Congregating in the Church of Google:
Why Teachers Are Integrating Google Apps into Their Classrooms to Promote Student Collaboration

By

John Vu

A research project submitted in conformity with the requirements for the Degree of Master of Teaching
Department of Curriculum, Teaching and Learning
Ontario Institute for Studies in Education at the University of Toronto

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Abstract

This qualitative research study investigates why teachers are integrating Google Apps (GAPS) into their classrooms to promote student collaboration. To do so, this study involves a review of the literature on this topic and semi-structured interviews with three teacher participants who have integrated GAPS into their classrooms to promote student collaboration. The findings of this study report that teachers are integrating GAPS into their classrooms for reasons related to its collaborative properties and what they allow students to do. The findings, however, also report that there are a number of potential obstacles that teachers can confront as they attempt to integrate GAPS into their classrooms. Nevertheless, the findings of this study present a compelling case for teachers to integrate GAPS into their classrooms to promote student collaboration.

Keywords: Teachers, Google Apps, Student Collaboration
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Chapter 1: Introduction

1.0 Research Context

According to scholars such as Schneckenberg (2014) and Shepard (2012), there is a disconnect between how students are using technology outside of school and how they are being educated in them. Students, as these scholars and others point out, use technology or, more specifically, cloud computing outside of school to collaborate with their peers (Chang & Gütl, 2010; Schneckenberg, 2014; Shepard, 2012). While the teacher-centered classroom practices in many schools are at odds with this, there is a trend towards their adoption of cloud computing as a means to promote student collaboration (Chang & Gütl, 2010; Denton, 2012; González-Martínez, Bote-Lorenzo, Gómez-Sánchez, & Cano-Parra, 2014; Siegle, 2010; Stevenson & Hedberg, 2011). One of the most popular cloud computing offerings that schools are adopting to promote student collaboration is Google Apps (GAPS) (Chang & Gütl, 2010; Denton, 2012; González-Martínez et al., 2015; Herrick, 2009; Meyer, 2010; Nevin, 2009; Siegle, 2010; Stevenson & Hedberg, 2011; Sultan, 2010). Yet if more schools are to adopt GAPS to promote student collaboration, more research must first be done on its ability to do so.

1.1 Research Problem

Although more schools are adopting GAPS to promote student collaboration, getting teachers to integrate the cloud computing offering into their classrooms remains a challenge (Denton, 2012). Yet research on such uses of cloud computing, as scholars suggest, can increase the chances of teachers doing so (Blue & Tirotta, 2011; Denton, 2012; Tan & Kim, 2011). Research such uses of cloud computing, however, is only developing (Alshuwaier, Alshwaier, & Areshey, 2012; Denton, 2012; Lim, Grönlund, &
Andersson, 2015; Stevenson & Hedberg, 2013). To González-Martínez et al. (2015), research on this subject is still immature as many of the contributions to it are introductory or shallow. Other scholars agree, stating: “apart from anecdotal evidences, information on the perceptions of stakeholders or the reasons behind adoption or non-adoptions of cloud computing in the educational environment is limited” (Lim et al., 2015, p. 92). This is particularly true in regards to related research on GAPS (Edwards & Baker, 2010; Stevenson & Hedberg, 2011). And this scarcity of research makes it ripe for further research (Edwards & Baker, 2010).

1.2 Purpose of the Study

The purpose of this study is to answer its research question of why teachers are integrating GAPS into their classrooms to promote student collaboration. This study, then, will look at both the benefits and drawbacks of this trend in education. And in doing so, this study seeks to encourage other teachers to integrate GAPS into their own classrooms to promote student collaboration. If successful, this study will help bridge the aforementioned gap between how students are using technology outside of schools and how they are being educated in most of them.

1.3 Research Questions

The research question of this study is “Why are teachers integrating GAPS into their classrooms to promote student collaboration?” The sub-questions of this study are: “What are the benefits of students collaborating through GAPS?” and “What are drawbacks of students collaborating through GAPS?”

1.4 Background of the Researcher
Being in education has enabled me to develop extensive experience in using GAPS for collaborative purposes, both as a student and as a teacher. As a student, I have used GAPS to write group papers and complete group projects. As a teacher, I have had my students do similar activities via GAPS, and made them use the cloud computing offering to collaborate on a number of others, including creating concept maps, doing debates, and making magazines. By producing and participating in these projects, I have gained significant insight on how GAPS can promote student collaboration. This insight includes knowledge on the benefits and drawbacks of students collaborating through GAPS.

1.5 Overview of Whole

There are five chapters in this study. In Chapter 1, I introduce this study’s research context, problem, and questions, in addition to its purpose and the experiences I have had collaborating through GAPS. In Chapter 2, I present a review of the literature related to why teachers are integrating GAPS into their classrooms to promote student collaboration. In Chapter 3, I detail my study’s methodology prior to producing its findings in Chapter 4. Finally, in Chapter 5, I delve into discussion of the findings and offer recommendations for future practice and research.
Chapter 2: Literature Review

2.0 Introduction to the Chapter

In this chapter, I review what the literature says about why teachers are integrating Google Apps (GAPS) into their classrooms to promote student collaboration. I begin by outlining scholars’ definitions of collaboration in the section called “Concept Mapping.” Within this section, I then present what scholars think cloud computing and its place in the classroom is. In the following section, “Pros and Cons,” I describe the benefits and drawbacks of collaborating through GAPS that scholars specify in their studies. The benefits are articulated in three subsections: “Google apps for collaboration,” “All together now,” and “Like clockwork.” Likewise, the drawbacks are broken down into three subsections: “‘You are not connected to the Internet,’” “Access required,” and “Question marks.”

2.1 Concept Mapping

2.1.1 Collaborate, collaborating, collaboration

What is collaboration? It is a question that has been asked and answered by many scholars, yet looking through the literature for a definition of collaboration is like peering into a kaleidoscope to find a colourful pattern—there is an astonishing array of them that can be made out (Salas, Salazar, Feitosa, & Kramer, 2014; Staples & Ornatowski, 1997). But if we rotate the tube, so to speak, we will see that collaboration is broadly defined as two or more individuals working together to achieve a common aim, goal, or purpose (Arvaja, Häkkinen, & Kankaanranta, 2008; Blecker & Liebhart, 2007; Boswell & Cannon, 2005; Goodyear, 2003; Hanson & Spross, 1996; Mattessich, Murray-Close, & Monsey, 2001; McInerney & Roberts, 2004; Salas et al., 2014; Vallance, 2010). While
such a definition of collaboration is wide in its scope, a narrow one can fail to reflect the forms in which it takes shape (Staples & Ornatowski, 1997). The form of collaboration that is often overlooked, and has the most bearing on this study, is sometimes described as electronic collaboration; that is, “collaboration among individuals engaged in a common task using electronic technologies” (Kock, Davidson, Ocker, & Walzawick, 2001, p. 1). An open definition of collaboration, then, will allow this study to shed light upon this and other types of it.

