Exploring Barriers and Enablers to Technology Integration into Pedagogical Practice

by

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BGS (awarded with distinction), Thompson Rivers University, 2008

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Abstract

In today’s post-secondary settings there is an increasing push to integrate technology into the delivery of courses and programs. In spite of technology-rich environments (access to equipment, technical support, etc.), the potential of technology to transform teaching and learning has not been completely realized. The literature suggests that second-order barriers, teacher belief systems, are the true gatekeepers to realizing this transformation and point to the important role professional development (PD) can serve in affecting beliefs. This qualitative case study sought to explore how faculty, who had completed a PD program aimed at hybrid course development, integrated technology and the barriers and enablers they perceived to technology integration. The findings of this study support the notion of a fully integrated PD model, including institutional knowledge building around the affordances and benefits of technology supported pedagogy.

Keywords: Technology Integration; Pedagogy; Post-secondary; Adoption; Teaching and Learning; Barriers
Dedication

As with all things in life, nothing is possible or as meaningful without the love and support of family and friends. More than anything though I am deeply thankful for my wonderful, loving and supportive husband, Arthur, two children, Marisa and Bailey, and amazing Mother-in-law, Alice. They have been the wind at my back throughout this entire journey.
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I would also like to acknowledge and thank Dr. Kevin O’Neill and Dr. Stephanie Chu. Both are exceptional teachers that have contributed greatly to the knowledge and skills I’ve acquired during my program and in shaping my thinking about my thesis topic. They are tireless supporters of their students, and it has been a privilege to learn from their vast knowledge and experience on educational technology and teaching and learning.

I would also like to acknowledge the participants in my study, without them I would not have been able to even undertake this study. Your willingness to participate and share your experiences have added to my knowledge and understanding of my thesis topic and contributed to this important area of inquiry in the literature. Thank you!

Thank you to Dr. Tony Bates, a former OLA colleague, whom many years ago inspired my interest in educational technology and the important role it can serve in supporting teaching and learning.

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<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>CoP</td>
<td>Community of Practice</td>
</tr>
<tr>
<td>CPD</td>
<td>Continuing Professional Development</td>
</tr>
<tr>
<td>F2F</td>
<td>Face-to-Face, i.e. traditional classroom instruction</td>
</tr>
<tr>
<td>HDT</td>
<td>Hybrid Development Training, i.e. hybrid training course designed for faculty</td>
</tr>
<tr>
<td>LMS</td>
<td>Learning Management System, i.e. Blackboard</td>
</tr>
<tr>
<td>PD</td>
<td>Professional Development</td>
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<td>SFU</td>
<td>Simon Fraser University</td>
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Chapter 1.

Introduction

In today’s post-secondary settings there is an increasing push to utilize technology in the delivery of courses and programs, either via hybrid (i.e., a balance between face-to-face and online components) or fully online models. Post-secondary institutions invest heavily in technology infrastructure, Learning Management Systems (LMS) and training programs to enable and support the use of technology in teaching and learning; however, oftentimes there seems to be a disconnect between the provision of the tools and training and the subsequent application of technology into pedagogical practice. In spite of a technology-rich environment that is equitably available to all faculty, and free of the traditional documented barriers, i.e. access to equipment, software, technical support, etc. (Cuban, 1986, 2001; Ertmer, 1999), why do many post-secondary instructors not use the available technology or only use it in a basic way that does not realize its envisioned potential in transforming teaching and learning? Is it possible that technology integration is simply ahead of the adoption curve for most instructors (Rogers, 1995), or are other factors affecting adoption?

The pressure from educational reformers for post-secondary educators to integrate technology in teaching is echoed in the ubiquitous rhetoric of flipped classrooms (i.e., a pedagogical model where lectures are viewed online at home and in-class time is dedicated to homework and other activities), MOOCs (Massive Open Online Courses), and Open Educational Resources (digital resources that are non-propriety) in mainstream media. This technology-focused vision continues to capture the imagination of those on the periphery believing that this is the next great shift for education; however, what is less spoken of are the barriers that post-secondary institutions and their faculty encounter with
realizing this reform in education, or the challenges associated with maintaining or even improving student outcomes. For example, mainstream media does not explicate the evidence of low completion rates for fully online/distance delivery models (Noble, 2002) when compared to those found in face-to-face instruction. It is important, therefore, to explore the factors that function as barriers or enablers to technology integration in order to discover solutions that can move us closer to this transformation in teaching and learning.

1.1. Purpose of Study

The purpose of this study is to undertake an in-depth qualitative case study at one post-secondary institution to explore and understand the experiences of instructors as they integrate technology into their pedagogical practice after attending professional development training specifically designed to impart the necessary skills and abilities to do so. By exploring the perspectives of study participants, it is anticipated that this research will lead to an improved understanding of the current barriers and enablers to technology integration into pedagogical practices in a post-secondary setting and how those experiences connect with current literature or reveal emerging factors. Therefore, the overall research questions to explore this central phenomenon (Creswell, 2012) are:

   How have participants integrated technology into their teaching practice since participating in the training experience?

   How do participants perceive the current barriers to technology integration in their teaching practice?

   How do participants perceive the current enablers to technology integration in their teaching practice?
Chapter 2. Literature Review

2.1. Technology Integration and 21st Century Skills

Technology integration into teaching and learning holds great promise for the future of education, including the ability to support and foster the development of 21st century skills (Boudreault, Haga & Paylor, 2013; Premier’s Technology Council, 2010). There is a mounting realization that:

Changes in communication and information technology... present an increasing set of opportunities and challenges...[and that] the enduring value of an actual campus [may have] less to do with the convenience of proximate classrooms, and more to do with the conversations, the physical and cultural activities, and community-building that happens in the "spaces between the classes. (Plant, 2007, p.10).

The underlying premise of this observation is the expected role technology will deliver in terms of hybrid and fully online delivery. Plant (2007) noted that the structural changes needed to redefine the learning landscape of the future are primarily about “how far we can push technology in the service of learners” (p.5). In spite of the compelling reasons in support of technology to transform teaching and learning there is well documented evidence “that teachers do not generally make effective use of... technology in their teaching” (Hixon & Buckemeyer, 2009; Levin & Wadmany, 2008 as cited by Aldunate & Nussbaum, 2013, p.519) With most post-secondary institutions today providing technology-rich environments in terms of access to technology and associated supports, what then is impeding the promise of wide-spread and meaningful adoption of technology integration into teaching and learning?
2.2. Research on Barriers to Technology Integration

Technology serves as a ubiquitous, ever evolving staple in post-secondary settings, yet the abundance of this resource has not been fully leveraged to transform teaching and learning in the ways that have been envisioned. Clearly, it is not enough to provide access to technology to instructors, something more is needed. If instructors within post-secondary institutions are to harness the potential of technology in their teaching practice they will need to be equipped with strategies that enable them to identify and overcome the barriers they encounter.

Much of the literature on technology integration barriers has been anchored in the theoretical framework provided by Ertmer (1999) that classified technology integration barriers into first- and second-order barriers. Ertmer’s (1999) theoretical framework is based on Brickner’s (1995) extension of the concept of obstacles to first- and second-order barriers to change (Brickner, 1995; Cuban, 1993, Fullan & Stiegelbauer, 1991 as cited by Ertmer, 1999). Essentially, first-order barriers to change leave underlying beliefs unchallenged, while second-order changes challenge fundamental beliefs about one’s current practice and result in new goals, structures or roles. Ertmer (1999) describes first-order barriers to technology integration in her theoretical framework as being:

...extrinsic to teachers and include lack of access to computers and software, insufficient time to plan instruction, and inadequate technical and administrative support. In contrast, second-order barriers [emphasis added] are intrinsic to teachers and include beliefs about teaching, beliefs about computers, established classroom practices, and unwillingness to change (p.48).

In the years that followed, Hew and Brush (2007) conducted a meta-analysis of 48 research studies covering the previous ten years and found that resources was the most commonly cited impediment to technology integration, such as lack of hardware, access to equipment, time, and technical support. Historically, these findings align with Cuban’s (1986) research on technology use
in classrooms since the 1920’s. While first-order barriers have been seen as pivotal to integration efforts, more recently second-order barriers (i.e., epistemological and pedagogical beliefs of teachers) have been viewed as the true gatekeepers (Ertmer, 2005; Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur & Sendurur, 2012). While lack of technology and technical support can still serve as a barrier to technology integration into teaching and learning, the norm these days is technology-rich institutions backed by technical support teams thereby transforming traditional documented first-order barriers into enablers.

Another facet to technology integration is professional development that provides instructors with the necessary skills and knowledge to introduce technology into their pedagogy. While not specifically sighted as a first-order barrier in Ertmer’s (1999) theoretical framework, it certainly is extrinsic in nature and a necessary component to enable integration efforts. Austin and Sorcinelli (2013) believe that technology is by far the most influential factor to impact teaching and learning in the past two decades, noting:

> As higher education institutions incorporate online and blended learning, even highly experienced faculty members, as well as those new to the profession, face new challenges as well as fresh opportunities for their pedagogical practice; teaching online is not the same as teaching face-to-face (p.87).

The challenge with faculty development comes in the form of appropriate structures (e.g., teaching and learning centres), varied contexts (i.e., generic vs. discipline specific), institutional type, etc. Most importantly, technology integration professional development must be part of an integrated whole, not a series of disjointed courses or a standalone operation on the fringe of academia. As Chu (2014) notes, there is a trend to a more integrative approach and Teaching and Learning “units on the periphery that are still offering the ‘drop-in workshop’ model tend not to survive.” (BCCampus, 2014, “Taking the T&L centre to the frontlines”) This acknowledges the important role professional development structures and support, a first-order barrier and/or enabler, serve in the success of technology integration efforts. What is particularly noteworthy is subsequent research that has looked at the interplay of professional development with
teacher beliefs that is discussed in the next sections (Ertmer, 2005; Kopcha, 2012; Ottenbreit-Leftwich, Glazewki, Newby & Ertmer, 2010).

2.3. Research on Teacher Beliefs in Education

Pajares (1992) conducted a meta-analysis of the literature on teachers’ beliefs and education research and described the difficulties of what he calls this “messy construct”, stating

… defining beliefs is at best a game of player’s choice. They travel in disguise and often under alias – attitudes, values, judgements, axioms, opinions, ideology, perceptions, conceptions, conceptual systems, preconceptions, dispositions, implicit theories, explicit theories, personal theories, internal mental processes, action strategies, rules of practice, practical principles, perspectives, repertoires of understanding, and social strategy, to name but a few that can be found in the literature (p.309).

What Pajares (1992) laid bare is the complexity of belief systems and that what research had been done was fraught with issues since a common definition was lacking. Roughly a decade later, Lumpe and Chambers (2001) cited, “there has been no concentrated effort to examine teachers’ context beliefs about the use of technology in formal school settings” (p. 95) and more recently Ertmer (2005) coined teacher beliefs and technology integration as the final frontier and Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur and Sendurur (2012) as a critical relationship. Pajares (1992) “argued that the investigation of teacher’s beliefs is a necessary and valuable avenue of educational inquiry [though it still seems] to remain lightly traveled” (p.326), thus revealing a need to contribute to this area of inquiry in the literature.

2.4. Beliefs about Teaching with Technology (BATT)

Lumpe and Chambers (2001) developed Beliefs about Teaching with Technology (BATT), an inventory of context and compatibility support beliefs
based on a large body of research on teacher beliefs informed by Ford’s (1992) personal agency beliefs. Context beliefs are influenced by external factors or people that enable goal acquisition, including the likelihood of that factor to transpire, whereas compatibility beliefs are defined as internal to the individual and reflect self-efficacy and personal beliefs about one’s own ability (Bandura, 1997 as cited by Lumpe & Chambers, 2001). While the development of BATT was aimed at assessing the distinction between compatibility and context beliefs held by teachers regarding technology use, their study statistically confirmed that context beliefs were indeed a different construct from compatibility beliefs.

The importance of context beliefs is pivotal because without the necessary external context support factors in place it is unlikely for lasting, substantive changes to occur regarding technology integration into pedagogical practices. Lumpe and Chambers (2001) state that, “there has been no concerted effort to examine teachers’ context beliefs about the use of technology in formal school settings”. Therefore, this study seeks to discover teacher beliefs about context support factors in a post-secondary setting.

### 2.5. Conclusion

“Bandura (1997) and Pajares (1992) contend that beliefs lead to action agendas or goals that guide people’s decisions and behaviours. In other words, people act on what they believe” (as cited by Lumpe & Chambers, 2001, p.94). The existing research base signals a need to further explore teacher beliefs about technology alongside professional development models intended to support technology integration goals. It has been established that beliefs are largely based on experiences and difficult to change, typically requiring a gestalt shift to produce change in beliefs (Nespor, 1987 as cited by Pajares, 1992; Prestridge, 2012). Therefore, it would seem reasonable to conjecture that experiences in the form of pedagogy-focused professional development may yield insights into this relationship between beliefs and faculty development and hence worthy of investigation.
Chapter 3. The Context of the Study

3.1. The Research Site

The site for this research study is a metropolitan community college in Western Canada where academic instructional faculty constitutes approximately 50% (N=925) of all college employees. This college has a technology-rich environment (i.e., computer labs, systematic software and hardware upgrades, smart classrooms, a robust WiFi network, etc.), including Blackboard, a Learning Management System (LMS), to facilitate online and hybrid delivery of courses and programs. There is no available data on extent or type of LMS usage by instructors other than amount of server space utilized. It is difficult to ascertain if LMS account size is a reflection of document storage or more advanced pedagogical uses.

3.2. The Training Program

A specific unit within the college’s educational and information technology department is responsible for providing training to faculty in support of technology integration into their pedagogy. This training unit offers an extensive array of Professional Development (PD) courses intended to fulfill this purpose. A review of the offerings with a trainer revealed that the majority of the courses deal with the functionality of software or hardware, not usage in a pedagogical sense. Of the 44 PD offerings delivered by the training unit, two have been designed with the intention of providing pedagogy-focused knowledge and skills to integrate technology into teaching practice, the Hybrid Development Training (HDT) course and Blackboard Intensive. The HDT team was lead by a faculty member considered to be an innovator or early adopter (Rogers, 1995) of technology in
their own teaching practice. The intention of this type of model is to provide an authentic, situated context and experience uniquely relevant to peers in training, essentially a cognitive apprenticeship model (Bandura, 1997; Vygotsky, 1978). Blackboard Intensive is a more recent PD offering that is delivered on a one-on-one basis in order to customize it to the specific instructional needs of an instructor, whereas HDT is a fully developed training course adapted from The Online Professor Program (TOPP)\(^1\).

The college’s HDT course taken by the participants in this research study was designed for small group delivery and focuses on how to adapt a current face-to-face course to be a hybrid delivery model, i.e. a balance between face-to-face and online components. The HDT course outline from Winter 2012 (the last time the course was offered at the college) stated that this training, “combines the pedagogy of effective online learning with many of the technical skills required to create a course, and then to successfully teach… [a] hybrid classroom.” Instructors taking HDT were expected to commit 4-6 hours per week to the course over a 13-week teaching semester in addition to their normal teaching load. The training also had the distinction of being delivered as a hybrid course itself, thus creating an experiential learning opportunity for instructor trainees, i.e. experience a hybrid course through the lens of a student. This experience included activities such as online discussions, quizzes, journals (online), submitted assignments, surveys, and other online activities. At the conclusion of the semester of training, trainees were to have produced two complete modules, including a “Getting Started” module, for their hybrid course in development. Over the next semester they would independently carry on with their hybrid development work and seek at least two reviews from a peer(s) or HDT trainer as needed. During the third semester, hybrid development would conclude with all elements fully developed and functioning for the newly created hybrid version of the formally face-to-face (F2F) course, i.e. structure and

\(^1\) TOPP – The Online Professor Program, Bergen Community College, http://ww3.bergen.edu/pages1/Pages/418.aspx
modules in place, including two final reviews by peers, trainers, etc. prior to the course running in the fourth semester.

