but there needs to be a large membership of
those who are interested. If those key members can train the new teachers and recruit new key members every year, then the knowledge can remain at the school, even after many teachers move to other schools.

**Implications for Broader Context**

I am beginning to develop a series of PD to be delivered to other English teachers in the area as well. It will have to be designed differently from this study because I will be unable to meet weekly with the teachers involved. However, I want to design this new research using specific points I learned from this study. I would like to also develop it so that it could be delivered asynchronously to different schools at different times in the future. I am working on a project to produce some YouTube videos with other teachers in the area.

Other schools in Japan can benefit from this study. I plan on presenting the results of my research at different conferences here in Japan and I hope that the results can be used to help others develop effective PD programs at their schools.

Technology integration happens slowly in the 1-12 public education sector. However, in order to benefit both the students and the teachers as well, we must continue to integrate technology in the classroom. I hope I can impact more classrooms through teacher PD in the future.
APPENDIX A
IRB CONSENT STATEMENT AND RECORD

INFORMED CONSENT FORMS FOR TEACHERS

College of Education
School of Teaching and Learning
University of Florida
2403 Norman Hall
Gainesville, FL 32611

Informed Consent for Teachers

Protocol Title: Evaluating professional development on educational technology integration for Japanese teachers of English.

Please read this consent document carefully before you decide to participate in this study.

Purpose of the research study:
The purpose of this study is to develop a successful professional development program on Google Drive for our school and then to evaluate its effectiveness. The goal is to help our staff use the apps within our Google Apps for Education account in their classes.

What will you be asked to do in the study:
You will be asked to participate in a 12 week lesson study cycle. I will attend all of the weekly meetings of the lesson study to observe the planning that goes on to integrate Google Drive into classes. During weeks 2 through 6 I will teach five classes covering the different apps within Google Apps for Education. During weeks 1 and 11 I will interview you for 15 minutes and ask you several questions about your participation in this study, your feelings on using Google Drive Apps, and your feelings on using Google Drive in the Global Interaction (GI) class at our school. These interviews will be recorded. The recordings will be transcribed onto a document within a week after each interview, and then the recordings will be deleted. Therefore, all of the recordings will be completely deleted by the end of the study and my return to the U.S. None of the transcriptions will contain your name, they will only have pseudonyms. Finally, in week 10 I will observe you in your GI class period, using Google Drive with your students.

Time required:
There will be twelve weekly planning meetings during the second semester. These meetings will take place during the school day in the class period when we are all free to work together. There will be five classes that will take place in the computer lab, also during planning time, once a week for 50 minutes, for five consecutive weeks. In addition, you will be interviewed 2 times over the course of the 12 weeks, for 15 minutes each time.

Reviewed by
University of Florida
Institutional Review Board 02
Protocol # 2015-U-1019
Reviewed on: 09/22/2015

Revised January 2015
Risks and benefits:
There are no psychological, social or financial risks for participating in this study. The results from this study can be used to inform the design of future professional development courses on educational technology/ICT for other teachers in this and in other schools.

Compensation:
There will be no compensation for the teachers who are part of this study.

Confidentiality:
Your identity will be kept confidential and your real name will not be used in any report, only pseudonyms will be used. All recordings of your interviews will be deleted after they are transcribed, therefore all of the recordings will be completely deleted by the end of the study and before my return to the U.S. The transcriptions will only use pseudonyms to identify different participants.

Voluntary participation:
Your participation in this study is completely voluntary. There is no penalty for not participating.

Right to withdraw from the study:
You have the right to withdraw from the study at any time without consequence.

Whom to contact if you have questions about the study:
Dr. Kara Dawson, Associate Professor, School of Teaching and Learning, University of Florida.

Erin Noxon, Assistant English Teacher.

Whom to contact about your rights as a research participant in the study:

Agreement:
I have read the procedure described above, I voluntarily agree to participate in the procedure and I have received a copy of this description.