2.1.2 Working on clouds

As new technologies sprout up, they should, from a pedagogical viewpoint, nourish collaboration (Schneckenberg, 2014). A recent technology that has been blossoming in this regard is cloud computing. (Huang & Liu, 2013). Educators can use cloud computing to create learning environments that cultivate collaboration. Studies in the field demonstrate that many teachers are, in fact, harvesting the collaborative potential of cloud computing in their classrooms (Aaron & Roche, 2012; Blue & Tirotta, 2011; Chang & Gütl, 2009; Denton, 2012; Edwards & Baker, 2010; González-Martínez, Bote-Lorenzo, Gómez-Sánchez, & Cano-Parra, 2015; Herrick, 2009; Lim, Grönlund, & Andersson, 2015; Maresova & Kacetl, 2015; Nevin, 2009; Schneckenberg, 2014; Shepard, 2012; Spaeth & Black, 2012; Stein, Ware, Laboy, & Schaffer, 2013; Stevenson & Hedberg, 2013; Sultan, 2010; Tan & Kim, 2011; Thaiposri & Wannapiroon, 2015).

Yet, even with the evidence that “awareness of cloud computing is growing at an exponential rate” (Chang & Gütl, 2009, p. 1891), a lot of teachers are in the dark about what cloud computing is (Iqbal, Uppström, & Juell-Skielse, 2012).
The concept of cloud computing is one that is shrouded in an air of mystery. To some scholars, the “cloud” in cloud computing is a term that was conjured up to conceal its complexity (Bora & Ahmen, 2013). This complexity is reflected in the fact that “no common standard or definition for cloud computing seems to exist” (Sultan, 2010, p. 110). Although there are a number of possible definitions of cloud computing in the literature—Vaquero, Rodero-Merino, Caceres, & Lindner’s (2012) study uncovered 22—many agree that it “refers to the use of remote servers over the Internet to provide on-demand access to software applications, hardware platforms, and infrastructure as services for users” (Stein et al., 2013, p. 236). In other words, cloud computing spells “the transition from local computing offerings to external ones” (Hirsch & Ng, 2013, p. 718). These offerings can appear as standalone services or full application suites (Hirsch & Ng, 2013). It is the latter offerings that this study will take into consideration. And while there is a whole line up of application suites that can be of interest, the one that this study investigates is GAPS.

2.2 Pros and Cons

2.2.1 Google apps for collaboration

When it comes to cloud computing offerings that can enrich collaboration, GAPS is in a class of its own (Stevenson & Hedberg, 2011). GAPS’s standing in this regard can be attributed to its wealth of productivity tools, which, in its educational edition, include Gmail, Google Calendar, Google Classroom, Google Docs, Google Drive, Google Sheets, Google Sites, Google Slides, and Google Vaults. To a handful of scholars, these tools are inherently collaborative and can be used for such purposes (Aaron & Roche, 2012; Herrick, 2009; Kurelović et al., 2013). In practice, people are collaborating through
these tools and to the extent that GAPS has become the most widely employed cloud-based productively suite (Aaron & Roche, 2012). This is also the case in education as teachers are incorporating GAPS into their curriculums to support collaboration among students (Blue & Tirotta; Sultan, 2010). It is noted that student collaboration can profit from GAPS in a number of ways (Aaron & Roche, 2012).

2.2.2 All together now

Although GAPS holds various collaborative properties, there is one that makes it stand out in regards to enhancing student collaboration. What sets GAPS apart from others like it on the market is its ability to enable real-time collaboration (Edwards & Baker, 2010; Kittle & Hicks, 2010; Stevenson & Hedberg, 2011). That is, GAPS permits multiple users (up to 50) to edit the same document, spreadsheet, presentation, or drawing at the same time (Aaron & Roche, 2012; Edwards & Baker, 2010; Tan & Kim, 2011). To Stevenson and Hedberg (2011), this facilitation of real-time collaboration might establish GAPS “as a catalyst for the kinds of relationships informing Hedberg’s (2010) disruptive pedagogies” (p. 328). This means that the real-time collaboration made possible by GAPS can potentially remodel the traditional styles of teaching and learning. Such potential can be seen as students are collaborating on GAPS in real-time to construct a group paper (Stevenson and Hedberg, 2011). Through these instances of collaboration, students are building shared learning artifacts that they would not have been able to produce without GAPS (Kittle & Hicks, 2010; Schneckenberg, 2014). Based on these appraisals of GAPS’s capabilities, it is apparent that the technology can or is changing how students collaborate. Yet, GAPS, as advertised in the literature, can also diversify where students collaborate.
2.2.3 Like clockwork

As students are collaborating through GAPS, the world is their oyster. Seeing that all of its files are saved on servers and accessed via the Internet, GAPS allows students to collaborate from anywhere and at any time (Chang & Gütl, 2009; Herrick, 2009). Students in New Jersey, for instance, can collaborate with those all the way across the Atlantic in Paris (Siegle, 2010). With GAPS, geography is no longer a boundary (Herrick, 2009). Widening the realm wherein students can collaborate are mobile versions of GAPS, which can be used on devices such as smartphones and tablets (Herrick, 2009; Nevin, 2009; Railean, 2012; Sultan, 2010). Yet, whether it is a Mac or an iPhone that students decide to collaborate through, GAPS provides them with the same computing environment wherever they access it (Nevin, 2009). While GAPS empowers students to collaborate around the globe, some of its shortcomings orbit the issue of how this is possible.

2.2.4 You are not connected to the internet

As a cloud computing offering, many of GAPS’s imperfections concerning student collaboration are entangled in how it is accessed. To collaborate through GAPS, students need to be connected to the Internet; but as scholars point out, this can ensnare them in a web of problems (Aaron & Roche, 2012; Blue & Tirotta, 2011; Edwards & Baker, 2013; González-Martínez et al., 2015; Holschuh & Caverly, 2010; Lim et al., 2015; Mokhtar, Ali, Al-Sharafi, & Aborujilah, 2013; Sultan, 2010; Thomas, 2011; Weber, 2013). Those who are online, for instance, can experience latency, especially when they are collaborating in an educational context (Blue & Tirotta, 2011; González-Martínez et al., 2015). And intermittent access, as Blue & Tirotta (2011) observe, can
tailspin into lost data and productivity. While broadband networks like leased lines or optical fiber are expected then, they tend to be too expensive for schools to afford (González-Martínez et al., 2015; Lim et al., 2015; Weber, 2013). The possibility of students not being able to be online “anywhere, anytime” (González-Martínez et al., 2015, p. 135; Mokhtar et al., 2013, para. 9; Shepard, 2012, p. 127) is “the greatest drawback” (Holschuh & Caverly, 2010, p. 38) of collaborating through cloud computing offerings such as GAPS. Adding to this string of issues is the scarcity of computing devices in schools, which students need to access the Internet and GAPS (Donna & Miller, 2013). Yet in schools that do have computing devices, students often are not allowed or elect not to take them home, making collaborating through GAPS a sticky situation—they must be glued to the seats of their schools’ classrooms and libraries (Donna & Miller, 2013; Stein et al., 2013). And even if school free themselves from this web of problems with students accessing GAPS, they can get caught another involving its accessibility to them.