As outlined on the college’s website, HDT supports one of the strategies outlined in the college’s Implementation Plan for Online and Partially Online Courses and Programs aimed at encouraging “the development of partially online or ‘hybrid’ course options for the top 20 high-demand courses...” As an incentive, instructors that completed the training course and delivered the hybrid version of their course “were eligible to request up to $500 from the VP Academic and Provost’s budget to support a PD opportunity of their choice (e.g., attend a conference or workshop.)” Eligibility for the incentives was later extended in May 2014 to include three additional options: 1) development of a hybrid through alternate processes (e.g., online training taken elsewhere, self-study, or personal experience); 2) instructors that had successfully developed and taught a hybrid and then mentored a peer in their development and offering of a hybrid course; and 3) instructors with existing hybrid courses were eligible for the funding if they opted to revise their hybrid course with a newly created online course template.

HDT was initiated as pilot project as part of the hybrid development and implementation initiative and “subject to review and evaluation by [the College’s Academic Council] in the 2015/16 academic year.” The cohort delivery model of the HDT course was discontinued after Winter 2012 semester and replaced with a self-paced fully online training delivery model, including availability to the Blackboard Intensive training, i.e. one-on-one sessions, when needed. This change in the delivery of the training was due to scheduling conflicts instructors had with attending some or most of the F2F sessions. There were a total of eight cohorts that received training between Fall 2009 to Winter 2012 with a total of 34 instructors successfully completing the course.

There has been no formal evaluation of the HDT course to determine if the necessary transfer of knowledge, skills and/or attitudes affected change in teaching practice, i.e. levels three and four of Kirkpatrick’s (1996) training evaluation model, or produced changes in student outcomes. The training
department records statistics on the number of PD attendees and hours of instruction, though there is no disaggregation of these data by Faculty, discipline or course(s) taught by attendees.

This setting is relevant to study as it explores what factors may be facilitating or impeding successful technology integration into pedagogical practices in a post-secondary setting.

3.3. Research Participant Profile

This study sought to explore technology integration into pedagogical practice by instructors after they took the HDT course, a PD training program designed to impart the necessary knowledge, skills and abilities to do so. The following description has been developed to give the reader a frame of reference regarding the profile of the participants in this study relative to the larger academic instructional population at the college. Note that the description is purposely high-level in order to maintain the confidentiality of the research participants.

The research participants who engaged in this training represented a number of disciplines within the college and brought with them a variety of backgrounds that provide important context to the accounts they have provided. There is an over-representation of participants from one of the Faculties; 30% of the participants are from that Faculty whereas they constitute 10% of all academic instructional faculty members. This however is not an entirely unexpected finding as one of the research participants from that Faculty stated, “we’ve been sort of movers and shakers for quite some time in terms of leading the charge around online development.” Another research participant also from that Faculty stated that because they primarily serve a mature adult learner market they decided not long after taking the HDT course to phase out any hybrid courses they were offering in favour of fully online. This is a particularly noteworthy revelation given that this Faculty delivers a large component of affective domain content where in-person interaction could be viewed as key to
achieving learning outcomes. A third research participant from this Faculty pointed out, “it’s been challenging because [my courses] are really good courses for face-to-face… [but I wanted] to see how you could take something that needs a lot of interaction and still support part of it online.” In spite of what could arguably be viewed as a barrier to technology integration this Faculty embraced fully online as a delivery option in addition to F2F, and now most courses offered in any given semester are made available in both F2F and online delivery modes.

The HDT research participants from one other Faculty are over-represented by roughly two-thirds. One of the research participants from that Faculty did not develop a hybrid course after taking the HDT course, while a second participant has been steadily working towards that goal and indicates being very close to achieving it, but has taught some hybrid courses developed by others. A third participant from that Faculty has developed and successfully delivered several hybrid courses.

Figure 3.1 Gender distribution

The gender distribution amongst the research participants reveals that females are slightly under-represented relative to all academic instructional faculty members at the college, though only by 5% and not entirely unexpected with a small sample.
In terms of receptivity to technology integration into pedagogical practice, the majority of the research participants did not exhibit any belief statements that would indicate anything other than a willingness to do so. They all expressed a general to high degree of comfort with using technology, some describing themselves as, “a techie”, or being “fairly comfortable with technology, not an early adopter but a competent adopter”, or “an early adopter... but [only] when it comes to online learning environments...” Almost all of the participants had used some types of technology in their courses prior to taking HDT, but the one research participant who, “went in not knowing, having never taught online or hybrid.” was clearly enthusiastic about taking the HDT course because he felt instructors need to be open to examining and improving on their craft especially when it comes to technology integration; students are increasingly tech savvy and instructors need to be ready to respond to that expectation through their pedagogical practice.
Chapter 4.  Methods

4.1.  Research Methodology and Design

This study employed a qualitative case study design (Creswell, 2012). The purpose of using such a design is because it allows for a detailed description to emerge from examining several cases, and provides necessary context and an in-depth discovery of the central phenomenon (Creswell, 2012). As cited by Creswell (2013), “A case study is a good approach when the inquirer has clearly identifiable cases with boundaries and seeks to provide an in-depth understanding of the cases or a comparison of several cases” (p. 100); thereby, making this design particularly relevant for the study of instructors who engaged in training specifically designed to impart technology integration knowledge, skills and abilities.

The primary source of data collection for the study was one-on-one interviews with instructors who had taken the HDT course. The interview protocol was based on three semi-structured open-ended qualitative research questions (see Appendix A for interview protocol), a design that allows participants to “best voice their experiences unconstrained by any perspectives of the researcher or past research findings” (Creswell, 2012, p.218). This type of open-ended questioning does not confine the research participant and enables them to tell their own story in their own words. The interview protocol included probes or sub-questions to assist with exploration of the topic; to ensure the researcher did not stray from the topic under examination; and allowed for greater exploration of a research participant’s responses (Creswell, 2012). The probes in the interview protocol also sought to explore the experiences and perspective of instructors who actualized technology integration as well as those who did not to ensure a full exploration of the central phenomenon (Creswell, 2012) under examination.
Due to the emergent design, some interviews required the principal investigator to ask unscripted follow-up questions for the purpose of clarification, etc.

Collection of artifacts in the form of course syllabi and/or a representative course assignment(s), pre- and post-HDT, were also sought for document analysis from research participants as another indication of what may have changed after HDT training. The purpose of this data collection was to examine how and to what extent technology had been integrated into a course to support teaching and learning and served as a form of triangulation (Creswell, 2012) with the data collected from the one-on-one interviews. Specifically, the document analysis sought to examine:

- Type(s) of technology integrated into the course,
- What types of instructional strategies were supported by technology, and
- How students were instructed to use technology in support of their learning

### 4.2. Research Participants

Since the purpose of the study was to explore the barriers and enablers to technology integration into pedagogical practice, the first consideration was identifying a population that had taken PD training specifically designed to impart the necessary knowledge, skills and abilities. The college’s HDT course (described in Chapter 3) was such a professional development program and it also had the benefit of being delivered as a hybrid itself with defined cohorts, thus providing possible insights regarding teacher beliefs about this instructional model as a direct result of their authentic, situated learning experience (Vygotsky, 1978). Selection of the instructors from the HDT cohorts was also highly relevant as enough time had transpired since the training to actualize that learning; the training was delivered by the college between Fall 2009 and Winter
2012 to eight cohorts ranging in size from one to six with an average of four individuals per cohort. Kirkpatrick’s (1996) levels three and four, i.e. Behaviour and Results, respectively, for evaluation of training stipulates that there should be sufficient time, approximately three to six months, post-training for participants to actualize skills and knowledge acquired during training. Therefore, instructors that completed the HDT course would have had sufficient time to utilize the knowledge, skills and abilities acquired during their training and provide a rich account of their experiences.

Since this study involved data collection from human subjects, ethics approval was first sought and obtained from the college’s Research Ethics Board (REB). Approval was then sought and obtained from the SFU Office of Research Ethics (ORE). Both approvals can be found in Appendix D and E with pertinent sections redacted to maintain confidentiality of the research participants at the study site.

4.3. Data Collection

Upon receiving approval from both the college’s Research Ethics Board (REB) and Simon Fraser University’s Office of Research Ethics (ORE), the list of instructors that took the HDT course was obtained from the college’s training unit. The email contact information was then sourced from the college’s employee directory (available on the public website). There were 34 potential participants in the sampling frame (Creswell, 2012), four of who were found to no longer be working at the college bringing the sampling frame down to 30. Convenience sampling was deemed the most suitable method to recruit research participants for this study, “because they are willing and available to be studied… [though] the researcher cannot say with confidence that the individuals are representative of the population” (Creswell, 2012, p.145). The sampling goal for this study was set at eight to ten participants as this was deemed to be a suitably sized pool of participants relative to the sampling frame. Also, as Creswell (2012) notes, “It is typical in qualitative research to study a few individuals or a few cases… because the overall ability… to provide an in-depth picture diminishes
with the addition of each new individual” (p.209) and stays true to the objective of qualitative research in revealing the complexity of accounts provided by the research participants.

Personalized email invitations were sent to members in the HDT cohort inviting him/her to participate in this study (see Appendix B for sample of email invitation). To effectively manage responses and ensure achievement of the sampling goal, invitations were staggered. Ten invitations were sent on March 24th yielding five acceptances. On March 30th a further five invitations were sent, yielding two acceptances. On April 1st, five more invitations were extended with no responses. On April 7th, five more invitations were extended, yielding three acceptances and thereby achieving the maximum sampling goal of ten participants. Invitations were purposely selected to ensure as much as possible a broad representation across the individual HDT cohorts, a form of maximal variation sampling (Creswell, 2012). This method resulted in all HDT cohorts, with the exception of the last cohort in Winter 2012, having at least one instructor representing their HDT cohort in this study. The interviews were scheduled and conducted at a time and location most convenient to the research participants between April 7, 2015 and May 20, 2015.

Even though participation posed minimal risks to the interview participants, an informed consent form was developed and discussed with each research participant prior to starting the interview (see Appendix C for informed consent form). The principal investigator discussed their rights as a research participant including their right to ask questions and that they were free to withdraw from the study at any time without any concerns. They were also informed that the interview would be audio recorded for the purpose of transcription and content analysis, and their identity would remain confidential and only known by the principal investigator. The principal investigator then obtained a signed copy of the consent form from participants before turning on the audio recorder. As per the interview protocol, participants were advised that they would receive a written transcript of their interview after it had been transcribed in order that they may review it and make any changes they wish;
this served as a form of member checking (Creswell, 2012). As per the one-on-one interview protocol, the request to review their transcript was made at the conclusion of their interview so they could anticipate follow-up contact from the principal investigator.

The majority of the one-on-one interviews lasted between 45-60 minutes; however, there were three interviews that went longer, each of those were roughly one hour and forty minutes long. Study participants who indicated having actualized their training were also asked if they would agree to provide a copy of their course syllabus and/or a representative course assignment, pre- and post-training, for the purpose of document analysis.

The purpose of these methods of qualitative data collection (i.e. one-on-one interviews, and document analysis) aids in a more realistic discovery of actual post-PD technology integration practices, behaviours, and barriers. As Pajares (1992) notes, there are “problems inherent in all self-reported instruments [like surveys that]… fall prey to ‘it depends’ thinking, and responses fail to provide either accurate or useful inferences of behaviour” (p.327). As such, qualitative data collection can provide a glimpse into actual behaviour, thereby affording a richer and more accurate base of information on which to draw inferences through triangulation across cases and analysis of collected artifacts (Creswell, 2013, 2012).

4.4. Data Analysis Plan

The principal investigator transcribed all ten interviews and as outlined in the study protocol the transcripts were sent to the participants to review and make any changes they wished to their responses. All transcripts were approved by the research participants with only a couple providing very minor changes before extending approval.

Following the traditional Data Analysis Spiral (Creswell, 2013), see Figure 4.1, as part of data management the finalized interview transcripts were loaded
into NVivo. The transcripts were then read and re-read, an immersive process aimed at “get[ting] a sense of the interview as a whole before breaking it into parts” (Agar, 1980 as cited by Creswell, 2013, p.183).

**Figure 4.1 The Data Analysis Spiral**

![Data Analysis Spiral Diagram](image)

(Creswell, 2013, p. 183)

Annotations and memoing were used to capture key ideas and concepts, and to create a profile of the study’s research participants. This was followed by inductive thematic coding (Creswell, 2012) of the one-on-one interview transcripts, both within and across research participants, to assist in classifying the data and to reveal the overarching account. This process involves assigning labels or codes to selected passages of text, recognizing that “not all information is used in a qualitative study... some may be discarded (Wolcott, 1994b as cited by Creswell, 2013, p. 184), a method referred to as “winnowing”. The initial coding pass produced a large volume of categories that were then reduced and combined to address overlap and redundancy through a number of successive passes. By its nature, inductive coding is a reflective process that requires flexibility and being open to change throughout the analytical process. As part of this process a codebook (available on request) and theme map, “a visual image
of the information” (Creswell, 2013, p.187), were developed to assist in conceptualizing codes that could be eliminated or collapsed.

To verify the coding scheme, representative sample quotes for each code were sent to the principal investigator’s supervisor to review and validate. This allowed for discussion about the themes and identification of similarities and differences in the coding scheme. This process is referred to as inter-rater reliability, a validation process where a colleague, peer or supervisor determines "whether your codes are appropriate and relevant to your research questions" (Bloomberg and Volpe, 2008, p.103). These discussions allowed for further revisions and refinements to the codebook (available on request), resulting in the following finalized coding scheme, one each for perceived barriers and perceived enablers.

**Figure 4.2 Perceived barriers**

![Perceived Barriers Diagram]
Finally, based on interview data, the cited uses of technology in support of teaching were summarized. Also, submitted document artifacts, i.e. samples of course syllabi or representative course assignment pre- and post-HDT, provided by participants were triangulated (Creswell, 2012, 2013) with their interview data to reveal the extent of actualization of training as demonstrated through types of technology uses, possible types of instructional strategies supported by technology, and how students were directed in the use of said technology.
Chapter 5. Findings

The purpose of this study was to explore the barriers and enablers instructors experience when integrating technology into their pedagogy after participating in a training program that was designed to support that goal. This study specifically sought to investigate three broad questions: How have participants integrated technology into their teaching practice since participating in the training experience? How do participants perceive the current barriers to technology integration in their teaching practice? How do participants perceive the current enablers to technology integration in their teaching practice? The findings in this chapter originate from ten participant interviews and document artifacts in the form of course syllabi and/or course assignments provided by five of the seven participants that developed and delivered a hybrid course following their training. There are three key findings described in this chapter: finding one responds to research question one; finding two responds to question two; and finding three responds to question three. The following is a summary of the key findings:

- **Finding 1**: The majority of the research participants developed and/or delivered a hybrid course, and integrated at least two of the LMS tools taught during the HDT course. Their integration of technology primarily reveals support for constructivist teaching strategies.
- **Finding 2**: There were four overarching perceived barriers to technology integration, all are extrinsic in nature.
- **Finding 3**: There were four overarching perceived enablers to technology integration, one is intrinsically focused and the remaining three are extrinsic in nature.
5.1. Finding 1 – Hybrid Development and Delivery

The majority of the research participants developed and/or delivered a hybrid course, and integrated at least two of the LMS tools taught during the HDT course. Most of the technology integration efforts show some use of constructivist teaching strategies.

The first research question in this study was: How have participants integrated technology into their teaching practice since participating in the training experience? To respond to this question interview transcripts and document artifacts, where provided, were used to identify:

- Type(s) of technology integrated into a course(s);
- What types of instructional strategies were supported by technology; and
- How students were instructed to use technology in support of their learning.

The interview transcripts were used to respond to the first question for all research participants. To respond to question two and three, the interview transcripts and the artifacts provided for document analysis by five of the seven research participants that developed and delivered a hybrid were used. The findings for the latter two questions are presented together for logical coherence.

To maintain the confidentiality of the study’s research participants, they have not been identified by name in the study’s findings, rather assigned pseudonyms, i.e. RP1, RP2, etc.