Participant: ___________________________ Date: ___________________________
## APPENDIX B
### REFLECTION LOGS TEMPLATE

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<th>Date / Time:</th>
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<th>Reason/Type of Meeting:</th>
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<td>Participant</td>
<td>Observations or Quotes</td>
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<tr>
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<tr>
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</table>
APPENDIX C
INITIAL (PRE) INTERVIEW QUESTIONS

Thank you for agreeing to participate in all of the Drive Apps sessions. The purpose of this interview is to help me understand your feelings on Drive, the idea of being in this PD experience, your experience and feelings on technology in the classroom, and help me gather general information on informing professional development classes here at our school in the future.

1. Currently, what are your feelings on Google Drive?
   a. What do you know about Drive?
   b. What do you think about using “the cloud” in the classroom?
   c. Do you feel that you have the technical skills required to use Google Drive in class?
   d. Do you feel that use of Google Drive in GI will be aligned with the goals of the SGH program?
   e. Do you feel that the administration supports us in using Google Drive and other technology in class?

2. a. Can you foresee any ways we will use Drive in our GI course or in your other classes this year?
   b. Do you feel that the other teachers want to use Google Drive in class?

3. What are your thoughts on being a part of this PD experience on the use of Google Drive?

4. Please tell me about your past experiences in using technology in any of your classes in the past.

5. Please tell me how you personally feel about the use of technology in the classroom.

6. a. Do you feel that when students are using technology in the classroom they are engaged in learning?
b. Do you think using technology like Google Drive in class will help improve student achievement and, if so, why?

7. a. Finally, what expectations do you have, if any, for this series of PD that focuses on our course using Google Drive?

b. Do you feel like this professional development will help you with your professional goals and, if so, what goals?
APPENDIX D
EXAMPLE OF INTERVIEW CODING DOC
APPENDIX E
FINAL (POST) INTERVIEW QUESTIONS

Thank you for participating in all of the Drive Apps sessions and for allowing me to observe your class. The purpose of this interview is to help me understand your feelings on the PD for the past weeks, your feelings on what worked and did not work in your learning the use of Drive in the classroom, and help me gather general information on informing professional development classes here at our school in the future.

1. Currently, what are your feelings on Google Drive?
   a. What do you know about Drive?
   b. What do you think about using “the cloud” in the classroom?
   c. Do you feel that you have the technical skills required to use Google Drive in class?
   d. Do you feel comfortable using Google Drive in class?
   e. Do you feel that use of Google Drive in GI will be aligned with the goals of the SGH program?
   f. Do you feel that the administration supports us in using Google Drive and other technology in class?
   g. Have you been using Google Drive for any uses outside of GI class?

2. a. In what ways do you think we will use Drive in our GI course or you will use Drive in your other classes this year?
   b. Do you feel that any of the other teachers will use Drive in their GI sections or in other classes?
   c. Do you feel that other teachers, in the English department and in other departments, support the use of Drive in class?

3. What are your thoughts on being a part of this PD experience on the use of Google Drive?

4. How do you feel that the school will support your use of Drive in classes?

5. a. In what way should I change the Drive Apps series in the future for other teachers at our school?
b. What should be included in the sessions that was missing?

6. a. Do you feel that when the GI students were using Drive in the classroom that they were engaged in learning?

b. Do you think this will help student achievement and, if so, why?

7. a. What did you think about the students’ use of Drive in class?

b. What seemed to be working and what was not working?

c. In what ways do you foresee students changing or engaging differently in class due to their use of Drive?

8. What information, if any, did you use to design and/or implement the lesson I observed?

9. Do you feel that this experience in our GI lesson cycle has had an effect on your teaching and, if so, how?

10. Is there anything else you feel we should do in the future to make the lesson go better or support you in integrating this technology in your classes?
### APPENDIX F