2.2.5 Access required

When it comes to how accessible GAPS is to students, studies hold opposing opinions (Blue & Tirotta, 2011; Donna & Miller, 2013; Edwards & Baker, 2010; Herrick, 2009; Kittle & Hicks, 2009; Nevin, 2009; Spaeth & Black, 2012; Sultan, 2012). On the one hand, a few studies note that students can find difficulty in figuring out how to use GAPS’ tool (Blue & Tirotta, 2013; Donna & Miller, 2013; Edwards & Baker, 2010). A study by Blue and Tirotta’s (2011), for example, expresses that it be can challenging for students to get used to collaborating through Google Docs. On the other hand, however, several studies speak of GAPS’ simplicity (Edwards & Baker, 2010; Herrick, 2009;
Nevin, 2009; Speath & Black; Sultan, 2010). Take, for instance, Edwards and Baker’s study (2010) wherein they write about how accessible and easy to use GAPS is to students. Or consider other studies, which label GAPS as an “out-of-the-box” (Sultan, 2012, p. 110) product that students can “simply begin typing” (Herrick, 2009, p. 60) to work with it. Additionally, these studies trumpet the ease with which students can collaborate through GAPS (Herrick, 2009; Kittle & Hicks, 2010; Speath & Black, 2012). Nevertheless, there are studies on either hand that highlight the demand for teachers to model how to do so (Blue & Tirotta, 2011; Donna & Miller, 2013; Stevenson & Hedberg, 2013, Tan, 2011). This demand for teachers to model how to use GAPS means that they themselves will have to develop a strong grasp of it, which can pose another accessibility problem.

As in the case of students, teachers will also have to learn how to use GAPS if it is to be employed in their classrooms for collaborative purposes. Yet, scholars point out that the prospect of learning how to use technology, and doing so with students, intimidates many teachers (Blue & Tirotta, 2011). Fortunately for these teachers, using GAPS does not ask them to have any special technical skills (Nevin, 2009; Spaeth & Black, 2012). Teachers, however, will also have to learn to integrate GAPS into their classrooms in a productive way, which presents them with a whole new set of pedagogical challenges (Mokhtar et al., 2013). As Shepard (2012) notes, teachers tend to apply technology to digitally replicate what they are already doing in their classes without it. And according to some scholars, these teachers must reform their traditional teaching methods (Chang & Gütl, 2010; Guan & Qian, 2013). That is, these teachers must work towards matching the characteristics of a specific technology and the
attributes of the tasks supported by it (Tan & Kim, 2011). Technology, as scholars mention, is a means to education, not an end (Shepard, 2012; Schneckenberg, 2014). In the words of Schneckenberg (2014), “[t]ools remain tools, and simply to make them available to students without reflecting which learning activities they should support does not necessarily lead to positive learning effects” (p. 429). Teachers who are integrating GAPS into their classrooms, then, will have a major responsibility to design and develop learning activities and assessment criteria (Guan & Qian, 2013). In regards to students collaborating through GAPS, this latter responsibility can seem problematic for teachers.

### 2.2.6 Question marks

Having students collaborate via GAPS raises many questions about assessment. Kittle and Hicks (2010), for instance, ask: “What about assessment? How and when do we assess the group? Individuals?” (p. 536). The two scholars’ concerns, here, are shared by others (Chang & Gütl, 2010; Donna & Miller, 2013; Hirsch & Ng, 2011). Hirsch and Ng (2011) like Kittle and Hicks (2010), remark that identifying who did what and who learned what is more difficult within a networked class. To Donna and Miller (2013), these concerns over teachers’ abilities individually assess their students’ contributions and efforts are barriers for using cloud computing offerings such as Google Docs and Google Drive in the classroom. This “lack of accountability” (Chang & Gütl, 2010, p. 1892) that comes with students collaborating online means that teachers must take additional care to ensure that an individual’s work can be established (Hirsch & Ng, 2011). While issues related to assessing students who are collaborating through GAPS are burdensome to teachers, they can be overcome by the technology’s revision history function.
Many of the questions raised about individually assessing students who are collaborating through GAPS can be answered by its revision history function. As scholars explain, GAPS’ revision history function keeps track of every change that is made to its documents, from the most recent edit to the very first—even if it was years ago (Aaron & Roche 2012; Denton, 2012; Edwards & Baker, 2010; Herrick, 2009; Nevin, 2009; Robertson, 2013; Scale, 2009). And GAPS’ revision history function identifies which users made edits to its documents and when (Denton, 2012; Edwards & Baker, 2010). GAPS’ revision history function, then, allows teachers with access to students’ documents to assess them individually (Edwards & Baker, 2010; Nevin, 2009; Schneckenberg, 2009). Moreover, because GAPS’ revision history function enables teachers to also view the number of revisions made to its documents, they can catch students who are plagiarizing based off of these figures (Nevin, 2009). For example, a three-thousand word essay would normally have seventy to three-hundred revisions; so, if students’ documents only have one or two, then teachers can assume that they copied and pasted text from another source (Nevin, 2009). As a result, GAPS’ revision history function, or GAPS itself, can offer solutions to the problems with students collaborating through it.

2.3 Conclusion

In investigating why teachers are integrating GAPS into their classrooms to promote student collaboration or, more specifically, what the benefits of students collaborating through GAPS are, it is evident that the cloud computing offering can augment the ways that students work together to achieve a common goal. One of the ways that GAPS can do this is via its collaborative properties. GAPS, for instance,
enables real-time collaboration, which in group projects such as group papers allows students to create “shared learning artefacts” (Schneckenberg, 2011, p. 426) that would they not able to without it. Another way that GAPS can bolster student collaboration is through its mobility and portability. That is, GAPS makes it possible for students collaborate from anywhere and at anytime. Yet to collaborate through GAPS students need access to the Internet, which is one of a number of its drawbacks.

When perusing the literature for what studies identify as the drawbacks of students collaborating through GAPS, there are three that stick out. First, not all students and schools can afford the strong Internet connections that they need to collaborate through GAPS without issues. Second, students and teachers may struggle to learn how to use GAPS. And third, teachers might struggle with individually assessing students who are collaborating via GAPS. While the first drawback listed here cannot be easily worked around, the second and third can as GAPS is a simple cloud computing offering that has its revision history function. It should be noted here that cloud computing is still developing and that many of its drawbacks will likely dissolve as it matures (Sultan, 2010).
Chapter 3: Research Methodology

3.0 Introduction to the Chapter

In this chapter, I outline the research methodology of this study. I begin by describing the research approach, procedures, and instrument of data collection prior to specifying the sampling criteria and procedures used to recruit participants. I then detail the data analysis and ethical review procedures that this study involves. Thereafter, I outline some of the limitations and strengths of the methodology. Finally, I conclude the chapter with a short summary of major methodological decisions and their rationale in relation to the research project’s purpose and questions.

3.1 Research Approach & Procedures

To answer the question of why teachers are integrating Google Apps (GAPS) into their classrooms to promote student collaboration, this study adopts a qualitative research approach. Qualitative research, of course, is concerned with “how,” “what,” and “why” questions (Ormston, Spencer, Barnard, & Snape, 2013) and finding answers in the experiences and perspectives of its participants (Bogdan & Biklen, 1998; Campbell, 1997; Creswell, 2013; Denzin & Lincoln, 2011; Lichtman, 2012; Ormston et al., 2013). Qualitative research or researchers “want those who are studied to speak for themselves” (Bogdan & Biklen, p. 5) and seek “to empower individuals to share their stories” (Creswell, 2013, p. 48). Adopting a qualitative research approach, then, is appropriate for this study as it aims to illuminate, understand, and extrapolate (Hoepfl, 1997) on ways GAPS can enhance student collaboration from the accounts of teachers who have used it. To do so, this study also involves a literature review and semi-structured interviews with relevant teachers.
3.2 Instruments of Data Collection

The primary methods of data collection employed in this study are semi-structured interviews. In semi-structured interviews there are “incomplete script[s]” (Myers & Newman, 2007, p. 4); questions, often open-ended, are prepared beforehand, but others may emerge through the dialogue between the interviewer and interviewee. (DiCicco-Bloom & Crabtree, 2006). This “openness” (Kvale & Brinkmann, 2008, p. 65) of semi-structured interviews allow interviewees to speak from experience (Galletta, 2013; Horton, Macve, & Struyven, 2004) and to follow up on responses. An interviewer can also return to and try to resolve any contradictory or unclear answers (Horton et al., 2004).