5.1.1. Types of technology integrated into a course(s)

Based on interview transcripts, Table 5.1 provides a summary of the types of technology uses cited by all research participants since taking the HDT
course, including whether they formally created and/or taught one or more hybrid courses. Seven of the 10 participants developed and delivered one or more hybrid or online courses. One other participant has taught two hybrid courses but has not formally completed the development of her own hybrid course as yet. Of the two participants that did not pursue hybrid development after taking the training, one cited a departmental decision as the reason and the other left their teaching position. Of those that have developed and delivered a hybrid course, all cited integration of at least two of the LMS tools taught during the HDT course. The most often cited use was online class discussions facilitated through Blackboard LMS, wikis or blogs. Online assessment, i.e. tests, quizzes, etc., was the next most frequently cited use, followed by assignment submissions via the LMS. Only a few of the participants who had developed and/or taught one or more hybrid courses cited posting of resources and course information to the LMS site.

Table 5.1 Summary of technology integration post-HDT

<table>
<thead>
<tr>
<th>Research Participant Pseudonym</th>
<th>Developed one or more hybrid courses</th>
<th>Taught one or more hybrid courses</th>
<th>Assignment Submission via LMS</th>
<th>Social Learning Tools¹</th>
<th>Videos²</th>
<th>Online Assessments¹</th>
<th>Posting resources and course information to LMS</th>
<th>Online Journaling</th>
</tr>
</thead>
<tbody>
<tr>
<td>RP1</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>RP2</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>RP3</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>RP4</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>RP5</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>RP6</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>RP7</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>RP8</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>RP9</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>RP10</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

¹ Online group/class discussions via Blackboard Collaborate, wikis, blogs, etc.

² Faculty-produced and externally sourced videos, i.e. TedTalks, YouTube, etc., including video simulations

³ Tests, quizzes, reading responses, etc.
5.1.2. Types of instructional strategies supported by technology and how students were instructed to use technology in support of their learning

For the purpose of logical coherence, the findings concerning instructional strategies and how students were instructed to use the technology have been presented together for the research participants who submitted artifacts for document analysis, and those results have been triangulated (Creswell, 2012) with their interview transcripts.

Document artifacts in the form a course syllabus or a representative course assignment, pre- and post-HDT, were sought in order to identify instructional strategies supported by technology and how students were instructed to use that technology. Five of the seven research participants who developed and delivered a hybrid course(s) provided artifacts for document analysis. Only one of the research participants provided documents, pre- and post-HDT, of a fully self-developed online course, while the others provided documents that were representative of self-developed hybrid courses post-HDT. Table 5.2 provides a summary of the documents submitted, and the instructional strategies used and supported by technology.
What follows is a brief discussion of the selected instructional strategy and instructions to students by each research participant who submitted documents artifacts.

**Research Participant 3 (RP3)**

Lecturing is facilitated through the use of the companion video link that provides verbal instructions on the step-by-step process to perform the calculation for each of the three components of a mathematical formula. The instructional strategy is instructor-centred online lecture using programmed instruction.

The one-page document is brief and provides three to four bullet point items on each of the three properties required for the mathematical calculation. This was followed by a single question in which students were to apply those concepts. The accompanying video provides some additional information not outlined in the one-page document and actually works through the question on
the “handout”; it reflects the procedural nature of solving a mathematical problem.

RP3 recounted creating a large number of videos initially; however, on reflection he indicated:

... I got off on an odd foot with trying to do so much recording, so that was in retrospect was not so good. I generally recommend, I mean I emphasize to not do that... You know that was like 14-hour days of a lot of editing and work; that was not good. And I don’t like those recordings very much, and I’ll little by little get rid of them and replace them... You can’t do it in big long bunches of time like that, I think three minute recordings or one minute recordings are a lot nicer... So, initially I think there was a lot of creating a whole bunch of stuff, learning objects that are dubious or worth creating in the first place.

Research Participant 4 (RP4)

RP4 provided the practicum field guide for the hybrid course he developed. RP4 also provided the course syllabus, pre- and post-HDT, for a F2F course converted to a hybrid by a team of faculty members with whom he collaborated. Findings are only presented for his self-developed hybrid course.

There is only one technology supported learning component in RP4’s hybrid course, an online seminar entitled “Contribution and Critical Engagement” that is worth 20% of the course mark. Discussions transpire throughout the duration of the practicum course and RP4 indicated that this use of technology replaced what would have been in-person discussions in the F2F version of this course. The online seminar is used, “as a form of practicum ‘seminar’ – the intention of which is to provide students an opportunity to share, reflect on and make meaning of the experiences they have...” in their practicum placement.

Overall, the course instructions, and in particular those related to the online discussions where it is indicated that students will be assessed both on the quantity and quality of their postings to the discussion forum and that online engagement, is a critical component in the course. The instructions let students know that the instructor will facilitate discussions but not respond to every single
post. Students are also told the characteristics for good discussion posts (see Figure 5.1) and then given an accompanying rubric so there is clarity on the evaluation for quantity and quality of participation. The rubric has four criteria, they are: quantity and timeliness, spelling and mechanics, demonstrates knowledge and understanding of content and applicability to professional practice, and generates learning within the community. These assessment criteria are rated on a three-point scale of unsatisfactory, satisfactory and exemplary, each with very specific definitions for achieving those performance levels.

**Figure 5.1 Characteristics for excellent discussion contributions**

- **Submit initial post(s) early in the assigned discussion timeframe** (typically two weeks for each topic), and subsequent responses to the posts of other learners at timely intervals throughout the duration of discussion period. The goal is to have a dynamic discussion around the topic that furthers our collective understanding of the topic under consideration.

- **Posts and responses should be thorough and thoughtful.** Just posting an "I agree" or "Good ideas" will not be considered adequate. Support statements with examples, experiences, or references (APA format). Be brief — keep each post and response to one or two short paragraphs. Keep in mind that fellow learners will be reading and responding to you, too.

- **Posts should be within a range of 150 - 200 words.** If a post does not meet the minimum word count of 150, it will not count toward your grade.

- **Make certain that all posts and responses address the question, problem, or situation as presented for discussion.** This does not mean students should not extend the topic, but do not stray from the topic.

- **Discussions occur when there is dialogue;** therefore, students need to build upon the posts and responses of other learners to create discussion threads. Make sure to revisit the discussion forum and respond (if necessary) to what other learners have posted to your initial responses.

- **When relevant, add to the discussion by including prior knowledge, work experiences, references, web sites, resources, etc.** (ensure that all sources are cited as per APA guidelines).

- **Contributions to the discussions (posts and responses) should be complete and free of grammatical or structural errors.**
Triangulation with RP4’s interview transcript revealed no mention of the use of online discussions in his courses, rather the focus was on the use of other types of technology to support his pedagogy. In particular, he spoke of PowerPoint and discovering the, “huge range of tools on YouTube [he] could use in a classroom. And then [his] favourite has always been TED Talks which is cutting edge and at a higher level, and so [he] brought that in.”

**Research Participant 5 (RP5)**

RP5 provided a course syllabus for each of the three hybrid courses she developed. The document for the third course, a project course, does not contain enough information to assess the level of technology integration, i.e. it refers students to the course website; therefore, it has not been included in the findings. Both of the fully developed course syllabi reflect integration of weekly online discussions as an instructional strategy, worth 20% of the course mark in both courses. The online discussions are centred around questions posted by the instructor that are based on weekly readings or in-class experiences.

The second technology supported instructional strategy differs between these two courses. For the first course, the second technology supported strategy uses weekly journaling worth 10% of the course mark. In this course, as described by RP5’s interview transcript, the journal entries were reviewed, commented on and assessed by the instructor. RP5 felt the journals were a wonderful addition to the course as they gave her an opportunity to interact with each student on a personal level, helping them to feel more connected to the course, though she recognized this would not be sustainable if the cohort increased which, “they would like to see…” thus indicating an increase in class size would limit the ability for meaningful student-instructor interaction.

For the second course, the second technology supported instructional strategy, worth 25% of the course mark, is on-line assignments that may include commentaries or summaries of readings, wikis, questionnaires, web searches, etc. There is not any further information available on this course requirement to definitively gauge the fit between the instructional strategy and technology used.
The instructions to students for all online components in both courses are succinct; see Figure 5.2 for an example of the instructions for online discussions.

**Figure 5.2 Instructions for online discussion**

<table>
<thead>
<tr>
<th>On-line discussion [20%]: Questions will be posted weekly based on readings or in-class experiences. At a minimum you will be expected to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• post your own “first post” to the questions (by Saturday afternoon, 4:00 p.m.);</td>
</tr>
<tr>
<td>• respond to the first posts of two other people (by Sunday at 4:00 p.m.);</td>
</tr>
<tr>
<td>• reply to the responses you get (by Monday at 6:00 p.m.).</td>
</tr>
<tr>
<td>The first postings and the responses should be thoughtful and substantial enough to move the discussion forward. Simply replying with “I agree” is not sufficient.</td>
</tr>
</tbody>
</table>

See the “Rubrics” folder on the Blackboard site for method of evaluation.

**Research Participant 6 (RP6)**

RP6 provided the instructions for two course assignments. The first assignment is entitled “Documentary” and is a group-based assignment worth 20% of the final course mark. The instructions are brief, i.e. four sentences, directing the students to produce a 10-15 minutes video on a topic specific to the course of instruction. Students are directed to draw material for the assignment from “interviews, readings, learning’s, class discussion and other related resources… [and that they are to] ensure that NO COPYRIGHT violations are infringed.” They are also informed that the instructor will provide more guidance in class regarding the project. RP6 indicated that this assignment was developed to be adaptable to either a F2F or hybrid/online delivery model; if the former the students would play the video in-class and if the latter they would upload it to the class LMS site for other classmates to view and provide feedback.

The second assignment provided by RP6 was entitled “Oral Presentation” worth 15% of the final course mark. This is also a group-based assignment with brief instructions to the students outlining the requirements for a 30-minute presentation on their selected topic, though it provides more specificity. The presentation is to address seven items, one which stipulates a topical overview, followed by identifying six factors, characteristics, or impacts associated with the
topic, and rounded out by the requirement to develop a handout for the class on the topic. Students are told, “you do not have to limit your group to a PowerPoint” presentation. They are encouraged to be engaging, “…creative and thoughtful” in their approach. As with the documentary assignment, this assignment has been developed for adaptation to F2F or hybrid/online delivery. If the latter the presentation is made to the class via Blackboard Collaborate.

In RP6’s interview, she reflected on adaptation of her assignments using technology saying that:

…As much as possible I try to do similar kinds of assignments, so… some of them were more difficult to do. Like for instance, in the [subject name] course one of the assignments was the students in a group had to produce a video documentary on a particular [broad topic name]. That was a little bit more difficult to do because people are all over the province. Theoretically, they could be all over so to actually be able to do that was difficult.

In spite of the challenges, RP6 says her Faculty is fully committed to making their courses available both F2F and fully online because there is a, “…recognition that it was the right thing to do because there’s such a need for trained [practitioners] in the rural and remote parts of the province.”

Research Participant 10 (RP10)

RP10 provided a course syllabus for the F2F and online version of a course she developed. Both courses have a Blackboard course site, and office hours for the online course are both available in-person and through Blackboard Collaborate. The option of in-person hours is likely due to the difficulties her students encountered with using Collaborate. In RP10’s interview she said she initially had online office hours via the chat function in Blackboard:

… but then we switched over to Collaborate. Collaborate is potentially a much more powerful tool because you can do audio, you can see… but it takes some training… but since we went to Collaborate… no one, not once has made it all the way to the login because its got to run Java, and its got to do this, and its got to do that, and like I said, you really do need some
training on it... I’ve had students phone me [saying]... “It wouldn’t work. I couldn’t get it to run. I couldn’t follow the instructions. I didn’t understand it.” So Collaborate has not been a good tool to use as a virtual online office hour... [it’s] the biggest one that I’ve just not found functional.

Overall the instructions to the students throughout the online course syllabus are detailed regarding weekly online time commitment, excluding reading and course assignments, instructions to access Blackboard, and that all course communications are to be mediated through the internal messages function in Blackboard. The course attendance policy is slightly modified over the F2F version of the course through the setting of expectations about asynchronous communication, regularly checking and engaging in online discussions, and the importance of being self-motivated. There are also netiquette guidelines that define how students are to respectfully engage in online dialogue, exemplify academic writing standards, and to see the, “online classroom [as] a place for intellectual work.” RP10 spoke about the netiquette training, but said one of her classmates:

... already had this fantastic one that she created with her students. So there was a fair amount of picking [her] brain, How did you do that? How did you like set it up so they contributed to this? ... So, yeah, there was definite sharing and that was the more pedagogical oriented discussion than some of the tool discussion going on in the class itself. But that was the focus of one of the sessions, was creating netiquette guidelines... I think we all created our own and shared them... [and] gave each other permission to use what we liked. So there was a fair amount of... collaboration.

The structure of the assignments between the F2F and online version of the course reflect some differences linked to the delivery method (see Table 5.3). The F2F course has an assignment worth 5% whereby students email “one well-developed discussion question” to the instructor the day before the first class of each week. Weekly discussion topics are pre-determined and outlined in the online course syllabus. Assessment of posts in the online version of the course is based on the “depth and interest-evoking quality of... responses to peers.”
Reading journals account for 20% in the F2F course and are based on weekly handouts in class; completed journals are submitted to the instructor.

**Table 5.3 Comparison of major course assignments**

<table>
<thead>
<tr>
<th>Major Course Assignments</th>
<th>F2F Weight</th>
<th>Online Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Essay #1</td>
<td>20%</td>
<td>20%</td>
</tr>
<tr>
<td>Essay #2</td>
<td>25%</td>
<td>20%</td>
</tr>
<tr>
<td>Reading Journals</td>
<td>20%</td>
<td>20%</td>
</tr>
<tr>
<td>Peer Reviews</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>E-mailed discussion questions</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Group Assignment/class presentation</td>
<td>10%</td>
<td>10%</td>
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<tr>
<td>Final Exam</td>
<td>15%</td>
<td>20%</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
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Peer review is reflected in both versions of the course, but instructions for the online course stipulates when essay drafts are due, including when peer responses to those drafts are due. Comprehension testing through regular quizzes, i.e. multiple choice and short answer, is also included in the peer review mark for the online course. The group assignment in the online course is mediated through the use of a wiki in place of an in-class presentation. In both versions of the course, the instructor assigns students to a group.

**5.2. Finding 2 – Perceived Barriers to Technology Integration**

There were four overarching perceived barriers to technology integration, all are extrinsic in nature.

This section on perceived barriers to technology integration is organized around the thematic coding structure presented in Chapter 4. In keeping with the storytelling nature of qualitative research, each section will begin with a brief introduction to the theme, followed by “[i]lustrative quotations taken from interview transcripts... [in order] to portray multiple participant perspectives and capture some of the richness and complexity of the subject matter (Bloomberg and Volpe, 2008, p.111), and provide a glimpse into the reality of the research
participants. The practices discussed by participants reflected what was taught in the HDT course to different degrees and as well, represented a variation in orientations to teaching and learning. This will be discussed further across participants in the Discussion chapter.

5.2.1. Training

All research participants reflected on their HDT experience and in doing so revealed two discrete themes related to training that functioned as impediments, they were: the prior knowledge base of the learners, and limited pedagogical coverage, i.e. what best moves into a hybrid environment and why.

Learners prior knowledge

The majority of participants expressed some level of concern or frustration with the training that appears to be linked to the different levels of exposure trainees had with technology and hybrid prior to taking the HDT course.

We had our instruction in a little mini-lab... Mouse pad. It was a really good set up... but it was a group lesson and the pacing had to be at the pace of the weakest person in the group. And so, it was painfully slow... so the days when I had other commitments for part of the day were actually better because I could come in and do the catch up and then join in and it was better. The people were lovely, the information was good, but it was excruciating. (RP5)

I think because it was early on they weren't really sure about what would be helpful for people and the issue always has been that people who are in that cohort are all over the place. And that was part of the issue is that I found that I was in a group that really had absolutely no understanding about hybrid, where I had some information and wanted to giddy up and get going, I wanted to actually get moving... so I found that I couldn't get what I needed done because [trainer name] had to sort of start here when I needed to be starting up here. (RP6)

I knew it would be useful, I like to learn hands on. I like to do by doing. I'm not good at reading manuals so it seemed like a good idea. So I'm glad I took it, but honestly say in terms of the knowledge, I did not get that much out of it. What I've
heard from other people... who had done the [HDT] course and... I found that... there was... more questions by other people about literally how to teach, not to teach online. So it reinforced by belief... that is people need a big, strong basis in teaching, doing the veneer of teaching online just added complications, that it’s incredibly difficult. (RP8)

...[I] took the course with a colleague who was very uncomfortable using computers, period. And the challenges that she encountered, um... she had a really, really hard time... It was instructive for me to see just how difficult it was for her to work with the technology. I wouldn’t have expected that... the way she taught the courses in-person, actually lent themselves very easily to going to a hybrid format or going online. But somehow the jump wasn’t an easy one to make. (RP9)

Some participant comments also tend to support the notion of pre-requisite training, not dissimilar to what one would find with traditional post-secondary courses for students.