#### OBSERVATION FIELD NOTES FORMS

<table>
<thead>
<tr>
<th>Erin Noxon</th>
<th>Evaluating Effective Professional Development on Educational Technology Integration for Japanese Teachers of English</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Participant</strong></td>
<td><strong>Observation Date</strong>&lt;br&gt;<strong>Beginning Time:</strong>&lt;br&gt;<strong>Ending Time:</strong>&lt;br&gt;<strong>Evaluation Questions:</strong>&lt;br&gt;In what ways do the participants use Google Drive in their classrooms in their section of the GI course? (Level 4)&lt;br&gt;What kinds of projects have been completed by the students within Google Drive in the various classes? (Level 5)&lt;br&gt;<strong>Specific Look fors:</strong>&lt;br&gt;- use of Drive app in class  □ helps students with use  □ explains to students why they are using the Drive app for this assignment  □ helps students with a problem during use  □ evidence of student work on Drive Apps  □ other staff or administrative presence in/observing class&lt;br&gt;Mark one:&lt;br&gt;• seems comfortable  □ seems uncomfortable  □ asks for assistance from me  □ does not  □ asks for assistance from another teacher (who: )  □ does not&lt;br&gt;□ use of specific verbiage and words used in/taught on Drive apps (note examples below):&lt;br&gt;□ use of specific skills used in/taught on Drive apps (note examples below):</td>
</tr>
<tr>
<td>Specific Observations</td>
<td>Time</td>
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</table>
APPENDIX G
EXAMPLE OF CODING QUALITATIVE DATA WITH QDA MINER™

QDA Miner - Dissertation 1.0.qdp

CASES:
Keisuke I1
Keisuke I2
Chris I1
Chris I2
Mayu I1
Mayu I2
Ryo I1
Ryo I2
Hitomi I1
Hitomi I2
Maka I1
Maka I2
Reflection Log 1a - React...

VARIABLES
FILE Hitomi I2
DOCUMENT [DOCUMENT]

CODES
Level One
- reaction
- attitudes
Level Two
- belief
- knowledge
- support
Level Three
- G1
- Classes
- Otherwise
Level Four
Level Five

DOCUMENT:

Interviewer: Okay, currently, what are your feelings on Google Drive?
Hitomi: Q112 Google Drive? It is very useful and convenient both in classroom and outside classroom.

Interviewer: What do you know about Drive, as in if somebody asked you, "What is Google Drive" what would you say?
Hitomi: Q1a2 Okay. It's a kind of hard disk in the air, so there and which I don't have to carry all around and I don't have to worry about losing. Not like USB memory key. Also, on the hard disk which we can share with other people I want.

Interviewer: What do you think about using the cloud in the classroom?
Hitomi: The cloud?
Interviewer: Yeah. What are your thoughts.
Hitomi: Q1b2 Okay. First of all, I was so afraid because many people told me it's very dangerous. It is very unreliable because the student's information, like personal information, go out all over the world. Still, you explain to me and I am using the email. It means I am using the cloud so that now in cloud, it's much more like familiar to me. Also, for students in emailing and the Internet is very close. Much closer for students than to us I think using cloud is very useful for students and it's very convenient because they can share the work together.

Interviewer: Okay, do you feel that you have the technical skills required to use Google Drive in class? Do you have the skills that you need for using Google Drive in class?
APPENDIX H
EXAMPLE OF ARTIFACTS COLLECTED FROM ADMINISTRATION AND THE SCHOOL

(Working document with my notes in English on training given to Academic Lab teachers to support Drive integration.)
Example of a student poster created on Google Slides

**Do you know these rules & fines?**

!!![Subway Prohibitions]

- No smoking
- No eating and drinking
- Fine $1000
- No flammable goods
- Fine $5000
- No durians

**Littering prohibition of garbage!**

- Fine $1000 (80,000 yen)

**No chewing gum!**

- Fine $1000 (80,000 yen)

To be good in Singapore follow the rules!!
Example of a student presentation slide made with Slides.
LIST OF REFERENCES


BIOGRAPHICAL SKETCH

Erin Noxon is a Google Certified Innovator who enjoys her experience and time teaching and living in Japan. Originally from Florida in the USA, she started as an environmental scientist, became a life science teacher, then an EFL teacher, then an integrated science teacher, then a media specialist, then decided to combine all of that to teach CLIL science in Japan. She has had diverse experiences in integrating technology within all these different professions. Currently as a teacher, tech advisor, and international exchange coordinator, she uses technology in a variety of ways for the teachers and students she serves. Her research interests include Professional Learning Communities, blended learning, school-wide technology deployment at the K-12 level, and teacher professional development. She is always proud to say that she is a “triple Gator;” all three of her degrees were earned at the University of Florida.