In semi-structured interviews, there are sequences of themes to be covered (Kvale, 2008). The semi-structured interviews of this study are sequenced into four themes or “sections” to answer the overarching question of why teachers are integrating GAPS into their classrooms to promote student collaboration. The first section, “Background Information,” asks teachers about their experience, both as professionals and as users of GAPS. The second section, “Teacher Practices,” examines how teachers are using GAPS in their classrooms. Thereafter, the third section, “Beliefs/Values,” delves into teachers’ rationale behind having their students collaborate on GAPS. Finally, the fourth section, “Influencing Factors/Next Steps,” explores the obstacles that teachers have had or still have to overcome when using GAPS.

3.3 Participants

In this section of the chapter, I review the sampling criteria and procedures that I used to recruit the participants of this study before introducing them.
3.3.1 Sampling criteria

The participants of this study were selected based on the following criteria:

• They are professional teachers with at least two years of experience in using GAPS for collaborative learning activities.

• They have used at least four tools offered by GAPS for collaborative learning activities.

• They are willing to share experiences with having their students collaborate on GAPS.

The expectation that the participants of this study be professional teachers with at least two years of experience with using GAPS for collaborative activities is intended to increase the chances of interviewing those who have the time to develop a level of expertise in this practice. To this end, the participants need to also demonstrate an in-depth understanding of GAPS and therefore must use at least four (or half) of the tools offered by it for collaborative learning activities. Considering that the methods of data collection of this study are the semi-structured interviews, the participants have to willing share their experiences with having their students collaborate through GAPS.

3.3.2 Sampling procedures

To recruit its participants, this study adopts a purposeful sampling approach called convenience sampling. In convenience sampling, participants are selected on the basis of their availability (Emmel, 2013; Gravetter & Forzano, 2015; Newell & Burnard, 2011; Saumure & Given, 2008; Yin, 2015), which saves researchers time, money, and effort (Creswell, 2013; Hays & Singh, 2011; Marshall, 1996). As a result, convenience sampling is advantageous to researchers who have limited resources as it is grounded in
those of the researchers. Being a student myself in the Master of Teaching program at the Ontario Institute for Studies in Education, I am immersed in a community of past, present, and future professional teachers, and rely on them as well as my existing contacts and networks to recruit my participants.

### 3.3.3 Participant bios

There are three participants in this study, all of whom are secondary school history teachers, and all of whom have integrated GAPS into their classrooms to promote student collaboration. The first participant, Arty, is in his fourteenth year of teaching and integrated GAPS into it during his eleventh to have his students do collaborative activities such as structured controversies via Google Slides. The second participant, Park, is an eighteenth-year teacher, who integrated GAPS into his classroom when it first came out to have his students work together on assignments like debates and seminars. Finally, the third participant, Robarts, is a fifteenth-year teacher, who also integrated GAPS into his classroom around the time that they came out, and did so to get students to collaborate on the same or similar group projects that Arty and Park do. All of the participants’ students use Google Docs to complete group papers, which

### 3.4 Data Analysis

To analyze the data collected via the semi-structured interviews I follow what Creswell (2013) calls a “data analysis spiral” (p. 182). In doing so, I begin by transcribing the semi-structured interviews using a computer program as it can aid in the storage and the retrieval of the material. I then take Agar’s (1980) suggestion “to read the transcripts in their entirely several times . . . to get a sense of the interview as a whole before breaking it into parts” (p. 103). Hereafter, I code the transcripts using my research
questions as an interpretive tool and identify categories of data and the themes within them. From there, I read the themes aside one another and synthesize them where appropriate. Finally, I interpret the data or, as Creswell (2013) puts it, “abstracting out beyond the codes and themes to the larger meaning” of it all in relation to findings of the literature review. In this process, I adopt the data analysis strategies used in deconstruction, including “examining silences—what is not said” (Czarniawska, 2004, p. 97) to “draw out conflicting logics of sense and implication” (Norris & Benjamin, 1988, p. 7) and “decipher what fundamental issues are causing discord” (Martin & Frost, 1999, p. 345). All of these data analysis approaches help towards achieving the goal of qualitative research, which is to “understand what stories convey and how” (Marvasti, 2004, p. 94).

3.5 Ethical Review Procedures

In the ethical review procedures of this study, participants are asked to look over and sign a consent letter (Appendix A) agreeing to take part in an approximately forty-five to sixty minute audio-recorded interview. This consent letter covers an overview of the study as well as its ethical issues and its expectations of the participants. Explaining the purpose of the study, here, helps in securing the support of the participants (Creswell, 2003). Yet as Lewis (2003) points out, a balance between providing the participants with too much and too little information about the study must be achieved as the former can curtail their spontaneity in the interviews, while the latter may leave them inadequately prepared to answer its questions. On this note, the consent letter briefs the participants about their right to refrain from answering any questions that they do not feel comfortable with and to withdraw from the study at any time. In addition to this, the participants have
opportunities to retract their statements and to review the transcripts before I analyze the data. The transcripts and audio recordings are stored in a password-protected computer for five years labelled in ways that maintain anonymity (Lewis 2003). To further protect their confidentiality, all participants are be assigned a pseudonym and identifying markers related to their students and schools will be excluded. Failure to address these issues, according to Richards and Schwartz (2002), “can lead to identification of participants and may make it easier, through the process of elimination to identify others” (p. 138). Aside from these ethical concerns, there are no known risks to participation in this study.

3.6 Methodological Strengths and Limitations

The methodological strengths and limitations of this study are centered around two issues (a) what it can conclude and (b) what it cannot include. What this study can and does include are interviews with teachers. In interviewing teachers, this study empowers them to share their stories and have their voices heard (Creswell, 2013). In turn, this study can learn “about the sense they make of their social and material circumstances, their experiences, perspectives, and histories” (Ormston et al., 2013, p. 4). Interviewing teachers helps this study understand the experiences in which it did not participate in (Rubin & Rubin, 2005). Given the ethical guidelines for its approval, however, this study can only involve interviews with teachers. What this study cannot include, then, is observation. Observation, of course, is one of the key tools in qualitative research (Creswell, 2013). In an observation, researchers are able to watch activities, conversations, interactions, participants, and physical setting as well as their own behaviors during the process (Creswell, 2013). In addition to this scarcity of data
collection methods, this study only interviews two to three teachers. Therefore, the study’s findings are not capable of generalizing the experiences of teachers who are integrating GAPS into their classrooms to promote student collaboration. Nevertheless, interviewing teachers allows this study to meet its purpose.