I’d do a bit more preparation first so I wasn’t starting at dead zero because I didn’t think anybody else was when I walked in everyone else had a little bit of knowledge, anywhere from a little bit to a fair bit. I was flat zero. And maybe that means one of the things they could do is offer a pre-requisite, three hour mandatory, potentially, or optional workshop... And you go in and talk and listen and learn some things, get some handouts to read through, to be prepared to take the actual training. I think that would be very valuable. (RP4)

**Limited pedagogical coverage**

Most participants expressed a real interest in understanding what moves best into online, what does not and why. Most participants felt substantive coverage of best technology supported pedagogical uses were not adequately covered in the HDT course, the focus was more on the technology than meaningful pedagogical uses, i.e. why use a wiki, how to facilitate or coach students’ online discussions, etc.

I was certainly positive about being able to take the training. What I did find was that it was mostly about button pushing
rather than good design and good [pause] good layout and all those sorts of things to support teaching. (RP1)

It was, as I recall it, it was more about the functionality... It was anchored in the use of Blackboard... that was the focus of [HDT] was the use of Blackboard. That was the platform that was going to be supported by the college in delivering hybrid modules and so at the very minimum they wanted you comfortable in that environment... You know I think I was... I gained a more solid understanding of the grade centre and the tools there and how to use some creative questioning through that grade centre... it was tips and tricks... so they weren't going through pedagogy and Blackboard, they were going through, you know, technology applications of Blackboard... You know, you always wonder if it's pedagogically sound, right? So without [HDT] focusing on that portion you're always wondering whether or not that's the case. (RP2)

So that the training as I recall was more about the tools and I was a little bit disappointed at the time because I really wanted a bit more discussion about why and how we would be using technology in the classroom. What were the pedagogical goals? What sorts of things moved best into a hybrid environment and which should stay in the face-to-face. Because having done online teaching and having taught face-to-face I really wasn't sure what parts would work best in these different platforms or environments... So I kind of worked on my own and in fact my bookcase has a bunch of books about, you know, creating community in the online classroom. You know the Pailoff and Pratt, and some of those things. (RP10)

While the research participants seem to genuinely like the HDT trainers, some did cite that the limited pedagogical coverage in the training was likely due to limitations with their depth of pedagogical experience.

From my experience it was more focused, you know, on the mechanics, the nuts and bolts of the technology and how to use it rather than talking about the pedagogical value of using any particular component... I think is it depends on the skill level of the [HDT] instructors and their background in instruction. So, you know, if you've taught for ten or fifteen years, you've got a Master's, PhD, you've been teaching multiple classes, you have a different perspective on the focus of the training, and how it can be applied in terms of pedagogy versus somebody who is in... [educational and information technology]... that focuses in terms of the technical aspects. (RP7)
... they certainly tried and this is one of the places where I do love my colleagues in [educational and information technology], but the fact that their not classroom teachers they didn’t do an overly good job at that. They definitely tried hard… because you still need to be in the classroom that it would transform… they don’t know what it’s like, and the stuff that comes out of their mouth makes me cringe at times… They are well intended, they’ve got some of the talent, but God you’ve got no clue what our lives are like. (RP8)

5.2.2. Institutional factors

A number of the research participants spoke about technology integration barriers that were institution-based, they were: a recognition and affordance for development time, the need to reconsider class size for hybrid and online offerings and the institutional rationale for hybrid development.

Affordance for development time

According to the faculty collective agreement, use of accountable time for development is restricted to minor development for off the shelf courses and redevelopment of existing distributed learning courses; however, participants describe the development process for hybrid as being lengthy, some describing it as a complete rethink or redesign from scratch even for conversion of an existing F2F course to hybrid. Accountable time covers a ten-month period in which regular faculty are “assured a minimum of one (1) month professional and curriculum development time.” Affordance for more substantive development time does not appear to be reflected in allowable uses of accountable time by faculty.

... there’s a notion that... [laughs]... that its easy to throw a course up online. I spent, [pause] I spent, I can’t even... untold hours developing one, like one course. It’s a lot of work. Like it’s... I spend way more time developing online offerings than in-person offerings. Like way more! Like it’s to develop a good, solid piece of work that you’re going to be proud of and that you know... that the students are going to get something out of is very difficult, it’s not an easy undertaking... like 10, 15 times as much work. (RP6)
... accountable time helps you do what you need to do well. Like it’s a very, it’s sufficient... but it’s not enough to do new and innovative stuff. Like that takes you to off the side of your desk, and so all of it just takes that little bit longer. You want to do something as radical as it is, say as going hybrid, as going online you need to free up time... (RP8)

... it’s partly just a time issue and part of the discussion that has occurred in the larger meeting is, what’s the incentive? Like hybrid is a lot more work, you’ve got to go through the training, and you’ve got to do all this stuff. Why? How can you sweeten the pot for instructors? How can you make this something that instructors want to do? And it’s pretty clear that there’s no more... like I actually got a course release the semester that I was developing the fully online course because it fit into the Strategic Plan... but there’s no more course release, that’s off the table. So a lot of people are doing things off the side of their desk and the mentoring is very much... you know... Good will, and I think if we’re really going to have a full scale hybrid program, it’s good to have the [educational and information technology] people, but if you also want faculty working in there there’s got to be some incentive for them to do it and some recognition of the time that goes in... to the mentoring aspect. (RP10)

Policy on class limits

A few of the participants noted that class size matters with hybrid and online courses because experience has taught them that as class size increases it becomes increasingly difficult to sustain a quality teaching and learning experience that is essential to creating the conditions for student success.

Since doing it, I can look and think there’s some really, really good things that are enabled by it, just the discussions for example, the fact that everyone gets involved and quieter students who don’t say a lot in class can write amazing posts. I’m conflicted because things like the journals, the journals with my cohort, I had 11, were wonderful. There were weekly journals and I responded to those journals weekly. So I had a chance to interact on each, with each student on a personal level and that made them feel so connected to the course, and actually helped me coach each one of them individually with what they needed. It was amazing, but is not sustainable in a larger class. We have 18 in the cohort this time and even with 18 it’s just not manageable anymore and if the cohort goes up to 28 like they would like to see... (RP5)
Rationale for hybrid

Almost half of the research participants cited the institutional rationale for hybrid as an impediment to larger scale adoption at the college. Specifically, they were concerned that the need to create more classroom space was being promoted over focusing on the pedagogical value of teaching and learning using hybrid.

I don’t believe in using technology if it doesn’t make sense... It shouldn’t drive the design of a course by any means. Some of the push around the college to do that is not just about “Try this” or “Create a course that’s half online”, it’s also about the logistics of seats, right? And so, in terms of pedagogy I don’t think that’s necessarily a good thing... When you don’t have the structure in place, you don’t have the policies in place and the push and the message during some of the meetings has been, “We have to address long-term needs.” Which, that's fine, but at the same time you still need to develop the educational technology infrastructure side in tandem, right... So I’ve actually invested a lot of time in other committees in the college sort of trying to push that agenda. (RP1)

So there’s really a push to move to hybrid partly... as [name of senior academic administrator] puts it, and I think he may be a little too financially oriented in the way he expresses it, because the college doesn’t have the space... And so hybrid allows you to offer more face-to-face classes because half the class is held in the online environment... So he’s kind of presented it that way... and I kind of think... it’s a really good idea, but I think you need to reframe the discussion to... this is a powerful learning experience for these reasons not we can just clear more classroom space, because that’s the message that I think instructors are receiving and so we’re kind of wondering what’s our pedagogical reason for doing this. (RP10)

In a similar vein, the institutional definition of hybrid was problematic for some participants; for a course to qualify as hybrid at the college 50% of the content must be delivered or taught online.

... there’s this formula the college has come up with, and I remember [college employee name] defending this when I challenged him on it once... you know, Mr. Spock approach to which courses should go hybrid are the ones that are over enrolled, right? It was waiting lists and stuff like that and it all
has to do with real estate, we have to build another campus if we don’t put some courses into an online environment at least part of the time, right? So you could get rid of one whole campus if all the courses went half and half during the busiest times of day. But that doesn’t necessarily mean the individuals that are associated with those courses are, you know, cut out to be hybrid designers. You have to be designers first and then they have to be instructors and they have to learn how to design, learn the pedagogy of online teaching and learning... So my thinking is find the people that are tending that direction and use them as pollinator insects to get this ecosystem running, up and running. (RP3)

5.2.3. Instructional Design (ID)

Of the participants that had done hybrid development, many made comments that point to a need for increased support around instructional design expertise. There is two discrete types of support instructors said were needed around instructional design: a timely collaborative model of support between faculty and instructional designers, and a framework or standards for hybrid and online courses at the college.

Well for me it made an increase in work compared to face-to-face. But it also forced me to think about how I go about assessing and learning and what are the sort of essential elements in a course that learners need to interact with, how do I stimulate interaction with the content, with me, with other students, things like that. So I believe it’s helped to make the courses more engaging and draw more engagement out of the students but I don’t think it’s entirely due to the technology itself. I think it’s a more complicated process than that. In fact, I think it can have the reverse effect if you just try to use the technology as a sort of off the shelf thing, like create a discussion forum and follow a bunch of guidelines for setting that up. (RP3)

... at least with a team [of instructors] we developed consistent Powerpoints slides and we sort of looked at how we are going to do this? What’s important in terms of consistency and look? And so we had, we had a group that was able to do that. And if I was to do that independent and in isolation I think that would have been very, very difficult because again I sure don’t have the expertise in order to think about all those things... Like I don’t have the skill set to know whether or not what I was developing was good practice... And I’m not sure it was best
practice but at least there was a level of consistency and I think just having that consistency is part of best practice... instructional designers... we’ve never had that here and we really need it. We really need some people who know what the hell they’re doing and can be helpful... we’re the content experts. And that’s what our role should be around the content and how to design that for the end user really it should be a collaborative affair and it’s never been a collaborative affair. It’s always fallen on the faculty to do it... And that’s probably why it takes an inordinate amount of time to launch something is because the expectation is the faculty do it... (RP6)

... there is instructional design support, I haven’t tended to ask for it all that much because a lot of times I’m doing delivery on-demand [laughing]. “Get your course to us six months in advance and we’ll set it up for you.” And I’m like, “No, not happening.” (RP10)

Discussions about instructional design also included comments about the need for standards that reflect best practices in hybrid development. They see this as assisting them in their migration efforts but as a vehicle to creating a continuity of experience for the student, i.e. similar experience from one course to another.

... but there’s this odd fear about bringing in quality standards and when you look out into the field there’s basically eight or nine standards for development of good online courses or hybrid courses, right. And there’s been this weird perception that, “why would we have this quality for our online courses when we’re not applying it to face-to-face courses?” I sort of question the thinking around that of why wouldn’t we want a standard, right? ... So when I look back to the courses developed in 2012 to now, the big discussion or concern has been, “well everyone’s doing their own thing and it’s a big mess.” Well of course it is because no structure has been put in place. So again, it’s, “Test this out and develop these courses, have a good time.” ... people are always coming to me “How you do this?” or “How you do that?” I shouldn’t be the point of contact for that, right, it’s the systems issue and should be a policy around what’s a design, how’s the best way to teach hybrid... (RP1)
5.2.4. Learning Management System (LMS)

Almost all of the research participants that had developed and delivered a hybrid or online course cited a number of issues related to Blackboard, the college’s Learning Management System (LMS). They were: instructors providing LMS technical support to students, issues with functionality and features of the LMS, and LMS stability, maintenance and upgrade issues.

Most of the participants spoke about having to support student orientation to the LMS and its functions at the beginning of their courses. This seems to be a real concern because it consumes valuable instructional time at the beginning of a course.

...there were definite barriers that got in the way... Extra time it takes to train the students, because the students don’t necessarily come in knowing how to use this, so you need to get them signed up and troubleshoot... you need to front-end the beginning of the program with training and be prepared to support them. But it’s important enough in that it’s part of the course and we persist through that... What else kind of got in the way? Mostly it was just dealing with all of the troubleshooting all of the time that became more of a nuisance than it was worth... they’re in the program for two years. You spend a little time at the beginning, you get them straightened out and then they’re good for the rest of the program. But if you have a 13, 14-week course and it’s a one-off and the students never see this again, then it’s a lot of time to invest for not a lot of benefit in the long run. (RP5)

... I ended up finally building in a whole week’s unit at the beginning of the course to try to anticipate technical problems because I was getting so many students freaking out that, you know, the deadline is being Sunday at midnight for an assignment and I would have this barrage of emails Monday morning about it, “Oh, it wouldn’t work and I wasn’t able to submit my assignment...” So, that’s why I built in some of the stuff, but I had all sorts of issues with... especially with the assignments tool and students not trying it until the last second ... So, anticipating technological issues I think was really key [laughing] to being a hybrid or an online instructor. And at least in the hybrid if they couldn’t get it to work they can bring it to you in class... there’s so many things you can solve with two minutes, like, “Show me what you did.” Whereas, you know,
I’ve been in email exchanges that went on for days trying to figure out why things aren’t working. (RP10)

Limitations of LMS functionality and integration features, e.g. Collaborate, publisher's e-textbooks, etc. were also cited by many of the participants that developed and delivered a hybrid or online course. Participants that spoke about these aspects of the LMS referenced their effects on the student experience, and posing barriers in terms of course design and delivery.

... in one of the courses I taught as a hybrid... we had a textbook that had online material and you had the option of sending students to the publishers website for the material, and quizzes and things like that or you could integrate that material into Blackboard. To be honest, I never made the effort to figure out how to make the integration work as well as it probably should have... It just couldn’t mesh very easily and it was confusing to – this was a first term in our program – it was confusing to the students to have Blackboard and then the publishers website and be sort of jogging between them and I mean I could do the jog but I wasn’t the one who was supposed to be learning the material. [laughs] They were supposed to be the ones who were learning and it was an uncomfortable situation for them for probably four weeks or so. (RP9)

Some of it was just, as I said I’m a content provider and I work in the online environment, but I’m not a computer expert by any means. So there were times when I just couldn’t figure out how a tool worked and I would usually go for help at that point, but not always. Like I still have some weird grade book stuff because I can’t figure out how to make some columns not show or not add up the way... they are doing weird stuff. (RP10)

Just over half of the participants that developed one or more hybrid courses cited challenges associated with scheduling of LMS upgrades, changes to functionality, and general stability of the system as being disruptive to the functioning of a course and the student experience.

Yeah, when I work in a classroom as a stand-up not too many things can go wrong, ... But with technology it breaks down, and it breaks down too often and I don’t want to have to have a backup plan... And there’s times when we’ll do things like have our students have to respond to online questions within a certain time period and then we get a note that in the middle of
the semester they’re shutting down Blackboard for three days for maintenance and its right in the middle of when my students have to post. So then I have to figure what am I going to do around their postings... It’s a pain in the [expletive] because of technology, of things not working... when they’ve told us, its been decided, they’ve worked with their vendors, the vendors are coming, we’re not going to get any hearing on it, nothing’s going to happen. And what they forget sometimes is that online learning is seven days a week 24/7, depending on when students want to access... so people are hesitant about wanting to go into a world that isn’t stable, isn’t as stable as they would like it to be... even a better word for it, predictable, and it isn’t predictable. And I find because I’ve taught in other environments, in all honesty, [the college’s] system is less predictable than other systems I work in. (RP4)

So the upgrades in the program can be frustrating. You know you’ll get something down pat and then the program will be upgraded to a new version, that’s always a little bit frustrating especially if you’re helping out some other people. And it can be frustrating for the students because they’ve gotten accustomed to, “Oh, if I want to upload my assignment this is how I do it”, and then all of a sudden it has changed. (RP9)

5.3. Finding 3 – Perceived Enablers to Technology Integration

There were four overarching perceived enablers to technology integration, one is intrinsically focused and the remaining three are extrinsic in nature.