3.7 Conclusion: Brief Overview and Preview of What is Next

In this chapter, I summarize the research methodology of this study. To start, I state that this study adopts a qualitative research approach as it aligns with its overall purpose of understanding why teachers are integrating GAPS into their classrooms to promote student collaboration. Thereafter, I write about how this study, due to its “openness,” uses semi-structured interviews to collect data from teachers who are integrating GAPS into their classrooms to promote student collaboration. Here, I also record how the semi-structured interviews, for thematic reasons, are sequenced into the following four sections: Background Information, Teacher Practices, Beliefs/Values, and Influencing Factors/Next Steps. After doing so, I list the three criterion that this study works with to recruit its teacher participants and explain how they are established to locate teachers who make meaningful contributions to it. From there, I move onto depicting the convenience sampling methods that this study applies as a means to economically recruit its teacher participants. I then outline how this study follows a data analysis spiral to interpret the data in a non-linear way. Subsequently, I describe the study’s ethical review procedures before concluding with a section on its methodological strengths and limitations. In the following fourth chapter, I report the research findings.
Chapter 4: FINDINGS

4.0 Introduction to the Chapter

In this chapter, I present the findings of this study, which is in search of the answers to the question of “Why are teachers integrating Google Apps (GAPS) into their classrooms to promote student collaboration?” The findings were uncovered through semi-structured interviews with three participants and data analysis. The findings are categorized into four themes. The first theme, “Reimagining Collaboration,” sets forth how teachers are integrating GAPS to promote student collaboration and how GAPS itself helps meet this goal. The second theme, “The Question of Assessment,” suggests some ways in which teachers may assess their students as they collaborate through GAPS. The third theme, “Technical Difficulties,” reveals a few of the obstacles that teachers have had to overcome when working with GAPS. The fourth and final theme, “Getting Started,” articulates why and how teachers should start integrating GAPS into their classrooms.

4.1 Theme I: Reimagining Collaboration

4.1.1 Substituting substitution

When it comes to integrating technology into the classroom, Robarts remarks that there is “[a] lot of talk of the SAMR model.” Developed by Puentedura, the SAMR model proposes four possible levels of technology integration: substitution, augmentation, modification, and redefinition (Phillips, 2015). At the lowest level of the SAMR model, substitution occurs when teachers use technology as a direct replacement for classroom practices with no functional change (Phillips, 2015). In regards to integrating GAPS into their classroom, many teachers, as Robarts points out, start with
substitution: “They start by taking a handout that they used to have the kids fill out by hand and they give the students the handouts digitally.” Park makes this point clearer when he describes how teachers “take a sheet paper, type it out, fill in the blanks, and then share it” through GAPS. For Robarts, this may be fine, but he wonders “Where’s the change?” In these instances, there are no functional changes; GAPS, as Arty asserts, functions “as paper and pen.” Yet, Park argues, “GAPS provides way more opportunities for deeper learning.” Robarts believes that this is especially true with respect to collaboration: “Anything you want to do regarding collaboration becomes much more effective and powerful when you use Google Apps.” Robarts’s beliefs here are shared by a number of scholars who praise GAPS for its capacity to promote collaboration (Aaron & Roche, 2012; Denton, 2012; Herrick, 2009; Kittle & Hicks, 2010). These potentials of GAPS can be realized through the work that Park, Robarts, and Arty do with their students. Robarts, however, states that in order for GAPS to deepen learning and promote collaboration, teachers need to “reimagine” how to use it.

4.1.2 Rewriting group papers

In answering the question of how instructors might use GAPS to promote collaboration, several scholars suggest incorporating it into group projects such as group papers (Blue & Tirotta, 2011; Denton, 2010; Edwards & Baker, 2010; Schneckenberg, 2014). Coincidentally, all of the participants employ GAPS or, more specifically, Google Docs for said purpose and do so for a few important reasons. One of the principal reasons as to why the participants will have their students write group papers via Google Docs is related to how readily sharable its documents are. Park mentions that “[w]ith a click of a button you can share them with anybody.” Google Docs, as Robarts and Arty note, also
allows their students to edit the same document at the same time or in “real time,” a feature that scholars repeatedly point out in their studies on how GAPS is used for collaboration (Aaron & Roche, 2012; Alshuwaier, Alshwaier, & Aresheyy, 2012; Denton, 2012; Edwards & Baker, 2010; Herrick, 2009; Kittle & Hicks, 2010; Nevin, 2009; Vallance, Towndrow & Wiz, 2010). Kittle and Hicks (2010), for instance, state that this feature is what distinguishes Google Docs as a writing tool. To Robarts, the group papers that his students complete are “much more effective and much more well written” as a result of the real-time collaboration that Google Docs enables. Robarts’s findings are consistent with those of scholars such as Thomas (2011), who writes, “everybody can work on the same document at the same time to make corrections as well as improve it dynamically in a collaborative manner” (p. 215). Robarts’s findings are also reflective of Schneckenberg’s (2014), which contends that cloud computing offerings such as GAPS allow students to produce “shared learning artefacts” (p. 426) that they would not have been able to otherwise.

4.1.3 Anywhere, anytime

In many of the studies on how GAPS is employed for collaboration, much is made of the technology’s mobility and portability (Aaron & Roche, 2012; Blue & Tirotta, 2011; Chang & Gütl, 2010; Donna & Miller, 2013; Herrick, 2009; Nevin, 2009). The participants also highlight the mobility and portability of GAPS. Park lauds how he and his students at Parkville Secondary School can collaborate on GAPS outside of school space and time. To illustrate his point, Park recalls the time when he was at his daughter’s soccer practice and was able to collaborate with his students on Google Docs to build an assignment together. Like Park, Arty also underscores how he can use GAPS far beyond
the four walls of his classroom:

“It’s something that allows me to easily assess when I’m in the classroom or when I’m outside the classroom or whether I’m at home or a thousand miles away. I can easily access it and I don’t have to bring everything with me. So, it makes me a better teacher because I’m not bogged down physically with these physical things I got to look at.”

Park and Arty’s experiences exemplify how “[p]hysical proximity and platform . . . are no longer limiting factors” (Herrick, 2009, p. 61) if and when they work through GAPS. The participants make a strong case for Chang and Gütl’s (2010) claim that GAPS allows anyone to work from anywhere and at anytime.

4.2 Theme II: The Question of Assessment

4.2.1 Evaluating assessment

In their studies on how teachers and students are collaborating through GAPS, some scholars communicate concerns about assessment (Donna & Miller, 2013; Hirsch & Ng, 2011; Kittle & Hicks, 2010). Kittle and Hicks (2010), for instance, ask: “What about assessment? How and when do we assess the group? Individuals?” (p. 536). Kittle and Hicks (2010) also question if collaborating through GAPS can be a truly equal experience. Discerning who did what and who learned what becomes more difficult when doing so (Hirsch & Ng, 2011; Kittle & Hicks, 2010). These issues are reiterated by Arty, who himself asks, “How do you know that one person is doing something . . . and that the other person isn’t?” To Robarts, however, assessing students who are collaborating through GAPS is actually “really easy” as GAPS has a revision history function.

4.2.2 Revision history
Whenever they are approached with questions of assessment related to their students collaborating through GAPS, all of the participants respond by bringing up GAPS’s revision history function and what it allows them to do. Robarts, for example, expresses how GAPS has a revision history function that allows him to “always to see what every student has done.” For Park, the revision history function enables him to “know when everybody did everything.” And for Arty, the revision history function lets him check “who’s on and who’s working.” In summary, the revision history function empowers the participants to figure out what, when, and who; that is, what changes were made, when the changes were made, and who made the changes. What the participants find to be empowering about the revision history function is comparable to other scholars do (Aaron & Roche, 2012; Denton, 2012; Edwards & Baker, 2010; Herrick, 2009; Nevin, 2009, Robertsson, 2013; Scale, 2009; Stevenson & Hedberg, 2013). Denton (2012), for instance, cites how the revision history function, which “creates a history of revisions, identified by date, time, and author” (p. 35), is advantageous as it enables viewers to observe all of the changes made to a document over time. Nevertheless, teachers could and should implement additional means to their assessment practices.

4.2.3 “Systems”

While the revision history function may be a boon for assessing students who are collaborating through GAPS, all of the participants have practices in place to support this process. In Robarts’s words, he has “systems” that he has his students use when they work together through GAPS. When Robarts’s students write group papers, for instance, they write in different colours so that he can simply identify who wrote what. This is a system that Park’s students follow as well. In all of their group projects, Park and Arty’s
students are assigned roles, which also makes it easy to determine who did what. In addition to these systems, the participants will have their students complete peer and self-assessments. Although the revision history function keeps tracks of who did what and when, Park and these systems speak of and to the need for “layers” of accountability. Park’s call for more measures echo Hirsch and Ng (2011), who insist that “additional means has [sic] to be taken ensure that the individual student’s work can be identified within a collaborative assignment setting” (p. 721).

4.3 Theme 3: Technical Difficulties

4.3.1 The dark web

One of the challenges of collaborating through technologies such as GAPS, according to Park, is that “[a]ll of this stuff is dependent on the Internet.” To some scholars, this is the “greatest” challenge to doing so (Blue & Tirotta, 2011; Holschuh & Caverly, 2010). Holschuh and Caverly (2010) stress that there is a “very real possibility that students and faculty will not be able to be online everywhere and at all times” (p. 38). And in such instances, “their efforts are thwarted” (Blue & Tirotta, 2011, p. 35). This possibility is all too real to the participants, but “the good thing,” as Arty points out, “is that it happens very rarely.” Park similarly notes that “[t]here’s no delays and no drops” with the Internet at his school. Park, however, acknowledges that this attributable to his school’s location in a wealthy area, which plays a big part in its ability to invest in a strong Internet connection. Nevertheless, servers do go down and Arty advises that “you’ve got quickly figure things out” when they do.

4.3.2 Google it?

Another challenge with attempting to collaborate through GAPS involves students’
CONGREGATING IN THE CHURCH OF GOOGLE

levels of willingness to do so. Robarts remarks how he knows “some teachers who have had challenges because their students were doing things a certain way and then they say, ‘We’re going to use Google Docs now,’ and the students resisted.” Arty is one such teacher. Arty notes that some of his students “are a little cautious” about using GAPS and that “some don’t want to put in time to get more familiar with the technology.” Arty recognizes that this is due to the fact that these students have done everything on paper since the fifth grade and so he finds that they are “still writing things down or still copying from the board” by hand. Arty, however, adds that “that’s a small portion” and that a lot of his students are “pretty willing” to learn new programs such as GAPS. In this regard, Robarts mentions that once his students got started with GAPS they could not stop; that is, “they started using it for everything.” Robarts’s students, then, are similar to those of Nevin’s (2009) who started using GAPS in other classes after they were introduced to it in English“—even though those classes were not using the service officially” (p. 38). On this note, Robarts states, “when students adopt something quickly without being told, you know that it’s of value.”

4.3.3 Access granted

In regards to learning how to use GAPS, several studies find that students have difficulties doing so (Donna & Miller, 2013; Edwards & Baker, 2010; Robertson, 2013). Contrary to those studies’ findings, the participants report that students have little to no issues with familiarizing themselves with the technology. Robarts relays that “they really figure it out quite easily.” Like Robarts, Park communicates that students consider GAPS to be “accessible.” Park makes this case by talking about his daughter, who at the age of nine “picked it up in four minutes.” Yet, Park and the other participants know that they
still need to teach their students how to use GAPS. In doing so, the participants have their students “play” with GAPS, a practice that they suggest is invaluable. Arty says that if “you play around with it (it’s very user friendly), it becomes second nature to you.” To Robarts, playing with GAPS is important as “[o]nce you start playing with it, you realize what it’s capable of.”

4.4 Theme IV: Getting Started

4.4.1 Children are our future

For those who wonder why teachers should integrate GAPS into their classrooms, the participants have one answer: “the kids.” When discussing why he integrates GAPS into his classroom, Arty candidly declares, “I have no desire to go into administration; I’m not doing this because I want to improve my career; I’m doing it because it’s good for the kids.” Park paints a similar portrait when he tells the following tale of a fellow teacher at his school:

“We have a teacher, she’s retiring this year, who two years ago basically redid everything. And she could have just rode it out, but she said, ‘No, this is what kids need,’ not, ‘I’m doing this for myself. I’m doing this because this is what kids need and it’s going to push the learning so much further.’”

To Arty, what kids or students need is ability to collaborate online. As Arty points out, [t]he reality is every life is moving to this” and “so they need to know how to do it properly.” Arty adds that by collaborating through GAPS, “the kids are doing something that the working world is beginning to do.” Robarts mentions that what he is trying to do with GAPS is prepare his students “for the life they’re going to have when they finish secondary and post-secondary school.” The participants’ perceptions, here, are supported
by a number of scholars, who also believe that the employment of cloud computing offerings such as GAPS in schools will prepare students for the future (Edwards & Baker, 2010; Schneckenberg, 2014; Shepard, 2012).

4.4.2 Camp google

For teachers who wish to integrate Google Apps into their classrooms to promote student collaboration, there are, as the participants point out, many professional development (PD) opportunities available to guide them. All of the participants refer to how they have had technology consultants from their school boards come in and teach them about GAPS. Park mentions that the key to the success of these PD opportunities was that there was a “level playing field” where every department had access to an hour with the technology consultants. To Park, this makes a “huge difference.” When it comes to time, Robarts states that having “release time” to play around and experiment with GAPS “was quite exciting cause it opened up for the door for a lot of possibilities.” Although Arty appreciates that a lot of different things were covered during his time with the technology consultants, the experiences he shares express how teachers can open up their own doors. Arty, for example, emphasizes that a portion of most of his school’s staff meetings are set aside for examining technology. Arty also highlights the “lunch and learns” that he and his colleagues organize. For Arty, these informal meetings allow him to have conversations with teachers who are more familiar with GAPS. According to Robarts, such initiatives are all about “creating a community of sharing.” While Park also speaks of creating a community of sharing, he contends that this will require a “shift in philosophy” for those teachers who “hide things in binders and put them on their shelves.” Park’s definition of sharing, then, matches Pund and Deshmujk’s (2012), which
states that the sharing of teaching resources includes the sharing of material, information, and human resources.

### 4.4.3 What would you do?

If he was in a scenario in which he had to create a PD opportunity on integrating GAPS into the classroom to promote student collaboration, Park says that he would “start with a philosophy of why.” It is only then that Park would inform his fellow teachers of the ways in which he uses GAPS. Yet, Park stresses that he would only show them “some” of the ways for he feels that “showing people a million different things isn’t necessarily useful.” Park states, “what you really need to show them is one cool use and let them grow them there.” Robarts, who has created PD opportunities of his own, would agree as he says that what he wants his colleagues to walk away with through his talks on GAPS are “simple frameworks” and “concrete examples” of how they can use it in their classrooms right away. Why and what aside, both Robarts and Park note that they would call attention to the when; that is, they would emphasize that successfully integrating GAPS into the classroom takes time. Robarts, for instance, repeatedly refers to the fact that successfully integrating GAPS into the classroom is a “process” that takes time and maintains that he would make this clear to other teachers. In Robarts’s words, “It’s a marathon, not a sprint, for a lack of a better cliché.”