This section on perceived enablers to technology integration is organized around the thematic coding structure presented in Chapter 4. Similar to the previous findings on perceived barriers, enabling themes will be presented along with illustrative supporting participant quotes. The intrinsic enabler is presented first, followed by the three extrinsic enablers.
5.3.1. Advancing pedagogical craft

The goal of advancing pedagogical craft was a central enabling factor for all research participants. They understood that technology can and does play a supporting role in achieving this goal. Further, there is an awareness of its relative advantages and limitations; however, the latter did not function as a barrier in their exploration of appropriate uses of technology to support their pedagogy. There were three sub-themes within the overarching theme of advancing pedagogical craft, they were: commitment to change or innovation, personally driven PD, and relative advantage of hybrid.

Commitment to change or innovation

Most of the research participants who developed and delivered a hybrid course spoke about work they had done around technology integration that demonstrates their commitment to change or innovation.

... the one that has been the most challenging and the one that I wanted to test to see how effective it would be with hybrid has been this last course that I’m redesigning yet again because I’ve probably taught three or four versions of it... trying to look at more interactive opportunities online, so it’s not just about reading content and then coming to class... For that particular course there is discussions. With other courses I use Collaborate or wikis... So I’ve tried all the discussion tools or wikis, blogs and that sort of thing, just seeing which is most effective. I use journals in two courses because the content is quite personal and it’s sort of a starting point for students, and all of that is private, so it’s just between myself and the student. Then, where I can sort of begin to decrease the safety is around more general topics so then I’ll get into wikis. But I like students to be able to practice first and get confident in that online before I start launching into “Tell me everything you know” because they find it overwhelming and scary. (RP1)

... I built a lot of things when I first started building. I got more efficient and more skilled and stuff as I went along, so I don’t regret that part of the learning. So I do think that the process of creating learning objects, digital learning objects like that, hybrid courses and stuff, its got to be a labour of love. I don’t see it as something that saves anybody any time in the short run... it’s like a life style choice. You know, having said that I’ve taught from a mountain top retreat cabin... that had better
broadband than [our metropolitan area], webinars and things like that while on summer vacation. You know I mentioned the retreat... and other places I’ve went to sort of unplug but think about what it might look like online so I’d draw schematics of how the course would look and things like that. So if you like that sort of thing its fantastic. (RP3)

I’ve always been fairly comfortable with technology, not an early adopter but a competent adopter, like open to learn, open to try new things and open to trouble-shoot too, I’m not put off too easily if things don’t work perfectly the first time. [pause] Yeah, my experience with technology has been, you know, up and down, up and down [laughing], some days you’re ready to tear your hair out and others you’re really grateful for what it can do for you... I had the structure at least. I knew what my evaluation breakdown would be. I wasn’t ready to use the grade book yet that first time through. I even tried later to use the grade book and struggled a little bit and eventually got to a sort of moderate level of being able to deal with it, but not liking it very much. But I think that’s just the software itself, and that might be something that’s improving as time goes on. (RP5)

**Personally driven PD**

Participants that cited engaging in technology focused PD in addition to HDT, i.e. both pre- and post-HDT, is a reflection of their receptivity and willingness to explore pedagogical opportunities enabled by technology. They are not necessarily innovators, rather early adopters, at least in the context of the social system at the college.

I think I’ve done a lot of self-teaching to be honest. When we switched over to Blackboard 9 I used quizzes for example, nobody had a lot of experience in that and so I was developing test banks... and a lot, a lot of work to design that. And it’s taken a couple of years to take out some of the bugs and that sort of thing but its really, I think if you are going to go that route you have to immerse yourself in the technology to understand what it can do for you... (RP1)

I have quite a bit of experience working in different platforms from sort of the beginning of hybrid and online courses... I had also worked at [another post-secondary institution] delivering online and hybrid courses... again working on a bunch of different platforms. So the main reason I took the course here
was to try to integrate those bits and pieces that, for the most part, I had picked up on my own and to find out what I really didn’t know about how the system worked and to see examples of how other faculty were using the Blackboard. (RP9)

**Relative advantage of hybrid**

Most of the participants who had developed and delivered one or more hybrid or online courses reflected on their experiences with technology-supported pedagogy. Their experience-based viewpoints demonstrated for them the relative advantage of technology as a powerful teaching and learning model.

Hybrid is the best. The students, because they have the face-to-face time, actually got to know what each other looked like. It's amazing how important that is, that they know what the person looks like. They interact in class and then they go and do their online work, they know who they’re talking to in the discussions. Students commented at the end of the term... something that I always did is they had the discussion for the week and then in our face-to-face I would talk about highlights of the discussion... A debrief of the discussion, and they really appreciated that and new ideas came out, because I think, realistically again, people don’t have time to read all the posts so they pick and choose a few and comment on a few but then... so you could say, “Well, there are interesting ideas that came up here and what do you think about this?”, so we’d have a debrief. So it was connecting the online, and also any other kinds of activities they did online we’d work them into the class activities too. So having them so they didn’t feel like two separate parts of the course, it was really an extension. (RP5)

... it’s just a different way of thinking about delivering course content or organizing interactions. Once you’ve sort of gone through that cycle with a course I think it actually takes less time and you can... you have flexibility about when you want to respond, more flexibility than if you’re in a classroom. You know, the conversations going on, I mean you can actually sit and chew over what students are thinking about things and the best way to respond to their questions, concerns might be... And I mean you also have the record of the interactions and that can be really useful when you’re thinking about, “Did that work or not?” And you can think it through with a lot more evidence in front of you as opposed to, you know, the spoken word that disappears. (RP9)
5.3.2. HDT delivered as a hybrid

Another enabling factor for some was the HDT course being delivered as a hybrid itself. This delivery approach seems to have provided an authentic situated learning experience for participants with respect to course design considerations and the student experience. As RP8 indicated, she now encourages all her colleagues that want to teach online to “just take an online course. Just do it, be a student. Feel all those frustrations.”

I think they wanted us to experience, I mean this is my projecting because they didn’t talk about this or anything, but I think they wanted us to experience how much work online is. Because it’s sort of weird with asynchronous part, you can as a designer or as an instructor create things that other people have to do and it could take them a long time depending on how you’ve defined what it is they’re to do and how much weight you put on it and stuff… But also I think it, yeah, I think it’s a necessary thing with hybrid design, course design, is to think very carefully each element and each thing and learning object you put in there, how much time does it take to engage with this? What are we doing here? (RP3)

... I don’t think you can really do an online or hybrid course well without having been a student in one. Which I think is one of the things that we were trying to accomplish here... Because [HDT course] was sort of designed like a hybrid itself... I think that could have been emphasized more even in the course because I can remember, “Oh yeah, I’ve got this out of class stuff to do, errr” ... But in a way that was a good reflection of probably the way our students deal with a lot of those sorts of things too. (RP10)

5.3.3. Infrastructure and support

Infrastructure and support were viewed as enabling factors by most of the participants. While some participants spoke about institutional support in the form of incentives in the context of the $500 stipend for those that completed the HDT course it did not seem to be a primary enabling factor for the majority of those in this study, rather they discussed its motivating qualities for others. The two primary sub-themes within the overarching theme of infrastructure and support were: technical support/consultation, and technology-rich environment.
**Technical support/consultation**

Most of the research participants were grateful for the technical support and consultation they have received from educational and information technology staff.

... it was good that there was a Help Desk. That was helpful when I got stuck. I appreciated that very much. (RP5)

Well I think that the [educational and information technology] folks did a good job putting this course together and whenever I have had to get in touch they’ve always been really responsive. And sometimes I know, I can’t remember what the questions have been but sometimes the questions have been a little fuzzy and they’ve managed to sort of figure out what it is I’m asking about and have helped. (RP9)

I have learned all these skills on the job and so I’m almost entirely self-taught in any Ed Tech that I know. And that’s probably been one of the big things. Like [HDT trainer], one time, she’s looking at what I’m doing and going, “That’s going to look terrible when you put it up because all these word tags are still hidden in the code.” Because I was getting all these different font sizes and stuff when I was cutting and pasting things in and so she showed me this nifty little tool where you erase and it just takes off all the tags… Until I saw that tool I was getting really crappy looking pages… (RP10)

**Technology-rich environment**

Most of the research participants that have taught a hybrid course since taking the training spoke about how the college’s technology-rich environment enabled their technology integration efforts.

... if I wanted something the money has been available. So it’s not just that I want it, there has to be the funds... The real drive has been that the students think online. We are doing them a disservice if we’re not teaching online... So there has been... [HDT] has existed, and the college has funded [educational and information technology], you know there are computers in most rooms now, the LCD projectors, I no longer have to go down to the bleeping Library to check out a television and the VHS and roll a bleeping cart throughout... (RP8)
So if you use the tools that are there you’ve got a lot of powerful stuff readily available to you and if you just follow along, the way they are kind of designed to be used, there’s a lot you can do... The college gave me a laptop to use... Two monitors for when I’m doing design is hugely helpful. A lot of times... so I’ve got the documentation open on one and I’m designing in the other, or I’m designing in one and I’ve got the student view open. And then having a laptop to be able to work off-site because I had my own laptop, it kept crashing. It wouldn’t run all the software the college was running... So having a college laptop... Every time I was at these meetings I was going, “If you’re going to make people do hybrid, you need to give them a laptop.” Because in the [discipline name] department we had one computer per office, and we found out other faculties they had one computer per instructor. What a concept. And you can’t do hybrid or, you know, computer intensive courses unless you have your own dedicated computer... So that was really important for me, enabling me to be able to get the work done. (RP10)

5.3.4. Peer networking and support

Technology integration efforts appear to also be enabled through informal peer networking and support in the form of mentoring. The majority of participants that developed and delivered a hybrid or online course spoke about this kind of support reflecting on the collaborative and assistive spirit in which this is done.

So [name of faculty colleague has] been like way ahead of the curve, and sort of been our guide and leader in this. So she’s been invaluable in terms of sort of understanding the pedagogy and at times I thought she was probably more of a resource than some of the folks in [educational and information technology], for our department anyway... [she]... was and has been, and continues to be the leader, you know she really is. She’s always... if I have a problem or an issue around technology I usually go to [her] because... Talk to [her] before I talk to anybody else... she’s been nothing short of, you know, visionary in terms of sort of moving people and keeps it on the burner. You know she’s always poking and telling people and trying to get the ear of people. I really appreciate her, her efforts in that. So I think she’s, um, yeah... I hate to think of our Faculty without [her] [laughs] you know, because she really is somebody who looks out for us. (RP6)
... we spent a lot of time out of class [the HDT course] just kind of, “What are you doing? Why are you doing that?” ... I don’t know if we collaborated so much as just [complained] over coffee, but... there was sharing going on... We would hit some of the same snags and go, “What did you do? I don’t know...errr.” ... So one of the things we had to do was create a netiquette document and [another instructor in the HDT course] already had this fantastic one that she created with her students. So there was a fair amount of picking [her] brain, “How did you do that? How did you like set it up so they contributed to this? And, how can you do that once a course has already launched but you want them to be using this stuff?” So, yeah, there was definite sharing and that was the more pedagogical oriented discussion than some of the tool discussion going on in the class itself... So there was a fair amount of, as you say, collaboration. (RP10)
Chapter 6. Discussion

The purpose of this study was to explore the barriers and enablers that instructors experience with integrating technology into their pedagogical practice after attending a PD training course designed to provide the necessary knowledge and skills to do so. To recap, this study was designed to investigate the following three questions:

1. How have participants integrated technology into their teaching practice since participating in the training experience?

2. How do participants perceive the current barriers to technology integration in their teaching practice?

3. How do participants perceive the current enablers to technology integration in their teaching practice?

Through qualitative inquiry, interview transcripts and document artifacts were analyzed and the results were categorized into three major findings as presented in the prior chapter. The three major findings responded to each of the three primary research questions.

This chapter will discuss and interpret the findings presented in the previous chapter. The discussion is framed into two broad categories:

1. Perspectives on learning revealed through actual technology integration;

2. Linkages between perceived technology integration barriers and enablers:
   - Instructor beliefs and Professional Development experiences
   - Implementation experiences
The remainder of this chapter will provide some recommendations for practice, study limitations, and conclude with potential avenues for future research.

6.1. Perspectives on Learning Revealed through Actual Technology Integration

The first question in this study asked: How have participants integrated technology into their teaching practice since participating in the training experience? As reported in the findings chapter, the majority of the research participants developed and/or delivered a hybrid course, and integrated at least two of the LMS tools taught during their training. The focus of the discussion in this section will be on how participants used technology to support teaching and learning as evidenced by the document artifacts provided by study participants. In particular, perspectives on learning, instructor- or student-centred, revealed by selected technology supported instructional strategies.

6.1.1. Student-centred pedagogical practices supported by technology

Findings from this study revealed a variety of technology supported instructional strategies used by participants reflecting different perspectives on learning. For example, online discussions were the single most prevalent technology supported instructional strategy used by participants demonstrating a student-centred or constructivist perspective on learning. Use of online discussions is “[e]ffective for high cognitive and affective [domain] learning levels” (Weston and Cranton, 1986, p.265) and serves as a knowledge-building, “conversation and collaboration [tool that] enable[s] communities of leaners to negotiate and co-construct meaning of [a] problem” (Jonassen, 1999 as cited by Karagiorgi and Symeou, 2005, p.24). However, it is difficult to ascertain if usage of online discussions is purely a function of the training the participants received or directly attributed to an instructor held value belief in constructivist approaches to teaching and learning. Of course, Ottenbreit-Leftwich et al. (2010) reference
an argument by Harris (2005) that posits, “value should not be solely attributed to only a constructivist pedagogical approach” (p.1324) when considering uses of technology in support of teaching and learning. Certainly in the case of one of the study’s participants the use of online discussions reflected a highly appropriate matching of domain and level of learning, i.e. affective domain learning characterized through the value of field experiences, demonstrating a student-centred perspective on learning where knowledge is socially constructed amongst students. While another instructor’s use demonstrated a similar perspective on learning through the requirement for students to make succinct substantial posts with original ideas that advance discussions to solidify learning.

The use of online discussions also captures the notion of student-centred learning when one considers that in hybrid delivery, relative to F2F delivery, student discussions can continue beyond the confines of the physical classroom, thus expanding the opportunities for deeper exploration, interaction and learning of a topic. It also affords time for more reflective contributions to weekly discussions, enables the learner to source media-rich examples to enhance and/or advance the learning of their peers, and potentially draws in quieter students. Two participants spoke directly to the advantage of online discussions for quieter students or those whom English is an additional language.

... the fact that everyone gets involved and quieter students who don’t say a lot in class can write amazing posts. (RP5)

Well one thing I notice is we have a lot of international students, as everybody does, or immigrants and people that have English as an additional language... So you know, often those people would be reluctant to speak up in class because maybe they think that their expression isn’t as clear as native speakers or people that have been here longer... So the discussion forums helped them to draw them out. And there was one woman from China, mainland China, that took a course and she kept coming up to me and saying that she thought she should drop out and this and that, but all the work that she did was excellent... And I just kept encouraging her and then finally I got her posting into the discussion forum and her expression was not flawless English there, but it was like a poem. I liked how she wrote; it was like a haiku poem, it was
just missing the little connects you need... it was very clear what she was trying to say... (RP3)

Another student-centred perspective on learning was evidenced through the use of group projects as an instructional strategy by two of the participants; however, both of these participants had previous experience with hybrid and online teaching which could explain their more advanced uses of an instructional strategy that leverages technology to support student-centred teaching and learning. The group projects designed by these participants were appropriately aligned with the domain and level of learning required by students. One of the participants had two group projects that blended affective and cognitive domain learning, each project reflecting an appropriate match between domain and level of learning (Krathwohl, 2002; Weston and Cranton, 1986). The group project designed by the second participant supported cognitive domain learning. This group project captured all cognitive processes across Bloom’s revised taxonomy (Krathwohl, 2002); however, a unique distinction is that worked examples were provided to help students form a mental model of what is required to be successful. It has been shown that worked examples, “can in fact help educators achieve the goal of fostering adaptive, flexible transfer among learners.” (Atkinson, Derry, Renkl & Wortham, 2000, p.208) thus providing evidence of an advanced approach to instructional design by this participant. A third participant used group projects in one of her hybrid courses, however that assignment was not mediated through technology, i.e. students were to work on that project during in-class time.

6.1.2. Instructor-centred pedagogical practices supported by technology

Reflective journaling was used by one of the participants that submitted document artifacts. Journaling is a form of self-reflective learning usually reserved for the benefit of the student, i.e. student-centred; however, journaling in this course included interaction with the instructor thus tending to a possibly more instructor-centred perspective on learning for this particular evaluative component of the course. This use of journaling in this participant’s course may
have been informed by the HDT course because as another participant pointed out:

I know in [the HDT course] we had to write a journal which is okay, there’s huge amounts of good stuff on how journaling is one of the best ways that we grow as human beings, that we grow as teachers. The number one way is to keep a journal, huge, huge amounts of research on this. So we had to keep a journal as part of [HDT course], but it was an open journal that other people could read... I objected to this... saying, “That’s not a journal then. If I know you are reading and commenting, like that’s a sort of, like that’s almost an email conversation.” (RP8)

The use of video by one of the participants provided another perspective on learning, in this case instructor-centred. In this particular case the use of video could be viewed as an appropriate instructional strategy for the transfer of cognitive domain content or knowledge transfer (Weston and Cranton, 1986), i.e. it provided a demonstration of procedural steps where students were passive recipients of information or programmed instruction (Skinner, 1958 as cited by Reiser, 2012). As discussed earlier, the choice of technology to support an instructional strategy need not always be constructivist which is typically associated with instructional uses of technology, rather it should be based on what best aligns with curricular needs. In this example, however, the use of technology does not appear to have fundamentally changed an existing pedagogical practice rather it was used to deliver a lecture mediated through the use of video. Certainly, “… not all technology use requires second-order change, especially uses designed to automate existing practice” (Dede, 1998 as cited by Ermer, 1999, p.51). However, “According to Zhao and Cziko (2011), many teachers use technology, not because it helps them achieve a new goal, but because it allows them to achieve their current goals more effectively than do their traditional methods” (as cited by Ertmer, 2005, p.33). Given that the HDT course syllabus did not include training on production of instructional videos it makes this participant’s efforts laudable to undertake the creation of digital objects to support his pedagogy and is more likely reflective of an initial foray to discover the bounds of what is possible. Certainly, future video production that incorporates diagrams and/or animation would enhance student learning by
assisting students in conceptualizing and linking the concept being taught to an actual situated application. The use of diagrams and animation has been shown to reduce or ease cognitive load (Sweller, 1989) for procedural and spatial knowledge acquisition and help in the formation of appropriate mental models especially in novice learners. Further, literature on worked examples has demonstrated that this method of instruction is well suited to skills acquisition, particularly as it pertains to disciplines such as, music, chess, programming, and mathematics (Atkinson, Derry, Renkl & Wortham, 2000, p.185).

Examination of the submitted document artifacts provided the most tangible evidence of post-training behaviours (Kirkpatrick, 1996), and to what extent appropriate mental models had been constructed by participants for far transfer of new skills and abilities into pedagogical practice (Reiser & Dempsey, 2012). It has been found that use of technology “in most higher education institutions [is] focused on improving administrative tasks and replicating behaviourist and transmissive models that have no significant impact on teaching and learning practices” (Blin and Munro, 2008 as cited by Repetto, 2011, p.191)

Further, a number of studies have shown that institutional LMS’s are used to administratively manage courses, i.e. posting of course documents, notes and resources, to manage grades, or communicate with students (Woods et al, 2004; Garcia-Valcárcel and Tejedor, 2009; Laurillard, 2007; Waycott et al, 2010 as cited by Repetto, 2011). While certainly these routine types of course management functions should be supported and are to be expected, the artifacts provided by participants in this study demonstrated uses that supported instruction more directly in the design and delivery of their hybrid courses, most of which were student-centred. As found by Becker (1994) and Becker & Riel (1999) low-level technology uses are usually related to teacher-centred practices while high-level uses are typically student-centred, or constructivist, practices (as cited by Ertmer, 2005).
6.2. Linkages between Perceived Technology Integration Barriers and Enablers

Analysis of the themes from the participant interviews revealed linkages across the perceived barriers and enablers. These have been classified into two overarching categories: Instructor Beliefs and Professional Development Experiences, and Implementation Experiences. The discussion and interpretation in this section is framed around these two categories.

6.2.1. Instructor Beliefs and Professional Development Experiences

Beliefs have been shown to influence teacher adoption of technology, therefore, discussion will first address the role that beliefs played for participants since the literature points to this intrinsic factor as being the most notable barrier to pedagogical change (Ertmer, 2005; Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur & Sendurur, 2012; Pajares, 1992). This is followed by a discussion about the role training and peer networking and support served as part of technology integration professional development.

Instructor adoption of technology: Beliefs a barrier?

Research has shown that teacher beliefs are a significant second-order barrier to technology integration (Ertmer, 2005; Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur & Sendurur, 2012). Ertmer (2005) has defined this barrier as intrinsic and shaped by, “beliefs about teaching, beliefs about computers, established classroom practices, and unwillingness to change” (p.48). However, the majority of participants in this study demonstrated that their beliefs functioned to enable their integration efforts rather than present a barrier. This is supported by the sub-themes nested within this study’s enabling theme of advancing pedagogical craft. For example, commitment to change or innovation and personally driven PD both serve as an indication of participants’ willingness to change and alter their established classroom practices through the use of technology. All participants in this study expressed a general to high degree of
comfort with using technology, and keenly spoke about the time and effort they have invested in using technology to support their teaching, one participant describing it as “a labour of love”, and even when confronted with technological complexity they generally persevered. They were also clear in viewing technology as a tool, that its use should be grounded and guided by curricular and instructional needs. In a study by Aldunate and Nussbaum (2013) on teacher adoption of technology they found that teachers who possessed the aforementioned qualities were more likely to adopt new technology than those who were mass adopters or laggards (Rogers, 1995). This serves to demonstrate that the participants in this study are likely further along the technology acceptance belief continuum than those whose beliefs may currently pose a barrier. This is an important finding because perceived integration barriers explicated by these receptive adopters will likely be amplified for those yet to consider integration efforts. Certainly, measuring beliefs is inherently difficult (Pajares, 1992), generally its only possible to do through inferences based on what instructors say, intend and do (Kagan, 1992; Kane et al., 2002, Nespor, 1987 as cited by Ertmer 2005), this is why the submitted document artifacts provided a more tangible indication of beliefs that support the use of technology in pedagogy.

**Hybrid development training**

There is a distinct connection between instructors who seek to advance their pedagogical craft and the training they take to achieve that goal; therefore, training plays a key role in assisting instructors in developing technology integration knowledge and skills they need to achieve their goals. Based on comments by research participants, it would seem that the design of the training they received may not have fully considered the prior knowledge of instructor trainees, i.e. beginner, intermediate, advanced, both from the perspective of existing technology competencies, and prior knowledge and experience regarding hybrid and online. This finding resonates with a study at the University of South Africa where Bothma and Cant (2011) noted that for training to be effective and meaningful it should be structured to scaffold levels of use from beginner to more advanced levels. This suggests that design of training for instructional faculty could benefit from the application of instructional design
principles, commencing with analysis of the learners existing knowledge and skills and their training needs (Branch, 2009; Morrison, Ross, Kalman and Kemp, 2011).

Reflective comments from a few of the participants in this study tend to indicate that the HDT course was being built as it went along, i.e. just in time delivery, so it seems reasonable to conjecture that the analysis phase for the design of the HDT course may have been limited in scope or not undertaken. The analysis phase in instructional design, i.e. ADDIE (Branch, 2009), seeks to identify the learning or performance problem and the resources needed to undertake the creation of an intentional learning space, tool or product to close the knowledge or performance gap in the target learner population. The needs assessment (Branch, 2009; Morrison, Ross, Kalman and Kemp, 2011) establishes, amongst other things, the current knowledge base of the learner population. This phase of ADDIE is critical because it forms the foundation that informs the rest of the ADDIE process, i.e. Design of the blueprint for learning, Development, Implementation, and Evaluation. A learner needs assessment will also make evident if the training intervention needs to be designed for different levels of learner development, i.e. beginner, intermediate or advanced.

Another training aspect of concern for the study’s participants was the perceived predominante focus on the functionality of the technology, i.e. the “how to” aspects, as opposed to the pedagogical “why” and “what for”. Moersch (1995) found that, “Although most training programs helped teachers increase computer skills at the mechanical level, little information or support was provided at the instructional level. Thus, teachers completed technology training courses still not knowing how to create or implement activities that incorporated meaningful uses of technology” (as cited by Ermter, 1999, p.55). This has been cited as a persistent weakness in traditional training programs (Ertmer, 1999) and appears to resonate with the limited pedagogical coverage cited by participants in the HDT course.
The syllabus for the HDT course outlined pedagogical discussions in four of the 11 F2F sessions; however, the majority of participants felt the pedagogical coverage was limited or too generic in nature, they wanted more substantive discussions on what best moved into an online environment and why. This could point to the need for a training model that ladders from the “how to” functionality of technology to pedagogically focused sessions that more deeply explore the “why” and “what for” aspects. In a study on Web-Enhanced Learning (WEL) at the University of Genoa, in collaboration with the Institute of Educational Technology of the Italian National Research Council, Repetto (2011) found that instructors:

… mainly stressed the need to develop skills for creating innovative tools for web-enhanced learning, and above all to learn the basics of ID in order to identify: which strategies are most effective for each educational objective… [and] which learning activities can acquire added value if achieved online” (p.193-194).

In other words, what moves best into the online environment and why, further that they saw acquisition of ID basics as a way to “simplify the preparation of learning material and the planning of learning activities, as well as improve students’ involvement and motivation” (p.194). Repetto’s (2011) study also echoes the need to pay particular attention to treatment of pedagogical issues in training programs and designing them around the participants’ skill levels, thus supporting the need for application of instructional design principles in the creation of PD training and the notion of a component-based or laddered training model that would allow instructors to enter training at a point that is most appropriate to their level of development and needs in terms of new knowledge and skills acquisition.

It’s possible that the initial design of the HDT course may not have been able to accommodate pedagogical content more fully due to the scope of the pilot project; however, half of the research participants felt that the focus of the training was likely linked to the background of the trainers, i.e. more technology-centric. The unit that designed and delivered the training course is also the functional area responsible for providing instructional design support at the
college possibly implying a linkage to why most of the participants also cited barriers related to instructional design support and standards. Affecting second-order change, i.e. instructor pedagogical beliefs, through training is likely unfamiliar territory for professional development trainers. As Garet, Porter, Desimone, Birman & Yoon (2001) note, “… knowing how to facilitate and support these types of changes is much less familiar to staff developers who typically have been concerned with facilitating first-order change” (as cited by Ertmer, 2005).

For more than half of the participants that taught a hybrid or online course the delivery of the training course as a hybrid itself served to deepen their understanding of the student experience in online elements of a course. That authentic, situated experience (Bandura, 1997; Vygotsky, 1978) was instructive in helping shape course design considerations for their own courses. One participant even thought it ought to be mandatory for instructors to experience a hybrid or online course before developing one of their own. While another participant said she now routinely encourages her peers to take a hybrid or online course to understand that experience through a student’s lens. Ertmer et al. (2012) recommend that institutions should use the same technology in training that teachers will use in their teaching. This endorses the notion of PD tools matching authenticity for intended application much like the HDT course did being delivered as a hybrid using the LMS that instructors would ultimately use in their own hybrid courses. More than half of the participants that developed and delivered a hybrid course after training spoke about the relative advantage (Rogers, 1995) of hybrid delivery, providing an indication that these positive experiences also served to create positive beliefs about the use of technology in teaching. As a result, the training unit may wish to reconsider offering the training course as a hybrid since beliefs are formed and shaped through direct experiences (Ertmer, 2005; Pajares, 1992).

**Peer networking and support**

Most of the participants spoke positively about interactions, both formal and informal, with their peers while developing their competencies around
technology integration. There is research that demonstrates peer support or mentoring models can be effective in fostering new skill development. For instance, Kopcha (2012) undertook a two-year study, of which the first year involved one-on-one peer mentoring. The study found that the dedicated mentor played a key role in promoting positive beliefs about technology, and helped improve beliefs about teachers’ abilities to plan and implement technology-integrated lessons. Year two of the program transitioned to a teacher-led Community of Practice (CoP); however, it found that this phase of the study did not substantially support teachers or influence their pursuits for further professional development. In contrast, Polly et al. (2010) cited the Technology Fellowship Program (TFP) at the University of Memphis that was guided by “Wenger’s (1998) general principles and Cambridge et al.’s recommendations (2005), [for the purpose of engaging] faculty in instructional technologies (Chism, 2004) in their fields” (Polly et al., 2010, p.61). The TFP model employed a multitude of approaches (i.e., hybrid instructional strategies, groups sessions, hands on labs, etc.) and garnered much more success, receiving one of four nationally recognized CoPs by EDUCAUSE. This dichotomy of CoP outcomes is not entirely unusual as their formation and functioning should flow naturally, and directly from the needs and norms of the social system they are intended to serve (Wenger, 2009). As Schwen and Hara (2003) aptly state, “[a]n imposed intention on community members is an arrogance of intentionality that subverts the social foundation” (p.263) and would profoundly affect their likelihood of success. Therefore, a peer support model that reflects the features of a CoP should be designed in collaboration with the members it intends to support and serve. This approach acknowledges and respects that with CoPs, “[l]earning is often not a formal agenda, but... a secondary outcome of becoming knowledgeable while working in the field” (Schwen and Hara, p. 261).

Two of the participants in this study spoke of a recently formed hybrid development network at the college that seems to reflect some of the qualities of a CoP, though attending all meetings has not always been possible due to scheduling conflicts. The LMS used by the college has a community function that could be leveraged to create a virtual meeting space and resource centre as this
fledgling CoP establishes itself, its norms, social structure, etc.; however, Wenger (2009) has indicated that CoPs are more likely to flourish in virtual environments if they have solidified their formation prior to moving into that sphere. Therefore, particular attention should be given to assessing the needs and desires of the CoP before embarking on the creation of an online CoP space.

6.2.2. Implementation Experiences

Infrastructure and funding are all enabled through support from the institution and without that technology integration would likely only occur in small pockets throughout the college by techno-alchemists, innovators and early adopters (Rogers, 1995), or Lone Rangers (Bates & Poole, 2003). The reality is, however, institutions throughout the post-secondary sector recognize the value of technology and invest heavily in it. Technology has become a staple in the design and delivery of many of the programs and services institutions provide to their students, and to facilitate the streamlining of operations. Exploring actual technology integration experiences into pedagogical practice can provide meaningful insights into the barriers and enablers instructors encounter with achieving this goal. In this section the discussion and interpretation of cited barriers and enablers is classified into two categories: Institutional Vision and Knowledge Building, and Technical Infrastructure and Supporting Mechanisms.

**Institutional Vision and Knowledge Building**

The definition of technology integration can mean different things to different people depending upon the ascribed to vision. For instance, is success measured by the amount of equipment that has been acquired, or the amount of learning that has occurred? Both perspectives can contribute the vision of technology integration but if the ultimate goal is a highly effective teaching and learning model then amount of learning becomes the bar by which success is measured.
Empirical evidence has demonstrated the role that beliefs serve in understanding teacher behaviour (Calderhead, 1996; Clark & Peterson, 1986; Kane, Sandretto, & Heath, 2002; Pajares, 1992 as cited by Ertmer, 2005); however, a number of studies have also shown a disconnect can form between teacher beliefs and actual practice as a result of interference from contextual factors (Fang, 1996 as cited by Ertmer, 2005). Institutional vision can form a context factor that can serve to impede technology integration efforts when it does not align with teacher beliefs. For example, concerns about the institutional rationale for hybrid were raised by half of the participants, specifically they felt the institutional framing needs to be more about the pedagogical value of teaching via hybrid instead of being linked to creating more classroom space thus potentially posing an impediment to larger scale adoption of hybrid at the college. Even when instructor’s technical knowledge has been found to be low they will still choose to incorporate it if they see value in doing so, but will conversely resist integration, “for the mere sake of technology” (Waycott et al., 2010 as cited by Repetto, 2011, p.191) Ultimately, while the hybrid rationale did not pose an integration barrier for the majority of the participants in this study, likely given their adopter attributes, it was an issue nonetheless that some felt compelled to share and again could be more significant for those not yet convinced in the reasons to pursue hybrid delivery if merely for the sake of creating more classroom space.