### 4.4.4 Tool and die maker

In reflecting upon their use of GAPS, the participants underscore the role of the teacher and pedagogy. Park maintains that a teacher’s part is important, that “[u]ltimately, a teacher has to understand it so that they can integrate it and work with it.” Park adds that “[t]here’s all of the background; there’s a ton of pedagogy, a ton of
design.” In regards these issues with integrating GAPS, Robarts warns, “if you don’t have a plan about how you’re doing to implement this technology into your classroom it can be a disaster because all the kids are going end up doing is wasting time.” Park and Robarts’s words mirror those of some scholars, which communicate that technology is not a means on its own (Hedberg, 2010; Schneckenberg, 2014; Tan, 2011). Robarts hammers this point home when he repeats that GAPS is a tool and that he will only use a tool if it empowers him to deliver his curriculum and remain relevant. And to Robarts, GAPS helps him achieve these ends.

4.5 An End

The findings of this study present a strong case for why teachers should integrate GAPS into their classrooms to promote student collaboration. The strongest pieces of evidence are offered in the first, second, and fourth themes of this chapter. In the first theme, “Reimagining Collaboration,” the participants articulate that GAPS has potential to change the ways in which students collaborate; they cite how it allows them to easily share documents; to edit documents in real time; and to do so from anywhere and at anytime. This potential, as the participants mention, is demonstrated when students write group papers through GAPS. In doing so, the students are empowered to collaborate and create a shared learning artifact that they would not have been able to without GAPS.

In the second theme, “The Question of Assessment,” the participants point out how GAPS itself can address the concerns with assessing students who working together through the technology. GAPS, as the participants note, has a revision history function, which allows teachers to view everything that their students have done; they can see what edits were made; when the edits were made; and who made the edits. The participants
propose that this makes assessment for learning and assessment as learning more easy and efficient. Nevertheless, the participants mention that it is important to implement additional measures of accountability when it comes to assessing students who are collaborating through GAPS.

In the fourth theme, “Getting Started,” the participants highlight why and how teachers should start integrating GAPS into their classrooms to promote student collaboration. In regards to why, the participants argue that collaborating through GAPS will prepare students for the future as it reflects what the working world is doing. By collaborating through GAPS, the students are developing skills that they can or will apply in the workplace. Aside from preparing students for their lives after school, the participants assert that the employment of GAPS can help teachers deliver curriculum in a way that will help them remain relevant. For teachers who are interested in integrating GAPS into their classrooms to promote student collaboration, the participants list a number of PD opportunities that are available to assist them with this process.

While the findings of first, second, and fourth themes support the integration of GAPS into the classroom to promote student collaboration, those of the third, “Technical Difficulties,” call attention to the obstacles that teachers may have to overcome with doing so. One of the greatest challenges, if not the greatest challenge, is securing a strong Internet connection as it comes at a significant cost. Without one, collaborating through GAPS is not possible. Another challenge is that there are students who are unwilling to use GAPS and those that do can find it difficult to learn. The participants, however, report that their students had little to no issues with acclimating themselves with GAPS. Nevertheless, GAPS is by no means perfect, but it is a powerful tool that can promote
student collaboration. These competing perceptions and what they mean to teachers will be explored further in the following chapter.
Chapter 5: Discussion

5.0 Introduction to the Chapter

In this chapter, I present an overview of the key findings of chapter four prior to outlining their implications for the educational research community and my professional practice and identity. Thereafter, I offer recommendations that address a few of the finding’s implications. I then name areas for further research and wrap up with concluding comments on why teachers should integrate Google Apps (GAPS) into their classrooms to promote student collaboration.

5.1 Overview of Key Findings and Their Significance

The findings of chapter four, which are categorized into four themes, present many of the reasons why the participants of this study have integrated GAPS into their classrooms to promote student collaboration. Most of these reasons are articulated in the first, second, and fourth themes. In the first theme, “Reimagining Collaboration,” the participants describe how GAPS, with its readily sharable documents that can be edited in real-time from wherever and whenever, and has the potential to improve the ways in which students collaborate on group projects such as group papers. In the second theme, “The Question of Assessment,” the participants point out how GAPS’ revision history function, which allows them to view who made what edits to its document and when, can address the concerns with assessing students as they collaborate. In the fourth theme, “Getting Started,” the participants explain that they have their students collaborate through GAPS to prepare them for the future and offer advice to teachers who wish to do the same. While the findings of these three themes specify why the participants integrated GAPS into their classrooms to promote student collaboration, those of the third, “Technical Difficulties,” detail their challenges in doing so, which include securing a
strong Internet connection and students’ unwillingness to use the technology. In spite of these challenges, however, the participants remain advocates for integrating GAPS into the classroom to promote student collaboration.

5.2 Implications

The findings of this study have many implications for the educational research community and my professional identity and practice. When it comes to the educational research community, the findings suggest that teachers who want to integrate GAPS into their classrooms to promote student collaboration may need to find ways to obtain the resources necessitated to do so. These teachers may also be compelled to create a space for them to share their GAPS-related resources. Meanwhile, when it comes to my professional practice and identity, the findings hint at how I, as a teacher, will need to reimagine how I integrate GAPS into my classroom to promote student collaboration and how I, as a researcher, will need to continue my work on this topic. I take this up in the subsequent sections.

5.2.1 Broad: The educational research community

5.2.1.1 Access denied

Several of the findings of this study suggest that a teacher’s capacity to integrate GAPS into his or her classroom will depend on the amount of funding that his or her school allocates towards acquiring the resources required to do so. These resources, as the participants repeatedly point out, include a strong Internet connection. Securing a strong Internet connection, however, can come at a steep cost. And while strong Internet connections are becoming more affordable with time, teachers who wish to integrate GAPS into their classrooms to promote student collaboration should not wait around; instead, they should actively try to find or create ways for their schools to invest in these
resources. This, of course, is easier said than done, but teachers themselves should not shoulder the onus of doing so. Principals, school boards, and parents should support their teachers in this process. Collaboration is the key to success here.

**5.2.1.2 Sharing is caring**

When discussing what would be helpful for teachers who are integrating GAPS into their classrooms to promote student collaboration, Park allude to “creating a community of sharing,” a place where they can exchange their GAPS-related resources. Yet, if this community is to ever come online, two things have to happen according to Park. First, teachers “who hide things in binders and put them on their shelves” will have to have a “shift in philosophy”; that is, they will have to become open to sharing their resources, understanding that whatever they give they will get back, and more. Second, teachers will have to create a space where they can share their resources. And this space will have to be one that teachers can easily access and add to. While what this space will look like is unknown to us now we can almost picture with certainty that it will appear through the Internet.