In considering a path forward, Wheeler (2011) has found consultation with academics and professionals responsible for technology integration while “long and tedious” (p.54) is ultimately worth the effort to come to a mutual understanding on a joint vision and goals to achieve it. As observed by the Education Development Center (1996):

… [i]t is not training in the technology but training in how to leverage the technology to provide, increase, improve, and/or assess student learning (p.8)... [r]ather than focusing on technology per se, professional development experiences might be more effectively linked to new visions for teaching and learning, rather than the development of user proficiency in the operation of specific software and hardware (as cited by Ertmer, 1999, p.59).
Here we see a coalescing of institutional vision focused on teaching and learning achieved through collaboration and professional development that is focused on leveraging the pedagogical affordances of technology to enrich and improve student success.

Two other aspects that tie into achievement of the institutional vision are affordance for development time and class size for hybrid and online courses. Time constraints are an often-cited barrier in achieving technology integration goals. For instance, Wheeler (2011) notes that:

... university lecturers tend to spend most of their time on the preparation of teaching sessions, the creation of resources, teaching and marking and there is very little time available for learning new methods or tools... The extent of usefulness of a new tool can only be demonstrated through trial within an authentic context, so realistically, teachers need to be given time to try out new tools before they accept their relevance and usefulness (p.53).

A number of instructors in this study cited concerns with affordance for development time and there may be some merit to this concern. As discussed in the findings chapter, the Faculty agreement does not address the more substantive work that is required for innovative course design and development such as hybrid, rather it is limited to minor development for off the shelf courses and redevelopment of existing distributed learning courses. Rogers’ (1995) Diffusion of Innovation Theory defines five characteristics of an innovation as perceived by the members of a social system that determines its rate of adoption, i.e. relative advantage, compatibility, complexity, trialability, and observability. Rogers (1995) has indicated that not all five attributes will be perceived with equal importance by potential adopters. In the context of affordance for development time, trialability and compatibility may hold greater importance to potential hybrid adopters at the college. Rogers (1995) defines compatibility as “the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters” (p.15) while trialability “is the degree to which an innovation may be experienced” (p.16). Certainly beliefs about the compatibility of an innovation will be formed based on
exposure to it, meaning instructors cannot determine the suitability of technology integration into their pedagogy without sufficient time to explore meaningful uses of it. Therefore, affordance for development time should be viewed as a context factor for the success of technology integration vision such as hybrid development.

Leveraging technology for meaningful online interaction and learning can be a powerful instructional strategy; however, it’s only sustainable with appropriate class sizes as cited by a few participants. Their experience-based viewpoint aligns with Weston and Cranton (1986) who indicate online group discussions is an interactive instructional method best suited to small class sizes. In Repetto’s (2011) study he found that class size was a determining factor for an online instructional approach. In classes with larger numbers of students the instructors tended to a content-driven instructional approach whereas if the class size was small they switched to a Networked Collaborative Learning approach (NCL, based on online collaborative learning), i.e. student-centred or constructivist. Repetto (2011) also referenced similar findings by Puddu et al, 2008. Given that online discussion was a prevalent instructional strategy employed by the participants in this study, consideration should be given to reviewing class size limits for hybrid and online courses at the college as a context factor that can serve to facilitate the rate of hybrid adoption and enable a rich and highly interactive learning experience for students.

**Technology Infrastructure and Supporting Mechanisms**

Technology infrastructure and support are important elements in supporting the efforts of faculty with their technology integration goals. Some participants cited consultative technical support as being most helpful when they have sought it out. Further, there seems to be a genuine appreciation for the support that is provided and positive interactions with the staff in the educational and information technology department. This type of infrastructure serves to support those ready and willing to explore technology-supported pedagogy, i.e. those seeking to advance their pedagogical craft. However, there were some issues related to technical infrastructure and support that were cited by
participants. For example, half of the participants that taught a hybrid or online course spoke positively about the technology-rich environment at the college, and how the equipment, hardware and software were enabling factors for them. While technology resources are a key ingredient to achieving institutional goals surrounding adoption of hybrid and online delivery, being technology-rich does not necessarily translate to widespread adoption. Ertmer (1999) referenced studies by Means and Olsen (1997) and Fisher et al (1996) that found efforts to eliminate first-order technology integration barriers, e.g., equipment, time, training, support, “are easy to measure and relatively easy to eliminate...[though] the underlying assumption was that once adequate resources were obtained, integration would follow” (p.50). In a subsequent study, Ertmer et al (2012) further confirmed that first-order barriers tended to be more of a barrier than second-order barriers, i.e. those internal to teachers. Only a few of the teachers in that study cited their own drive and personal beliefs as being the most significant barrier for them thus suggesting to those authors “that the best way to bring more teachers on-board is not by eliminating more first-order barriers, but by increasing knowledge and skills, which in turn, have the potential to change attitudes and beliefs” (p.433). This finding ties in with the need to design and develop training programs that teach meaningful pedagogical uses of the resources available in this technology-rich environment, and collaboratively building institutional knowledge around the pedagogical affordances of technology in advancing and enriching student learning.

The majority of participants that developed and delivered a hybrid course spoke about the investment of time in providing student orientation to the LMS or troubleshooting technical issues with them. A few participants viewed this as a real concern because it typically cut into valuable instructional time at the beginning of the course and some saw this really as the type of support that should be provided by educational and information technology staff not instructors. Only one participant spoke about a series of videos the college produced that were created to provide student orientation to the LMS. This signals that there may be opportunities to create greater awareness of this resource amongst instructors so they can direct students to it and possibly
alleviate some of the front-line tech support demands of students. Another possible way to ease LMS orientation time with students is to have students themselves create troubleshooting tips in a class log or journal (Ertmer, 1999). This can serve as a FAQ built by students for students. It also models student-centred approaches to building socially constructed knowledge, in this case about the tool they collectively use as part of their educational experience at the college.

Finally, more than half of the participants that designed and delivered a hybrid or online course spoke about frustrations with the LMS. Concerns about this aspect of the technology infrastructure centred on features and functionality and general maintenance issues, i.e. stability, upgrades, etc. The topic of features and functionality spanned issues related to LMS integration with publisher’s online textbooks, difficulties working with LMS file management system, grade book/centre, and Collaborate to comparisons to other LMS tools like Canvas, Moodle, Desire to Learn (D2L) that were perceived to be more user friendly and possessing needed features not available in Blackboard. It is not clear if there is a routine evaluation cycle in place for the college’s LMS, if not, it might be useful to conduct one to see how widespread these issues are and whether there are important pedagogical needs not being served by the current LMS. The issues related to the stability and maintenance of the LMS touched on the need for a more collaborative process regarding scheduling of maintenance and upgrades because they can have a huge impact for courses with online elements, i.e. conflicts with assignment submission deadlines to LMS upgrades that result in changes to core features such as how to upload an assignment. These types of issues are more operational in nature but could be integrated into institutional knowledge building discussions about how to support and achieve widespread adoption of technology integration into pedagogical practices.

6.3. Recommendations for practice

Discoveries yielded from this study provide an indication that certain strategies may be assistive in achieving technology integration goals. Some
opportunities have already been identified in the prior section; however, implementation of all identified opportunities may not be feasible. Therefore, a core set of strategies is offered for PD Designers and Trainers, and Institutional Administrators.

6.3.1. Professional Development Designers and Trainers

There are a number of PD models reflected in the literature and the selection of a particular model will largely depend on the overall purpose for PD within an organization (see Figure 6.1).

Figure 6.1 Spectrum of Continuing Professional Development (CPD)

<table>
<thead>
<tr>
<th>Model of CPD</th>
<th>Purpose of model</th>
</tr>
</thead>
<tbody>
<tr>
<td>The training model</td>
<td>Transmission</td>
</tr>
<tr>
<td>The award-bearing model</td>
<td></td>
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<tr>
<td>The deficit model</td>
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<tr>
<td>The cascade model</td>
<td></td>
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<tr>
<td>The standards-based model</td>
<td>Transitional</td>
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<tr>
<td>The coaching/mentoring model</td>
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<tr>
<td>The community of practice model</td>
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<tr>
<td>The action research model</td>
<td>Transformative</td>
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<tr>
<td>The transformative model</td>
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</tr>
</tbody>
</table>

(Kennedy, 2014, p. 349)

The spectrum moves from the well-known and widely used training model that is an “effective means of introducing new knowledge (Hoban, 2002), albeit in a decontextualized setting... [however, what this] model fails to impact upon in any significant way is the manner in which this new knowledge is used in practice” (as cited by Kennedy, 2014, p. 339); it simply serves as a form of transmission typically with the agenda for learning determined by the deliverer. The other end of the spectrum embodies a transformative model that captures appropriate elements of the other models “with a real sense of the awareness of issues of power... [found in the other models, thus providing] an antidote to the constricting nature of the standards, accountability and performance management agenda” (Kennedy, 2014, p.348). What this serves to underscore is that PD is multi-faceted and moves along a continuum with a variety of
approaches contributing to development of professional knowledge and skills. Beavers (2009) adds to this narrative noting that, “[t]here are numerous resources and studies detailing the components of effective professional development; however, these models can be quite extensive and potentially overwhelming… [b u t ] by incorporating a few basic principles established in the field of adult education, teacher professional development can dramatically increase its effectiveness” (p.26). The following recommendations capture this notion based on findings from this study.

**Model for Professional Development Design and Delivery**

The concept of a laddered training model could yield significant benefits for far transfer of skills and abilities and longer-term success for institutional technology integration goals. The notion of laddered PD is endorsed by Kirkpatrick and Kirkpatrick (2013) who posit that PD designers should “[t]hink of the training program not as an event, but as an ongoing process with multiple components” (p.27). In the same vein, Polly et al. (2010) “recognized that faculty members represent different stages on the continua of professional development with instructional design and technology integration” (p.63); therefore professional development must accommodate these differences and the various stages of development amongst faculty, an assessment that aligns with findings in this study. A PD design such as this would allow faculty to enter PD at a level appropriate to their current skill level and provide similarly appropriate successive training to progressively build and reinforce skill acquisition to mastery levels, possibly with three dedicated streams: technology (features and functionality), pedagogical applications, and instructional design. The pedagogical stream could include realistic and relevant scenarios (Wheeler, 2011), guest speakers who are considered experts in pedagogical applications of technology, and presentations of authentic applications used by peers with access to the same technology. Beavers (2009) notes that adults learn differently, especially well educated ones such as teachers, so a PD environment that allows for collaboration, sharing, and problem-solving has the added benefit of building community with peer learning oftentimes continuing after PD activities conclude.
Ultimately, “professional development is more than a series of training workshops, institutes, [and] meetings… It is a process of learning how to put knowledge into practice through engagement in practice within a community of practitioners” (Schlager & Fusco, 2003, p.205) – that requires an integrative approach. There is a growing shift in the delivery of PD that is transitioning to an integrative approach and it is borne out of the recognition that disconnected drop-in workshops do not adequately meet the needs of faculty in helping them appropriately integrate technology into their teaching. This shift also includes changes in modes of delivery where [emphasis added]:

… some campuses are offering faculty a choice of face-to-face or online tutorials to provide basic information about campus resources and pedagogical tools as a strategy for better accommodating faculty members’ busy schedules… [and] Online and blended/hybrid offerings will be an increasingly larger part of the learning experience (Austin & Sorcinelli, p.93).

**Post-PD support and follow-up**

To further support transfer of knowledge and skills into practice, Kirkpatrick and Kirkpatrick (2013) indicate that it is necessary to build in post-training activities because “[r]esearch by Robert O. Brinkerhoff shows that only 15 percent of what is learned during training will be applied on the job if it is not reinforced and monitored“ (p.27). One of the key implications from Kopcha (2012) was the need to consider ways to offer follow-up support as part of their PD on technology integration efforts. As Kirkpatrick and Kirkpatrick (2007) posit, “sometimes it is best to wait until new behaviours have had a chance to take root. Two or three months after training are a good rule of thumb. For others, six months is more realistic“ (Chapter 5). In the context of higher education, allowing instructors at least the duration of one semester (i.e., 4 months) would be a reasonable time frame for first follow-up. A follow-up process would also include an evaluative component to assess the effectiveness of training, providing a feedback loop for refinements or improvements to the training model to ensure it remains relevant and responsive to the PD training needs of instructors. It could
also serve as a check-in to informally assess integration progress and to offer assistance or support where indicated.

**Collaborative Instructional Design (ID) support model**

Affordance for development time is an issue that has been reported in studies regarding adoption and integration of technology into teaching practices. Kopcha (2012) found that teacher “perception of time was consistently negative, even as their access to technology and training improved and they learned more about teaching with technology” (p.1118). In another study, Polly et al (2010) reported “faculty members were more willing to integrate technology when they were given... course release time” (p.61). It is possible that as faculty become more conversant with the vast suite of technology options, the sheer magnitude of assessing them for their specific instructional context simply becomes time prohibitive given other faculty demands (i.e., scholarly research) thus calling into question whether they believe the pay off is worth the investment of time. Some participants in this study cited the need for more development time when creating innovative course offerings such as hybrid; however, increases in time release alone may not necessarily lead to increased adoption of technology into pedagogy or even high level uses, i.e. student-centred. Provision of just-in-time instructional design support could help ease the time commitment on the part of instructors integrating technology into their pedagogy, by providing expertise around design standards and appropriate tools to support specific instructional objectives.

Another model for instructional design support that moves beyond just-in-time support is one advanced by Polly et al. (2010). In their study the instructional designers agreed that instructors, “would more effectively integrate technology with [their] support and more time invested during the design and planning of technology-rich activities” (p.66). They wanted to move away from the perception of a technical support unit to one where collaboration with instructors focused on the teaching objectives rather than the tools (Polly et al, 2010). Some participants felt the staff in the educational and information technology department did not fully understand their teaching realities, so their perception of
instructional design as a barrier may simply reflect the need to integrate this aspect of technology integration support into the broader knowledge building dialogue at the college, and/or dedicated ID training streams for faculty. Certainly greater utilization of instructional design supports and application of standards would assist in streamlining hybrid development and afford a more consistent approach to online elements across courses thus leading to a continuity of experience for students enrolling in hybrid courses. Application of universal design standards could also reduce course development time and contribute to a reduction in the need for instructors to provide or embed LMS orientation into their hybrid or online courses. An evaluation of current supports in relation to instructor needs may be assistive in identifying awareness of services, current needs of instructors and possible ID resourcing gaps.

6.3.2. Institutional Administrators

Assess and understand context factors

All perceived barriers cited by participants were extrinsic or first-order, meaning they are external to instructors. Since this study’s findings are limited to a small group of instructional faculty it may be beneficial to more broadly assess and understand beliefs about the extrinsic context supports needed to facilitate adoption of hybrid and online delivery. The Beliefs About Teaching with Technology (BATT) survey instrument developed by Lumpe and Chambers (2001) would facilitate this goal. BATT was developed for K-12 settings, but the majority of the items on the instrument are generic to technology integration issues; items that are K-12 specific could be replaced with items more suitable to a post-secondary setting. Identification of low scoring BATT items would help focus and prioritize college efforts on what context supports require attention over others.

Institutional Knowledge-building

There is a need to engage in collaborative knowledge building around introduction of innovative ways to deliver courses, such as hybrid and online.
Participants cited concerns over the institutional rationale that hybrid delivery will address classroom space issues at the college. Reframing the narrative about the pedagogical benefits of hybrid as a powerful teaching and learning model would be assistive in re-engaging and drawing in instructors that may have opted not to adopt given the current institutional rationale for hybrid. Instructors need to see the teaching and learning value in hybrid, something that can be achieved through collaborative dialogue between instructors and administration, instructional designers and instructors, amongst instructors, and instructors to students.