**5.2.2 Narrow: Your professional identity and practice**

**5.2.2.1 Reinvent the wheel**

A finding from this study that speaks to (or of) me is that there are teachers who use GAPS “as paper and pen.” Whenever I reflect upon this finding, I immediately remember the times that I used GAPS “as paper and pen.” I remember my second practicum and how I reproduced handouts on GAPS that I had my students complete. What I recognize now through my participants’ observations on this issue is that I was, according to the SAMR model, merely “substituting” paper and pen with GAPS. I
wonder, then, how I can “augment,” “modify,” and “redefine” the way that I use GAPS. Although I do not have a definitive answer to this question, I believe that I should practice what one of my participant preaches and begin to “reimagine” how I do so.

5.2.2.2 Re-search

As an English teacher, what I always tell my students to do when we are studying any text is to pay close attention to what is and is not mentioned. And what is not mentioned in the literature on why teachers are integrating GAPS into the classroom to promote student collaboration is Google Classrooms, Google Hangouts, and Google Vaults. The absence of these productivity tools in there, however, is not surprising as they came online after most, if not all, of the research that was done on why teachers integrated GAPS into their classrooms to promote student collaboration. There is, then, a gap in the literature, which includes this study. What this means for me as a researcher is that my work is not complete. I can, should, and will continue to do research on why teachers are integrating GAPS into their classrooms to promote student collaboration.

5.3 Recommendations

5.3.1 Google it!

Teachers who are searching for a space to share their GAPS-related resources may not have to look further than GAPS itself. That is to say that several of GAPS’ productivity tools can act as spaces for teachers to share their GAPS-related resources. These productivity tools include Google Classroom, Google Docs, and Google Drive. With their share functions, Google Classroom, Google Docs, and Google Drive, allow teachers to invite others to view or edit files that they create through it. All that is required of those involved are Google accounts, which are free. It should be noted,
however, that GAPS’ files can only be shared with up to two-hundred users. If teachers want to share their GAPS-related resources with more than two-hundred users, then they will have to explore other possibilities such as building websites.

5.3.2 Google classroom

With all of this study’s discourse on professional development opportunities, it is apparent that teachers should be educated on how they can integrate GAPS into their classrooms to promote student collaboration. And teachers, as one of the participants argues, should be educated on how to do so before they become professionals. One way that this can happen is through teacher education programs. Teacher education programs should offer courses that teach their students how to integrate GAPS into the classroom to promote student collaboration. Such education, however, should not be limited to “technology” courses; instead, it should also be embedded in core curriculum ones so that teachers can understand how to integrate GAPS into their classrooms to promote student collaboration in a fashioned that is tailored to their “teachables.”

5.4 Areas for Further Research

This leaves out certain perspectives on the place of the technology in classroom settings. One of the perspectives that this study omits is that of students; that is, it does not look into what students make of collaborating through GAPS. This study does not answer questions such as: How are students collaborating through GAPS? Which features of GAPS do students find useful when collaborating through it? What do students see as drawbacks of collaborating through GAPS? Would students collaborate through GAPS if they were not required to? These are a few areas for further research.

5.5 Concluding Comments
While the findings of this study suggest that teachers should integrate GAPS into their classrooms to promote student collaboration, it is worth reiterating that the technology is just a tool. How GAPS is integrated into classrooms to promote student collaboration is up to teachers. Teachers will need to imagine how to augment, modify, and redefine the ways that they use GAPS to promote student collaboration. Teachers will then reimagine how to do so as GAPS continues to grow. Yet as GAPS continues to grow, so will other similar technologies. And new, perhaps better, technologies will also emerge. GAPS, then, may not always be the best tool to promote student collaboration. Nevertheless, GAPS is one of, if not the best tool to promote student collaboration both for the time being and foreseeable future.
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Appendix A: Consent Letter

Date:

Dear ________________________________,

My Name is John Vu and I am a student in the Master of Teaching program at the Ontario Institute for Studies in Education at the University of Toronto (OISE/UT). A component of this degree program involves conducting a small-scale qualitative research study. My research will focus on how a teacher’s use of Google Apps can enhance student collaboration. I am interested in interviewing teachers who are using Google Apps for collaborative learning activities. I think that your knowledge and experience will provide insights into this topic.

Your participation in this research will involve one 45-60 minute interview, which will be transcribed and audio-recorded. I would be grateful if you would allow me to interview you at a place and time convenient for you, outside of school time. The contents of this interview will be used for my research project, which will include a final paper, as well as informal presentations to my classmates and/or potentially at a research conference or publication. You will be assigned a pseudonym to maintain your anonymity and I will not use your name or any other content that might identify you in my written work, oral presentations, or publications. This information will remain confidential. This data will be stored on my password-protected computer and the only people who will have access to the research data will be my course instructor Arlo Kempf. You are free to change your mind about your participation at any time, and to withdraw even after you have consented to participate. You may also choose to decline to answer any specific question. I will destroy the audio recording after the paper has been presented and/or published, which may take up to a maximum of five years after the data has been collected. There are no known risks or benefits to participation, and I will share with you a copy of the transcript to ensure accuracy.

Please sign this consent form, if you agree to be interviewed. The second copy is for your records. I am very grateful for your participation.

Sincerely,

Name

Phone Number
Email

Course Instructor’s Name: Arlo Kempf
Contact Info: arlokempf@utoronto.ca
Consent Form
I acknowledge that the topic of this interview has been explained to me and that any questions that I have asked have been answered to my satisfaction. I understand that I can withdraw from this research study at any time without penalty.
I have read the letter provided to me by John Vu and agree to participate in an interview for the purposes described. I agree to have the interview audio-recorded.

Signature: ________________________________

Name: (printed) ________________________________

Date: ________________________________
Appendix B: Interview Protocol

Introductory Script: Thank you for agreeing to participate in this research study, and for making time to be interviewed today. This research study aims to learn why teachers are integrating GAPS to promote student collaboration for the purpose of inspiring others to do the same. This interview will last approximately 45-60 minutes, and I will ask you a series of questions focused on benefits and drawbacks of students collaborating through GAPS. I want to remind you that you may refrain from answering any question, and you have the right to withdraw your participation from the study at any time. As I explained in the consent letter, this interview will be audio-recorded. Do you have any questions before we begin?

Section 1: Background Information

1. What are you currently teaching? What have you previously taught?

2. Where are you currently teaching? Where have you previously taught?

3. How many years have you been a teacher? Of those years, how many have been at your current school?

4. Can you provide a description of your classroom in terms of its demographics, resources, and setup?

5. When and how did you come across Google Apps? When did you start to using it in your classroom? How long have you used it? How often do you use it?

Section 2: Teacher Practices (WHAT/HOW?)

6. How do you introduce Google Apps in your classroom? What do you do to familiarize your students with it?

7. What tools provided by Google Apps do you have your students use to collaborate? Which ones do they seem most engaged with?

8. What collaborative activities using Google Apps have you had success with?

9. How do you assess your students when they are collaborating on Google Apps?

Section 3: Beliefs/Values (WHY?)

10. What motivates you to have your students collaborate on Google Apps?
11. What do you suppose students gain by collaborating on Google Apps?

Section 4: Influencing Factors/Next Steps (WHO?/WHAT NEXT?)

12. Were there any challenges that you encountered in integrating Google Apps in your classroom? If so, what were they and how did they affect your students’ ability to collaborate on Google Apps? How did you get past these challenges?

13. What professional development opportunities, if any, have you participated in to help you integrate Google Apps into your classroom? Are there any other resources?

14. What advice would you give a beginning teacher who wishes to use Google Apps to improve their students’ collaboration?

15. What are your aspirations when it comes to the use of Google Apps in your classroom and in your school?