6.4. Limitations of study

6.4.1. Sample size

This case study examined the technology integration experiences of 10 instructors after they completed training designed to impart the necessary skills and abilities to do so. Given the relatively small sample it precludes broad empirical generalization, though it can be viewed as contributing to the growing body of literature on barriers and enablers to technology integration in to pedagogical practice. Also, given that participation in the study was purely voluntary, it is possible that individuals that chose not to participate may have had different post-training technology integration experiences and/or held different beliefs about the use of technology to support teaching. Finally, a larger sample of one-on-one interviewees may have changed the proportions of instructors that had actualized their PD training and introduced different perspectives on post-PD training experiences.

6.4.2. Scope of data collection

The scope of data collection was guided by the chosen research methodology, i.e. qualitative case study via one-on-one interviews and document analysis. The sampling goal of 10 participants was achieved relative to the population frame of 34 instructors that engaged in the training program. As is
typical with a qualitative research study the goal is to obtain a rich tapestry of stories that would not otherwise be possible through quantitative methods, such as surveying. Certainly, the results of this study could be used to inform the design of survey to see if the findings transfer to the larger instructional faculty at the college.

Document artifacts were provided by five of the seven participants that developed and delivered a hybrid or online course(s), so it is possible that additional insights could have been realized from the two participants that did not provide documents or they may have simply further reinforced the study’s results.

The functional unit responsible for the training course was accommodating in providing the list of the HDT cohort, and details they had regarding the training program, i.e. course syllabus, etc. Further, documents pertaining to the institutional support and rationale for the training program were openly available on the college’s website thus facilitating insights on the institutional support and rationale for the pilot program.

6.5. Future research

In terms of future research, it would be beneficial to explore whether these findings also transfer to other types of public post-secondary institutions (i.e., research- or teaching-intensive universities, institutes, etc.) and their private sector counterparts. There is likely to be some differences in the types of instructional faculty these institutions attract, their technology context supports, including differences in PD design and delivery models that may produce further insights into teacher beliefs regarding technology integration thus building upon the sparse body of literature in this area.

Another area of enquiry would be to study the effects of current integration efforts through the examination of student outcomes of hybrid courses relative to their F2F counterparts because ultimately the goal of technology
supported pedagogy is intended to lead to increased student learning (Ertmer, 2005).
References


Kopcha, T. J. (2012). Teachers' perceptions of the barriers to technology integration and practices with technology under situated professional development. *Computers & Education*, 59(4), 1109-1121. doi: http://dx.doi.org.proxy.lib.sfu.ca/10.1016/j.compedu.2012.05.014


Repetto, M. (2011). The WEL project at the university of genoa: Effects on faculty attitudes and teaching practices. In M. Repetto, & G. Trentin (Eds.), Faculty training for web enhanced learning (pp. 189-203). Hauppauge, NY, USA: Nova.


Appendices
Appendix A.

Interview Protocol

---

**Project:** Exploring barriers and enablers to technology integration into pedagogical practices

Date: ___________    Interviewer: ___________

Time of Interview: ___________    Interviewee (pseudo): ___________

Place: ___________

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I would like to thank you very much for coming today. Before we get starting I'd like to provide you with some details about my research project. I am a student at Simon Fraser University (SFU) working on my thesis research project. The purpose of my research study is to explore barriers and enablers that faculty have experienced with integrating technology into their pedagogy.

Today's session will be recorded so I don't miss any of the important details we discuss. Any notes I might take, and the audio recording will be transcribed after this session without identifying information, and will be kept confidential and will only be used for this research project. No reference will be made in verbal or written form that could link your name to the project. I do not foresee any potential risks or discomfort to you as a result of participating. The total time I anticipate being here would be roughly 60 minutes. You are free not to participate and to withdraw from participation at any time. Would you like to participate in the study?

If you have questions or concerns at any time about the study or the procedures, you may contact my thesis supervisor, Dr. Cheryl Amundsen at [Hand the official SFU consent form for human participants to the interviewee. Allow them time to read it over and sign] or by e-mail at [Hand the official SFU consent form for human participants to the interviewee. Allow them time to read it over and sign] [Once they have signed the consent form, turn on the audio recorder, test it and proceed]

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1. How would you describe your training experience?

   **PROBES:**
   - What was the most important learning you took away from the training?
   - Were you confident to proceed in developing your course(s) once the training was completed? Why?

2. What has been your experience with technology since taking that training?

3. How have you integrated technology into your pedagogical practice since attending the PD session?

   **PROBES:**
   - If interviewee HAS NOT integrated technology:
     - What factors do you believe impeded your ability to integrate technology into pedagogical practice, and why?
     - What factors do you believe enabled your efforts, and why?

     - What could have been done differently to help you succeed?
     - Are there different or additional institutional supports that would help?
     - If so, what and why?
If interviewee HAS integrated technology:
- How would you describe your experience with integrating technology? How did technology integration work in actual practice?
- What factors do you believe impeded your ability to integrate technology into pedagogical practice, and why?
- What factors do you believe enabled your efforts, and why?
- Do you have examples of how you’ve integrated technology into your course[s], e.g., course syllabus, outline of a course assignment, etc. [Collection of artifacts for document analysis]

If they did encounter some issues/challenges, ask them:
- What would you do differently next time?
- Are there different or additional institutional supports that would help?
- If so, what and why?

That concludes my questions. I would like to thank you very much for taking time out of your schedule to participate in my study. I am very grateful for your invaluable input and once again I’d like to assure you that all responses collected from the study’s one-on-one interviews remain confidential.

Do you have any questions for me?

Once I have transcribed the audio recording of your interview, I’d like to send you a copy of the transcription so you can review and make any changes you wish. [This follow-up would be for the purpose of member checking]

Again, I want to thank you very much for your time and participation in my study.
Appendix B.

Email Invitation

EXAMPLE OF EMAIL INVITATION TO PROSPECTIVE STUDY PARTICIPANTS

Re: Your technology integration experiences since taking [ ]

Dear [Prospective Study Participant],

I’m writing to you because you took the [ ] sometime between Fall 2009 and Winter 2012.

I’m currently on leave from Douglas College to undertake thesis research about the integration of technology into pedagogical practices in higher education. The purpose of this research is to understand the actual experiences of faculty as they consider integrating technology to varying degrees into their pedagogy. This study seeks to explore the current barriers and enablers to technology integration, and how those experiences connect with current literature or reveal emerging factors.

I believe you could make a valuable contribution to this study by sharing your experiences with technology since taking the [ ] course, regardless of whether you have made many or no changes since then. I’d like to spend approximately 30 – 60 minutes in a one-on-one interview with you sometime between [date] and [date] at a time convenient to you to discuss your experiences.

Your participation in the interview will be kept confidential and after I’ve transcribed the interview I will send you a copy of the transcript for you to review and make any changes you feel are needed. If you choose to withdraw from the study, I will destroy all of the material that I have collected from you for this study and it will not be used in my research. Information obtained for this study will be used for research purposes only.

In the long run, we all benefit from a better understanding of the opportunities and challenges associated with efforts to integrate technology in higher education. After the interview, as a small token of my appreciation for your time and participation in this study, I’d like to give you a gift of a $10 coffee card.

Please let me know if you are willing to be interviewed by replying to me, the study’s principal researcher, at [ ] on or before [date].

Best regards,

Pamela Bischoff
SFU MA student
Appendix C.

Informed Consent Form

SIMON FRASER UNIVERSITY

Consent Form for Exploring Barriers and Enablers to Technology Integration into Pedagogical Practices

Principal Investigator: Pamela Bischof, MA Student, Faculty of Education, Educational Technology and Learning Design, Simon Fraser University. Phone: [REDACTED], Email: [REDACTED]

Research Sponsor(s): None

Purpose:
The goal of this research is to understand the experiences of faculty as they integrate technology into their pedagogical practices. By exploring the perspectives of study participants, it is anticipated that this research will lead to an improved understanding of the current barriers and enablers to technology integration into pedagogical practices and how those experiences connect with current literature or reveal emerging factors.

Study Procedures:
Your voluntary participation in this study will involve;

- an interview of approximately 1 hour in duration where you will be asked about your experiences with integrating technology into your pedagogical practice since taking the [REDACTED] course from the [REDACTED] College. With your permission the interview will be recorded and then transcribed to accurately record your views and experiences. If you would prefer that the interview not be recorded, written notes alone will be taken.
- a request for a copy of the course syllabus and a representative example(s) of a course assignment, pre- and post- [REDACTED] training, will be sought for document analysis.

Potential Benefits:
The interview will provide you with the opportunity to voice your opinion on your experiences, and this will add to knowledge about how faculty perceive the facilitators and barriers to technology integration.

If you are interested in learning about the results of this study, please provide your contact details at the bottom of this form to receive a copy of the thesis paper. You may also indicate if you wish to be informed about when the study results will be presented.

Potential Risks:
This is a minimal risk study as there are no known or anticipated risks to you by participating in this study.

Confidentiality:
Your confidentiality and the confidentiality of the data you provide for this study will be protected through secure storage. No one but the principal investigator and her thesis supervisor will have access to your information. All study data will be destroyed two years after the successful thesis defense of the principal investigator.

You will not be identified in the writing-up or presentation of this study’s findings. That is, your name and any other piece of information that could potentially identify you as an individual will not be included in the writing-up.
of or presentation of this study’s findings. Selected, non-identifiable quotes of study participants that connect with the literature and/or validate analytical findings will be included in the study’s report. The principal investigator requests that all participants refrain from disclosing their participation in this study to ensure confidentiality is maintained.

Dissemination of Results:
It is anticipated that the results of this study will be shared with others in the following ways. As part of the principal investigator’s program of study, she is required to write-up her research in the form of a thesis for approval by a committee. The results of the study may also be published in a scholarly journal and presented to interested groups, i.e. conference presentation.

Remuneration/Compensation:
There is no specific remuneration or compensation for participation in this study, however the principal investigator would like to provide a gift of a $10 coffee card as a small token of her appreciation for your time.

Contact for information about the study:
If you have any questions or desire further information with respect to this study, you may contact Pamela Bischoff, Principal Investigator [(please provide contact information)] or the principal investigator’s thesis supervisor, Dr. Cheryl Amundsen, Faculty of Education, Simon Fraser University [(please provide contact information)].

Should you wish to obtain information about your rights as a participant in research, or about the responsibilities of the principal investigator, or if you have questions, concerns or complaints about the manner in which you were treated in this study, please contact the Director of the Office of Research Ethics, [please provide contact information] at Simon Fraser University, 8888 University Way, Burnaby, British Columbia, V5A 1S6 Canada.

Consent:
Your participation in this study is entirely voluntary and you may refuse to participate or withdraw from this interview or study at any time without any consequence. If you withdraw, your data will be destroyed and not used in the study’s final report.

Your signature below indicates that you have received a copy of this consent form for your own records. Your signature indicates that you consent to participate in this study.

__________________________________________________________
Subject Signature Date: ____________________________
(Month/Day/Year)

__________________________________________________________
Please provide your contact details if you are interested in attending the thesis defense of this study’s results and/or receiving a copy of the final report:

Address: __________________________________________________

Phone #: ____________________________ Email: ____________________________

Please send me a copy of final report Please notify me about the thesis defense scheduling
Appendix D.

College REB Approval Letter

Name, address, and email of principal researcher: Pamela Bischoff, [Redacted]

Name of Co-investigator(s): N.A.

Project Title: Exploring Barriers and Enablers to Technology Integration into Pedagogical Practices

The College Research Ethics Board has reviewed your application to conduct research involving human participants. We are pleased to report that your project has been APPROVED.

REB approval for your project expires on the date shown at the bottom of this letter. You must request an extension of the project if it is not concluded by this date. Following the conclusion of the project, you have thirty (30) days to submit a final report to the REB.

You must notify the REB of any changes in the study. Any unanticipated issue that increases the level of risk to participants or has other ethical implications should be reported to the REB without delay. Major changes will require the submission of a revised request for ethical approval of the research project.

Any adverse events (research-related injuries, distress, or other harms) must be reported to the REB as soon as is practically possible.

The REB may ask to review any part of the research while it is being conducted, or after the completion of the project.

Please print a copy of this letter and retain it with your study records.

If you have any questions or need further assistance, please contact the Chair of the REB, [Redacted]

Good luck with your research.

Signature of REB Chair:

Date of letter: 24th January, 2015
Expiration date for approval: 24th January, 2016
Appendix E.

SFU ORE Approval Letter

SFU OFFICE OF RESEARCH ETHICS

Street Address
Simon Fraser University
Discovery 2
Room 230, 8900 Nelson Way
Burnaby, BC Canada V5A 4W9

Mailing Address
8888 University Drive
Discovery 2
Burnaby, BC Canada
V5A 1S6

Director 778.782.6593
Associate Director 778.782.5631
Manager 778.782.3447
dore@sfu.ca
http://www.sfu.ca/ore.html

Minimal Risk Approval

Study Number: 2015/0074
Study Title: Exploring Barriers and Enablers to Technology Integration into Pedagogical Practices

Approval Date: 2015 March 9
Expiry Date: 2016 March 9

Principal Investigator: Bischoff, Pamela
Faculty Supervisor: Amundsen, Cheryl

SFU Position: Graduate Student
Faculty/Department: Education

SFU-Collaborator: n/a
External Collaborator: n/a
Research personnel: n/a

Funding Source: n/a
Grant Title: n/a

Documents Approved in this Application:

- Email Invitation, uploaded 2015 February 7
- Interview Protocol, uploaded 2015 February 7
- College Request for Approval, uploaded 2015 February 7
- Letter of Approval, uploaded 2015 February 7
- Study Detail, uploaded 2015 February 9
- Letter to SFU ORE, uploaded 2015 March 2
- Consent Form, uploaded 2015 March 9

I am pleased to inform you that the above referenced study has been approved by the Associate Director, Office of Research Ethics, on behalf of the Research Ethics Board in accordance with University Policy B.20.01 (http://www.sfu.ca/policies/research/o20.01.htm). The Board reviews and may amend decisions or subsequent amendments made independently by the Associate Director, Director, Chair or Deputy Chair at its regular monthly meeting.

The approval for this protocol expires on the Expiry Date, or the term of your appointment/employment/student registration at SFU, whichever comes first. An annual renewal form must be completed every year prior to the anniversary date of approval. Failure to submit an annual renewal form will lead to your study being suspended and potentially terminated. If you receive any grant for this protocol in addition to any funding listed above, please email stating the funding source, the term of approval of the funding source and the title of that funding application if it differs from the title of your ethics application. If you intend to continue your protocol to collect data past the term of approval, you must contact the Office of Research Ethics and request an extension at least 6 weeks before the expiry date.
OFFICE OF RESEARCH ETHICS

The Office of Research Ethics must be notified of any changes in the approved protocol. If you wish to revise your study in any way, please send an email requesting an amendment addressed to [email protected]. In all email correspondence relating to this application, please reference the application number shown on this letter, which should be included in square brackets at the beginning of the Subject Line; this will ensure that all correspondence is saved to the electronic study file.

Your application has been categorized as “Minimal Risk”. “Minimal Risk” occurs when potential participants can reasonably be expected to regard the probability and magnitude of possible harms to be no greater than those encountered by the participant in those aspects of his or her everyday life that relate to the research. Please note that it is the responsibility of the researcher, or the responsibility of the Student Supervisor if the researcher is a graduate student or undergraduate student, to maintain written or other forms of documented consent for a period of 1 year after the research has been completed.

The REB assumes that investigators continuously review new information for findings that indicate a change should be made to the study protocol or consent documents and that such changes will be brought to the attention of the ORE in a timely manner.

If there is an adverse event, the principal investigator must notify the Office of Research Ethics within five (5) days. An Adverse Events Form is available electronically by contacting [email protected]

All correspondence with regards to this application will be sent to your SFU email address.

Please notify the Office of Research Ethics at [email protected] once you have completed the data collection portion of your project so that we can close the file.

This Notification of Status is your official ethics approval documentation for this project. Please keep this document for reference purposes and acknowledge receipt of this Notification of Status by email to [email protected] and include the study number in square brackets as the first item in the Subject Line.

Best wishes for success in this research.

Sincerely,

Holly Longstaff, PhD
Acting Associate Director
Office of Research Ethics