UNIVERSITÉ DE SHERBROOKE

Faculté d'éducation

What is Crossing the Virtual Window?

Collaboration in Virtual Team Teaching

By

Sharon Coyle

97 672 030

Essai présenté à la Faculté d'éducation

En vue de l'obtention du grade de

Maître en enseignement au collégial

Mai 2015

© Sharon Coyle 2015

UNIVERSITY OF SHERBROOKE

Faculty of Education

What Is Crossing the Virtual Window?

Collaboration in Virtual Team Teaching

by

Sharon Coyle

Master's paper submitted to the Faculty of Education

In fulfillment of the requirements for the degree of

Masters of Education (M.Ed.)

Performa Master Teachers Program

May 2015

© Sharon D. Coyle, 2015

UNIVERSITY OF SHERBROOKE

Faculty of Education

What Is Crossing the Virtual Window?
Collaboration in Virtual Team Teaching

Sharon Coyle

was evaluated by an examining board made up of the following individuals:

_____Elizabeth Charles_____ Research Supervisor

_____Stephen G. Taylor_____ External Evaluator of the Master's Paper

The Master's paper was accepted on:

DEDICATION

To

Claudia Mitchell,

Dianne Bateman,

And Wilma Brown,

who are each the kind of teacher that changes the way you think,

only exponentially so, since they help change the way teachers think about teaching.

ACKNOWLEDGEMENTS

Thanks to Liz Charles, my research supervisor, who sees connections, knows sources, and speaks research. Your expertize in active learning and your comfort with technology helped make this a wonderful learning experience!

Thanks to those involved in VTT over the years, including Sophie Jacmin, Caroline Chwojka, Neil Caplan, Nathan Loewen, Andre Alizzi, Jennifer Mitchell, Stacey DeWolfe, and from Entente Canada Quebec, Louise Paul and Bruno Gislain. Thanks to the administration of both Cegep de Sept-Iles and Vanier College for supporting VTT, including Donald Bhérer, Jacques Delagrave, John McMahon and Eric Lozowy.

Thanks to the students who participated in the research and the VTT classes over the years. Your willingness to try something new was crucial to making this collaboration occur.

Thanks to the The University of Sherbrooke Performa Master Teachers Program (MTP), for providing me with the opportunity to participate from a distance. The MTP's inspiring teachers lead by example to share their passion for the scholarship of teaching and learning. Thanks to my fellow students in the MTP, especially "The Away Team" members Laura Fowler-Massie and Debbie Phillips; together we blazed new ground as the first Blended Learning Cohort!

Thanks to my family, Benoit, whose solid support, both moral and practical, allowed me to focus, and my children, Ariane, Felix, and Julie who have spent half their lives with a mom who stays up late writing papers.

SUMMARY

Virtual Team Teaching (VTT) is a form of collaborative teaching and learning at the college level that involves two teachers with their respective classes working together in real time from two distant classrooms. This paper looks at collaboration that occurs during VTT practice in order to examine factors that support and inhibit collaboration. It is aimed at teachers, administrators, technical support, and pedagogical advisors concerned with collaborative practices at the college level. What kind of affordances does Virtual Team Teaching provide for teachers and students in terms of collaboration? 1) How do teachers collaborate to build the activities and content for a VTT session? 2) What are some of the outcomes of this collaboration between these teachers? 3) How do students collaborate across the two classrooms? 4) What are some outcomes of this collaboration between students? And 5) Does the teachers' collaborative effort impact the students' collaboration, and vice versa?

VTT aligns with social constructivist approaches by creating a context of communication for mutual understanding and collaboration for the creation of shared artefacts. VTT is a form of synchronous Blended Learning that mixes face-to-face and online learning experiences. Clark and Schaefer (1989) explain the importance of establishing common ground in order for individuals to be able to work together. Polman (2001) underlines the importance of learning together by participating in common activities. Staples (2007) lists specific student and teacher behaviours that support collaboration. Teachers can scaffold student collaboration by supporting student contributions, orchestrating common ground, and matching tasks to student needs. Students' collaborative behaviours are affected by their ability to impact a situation, their quality of attention, and their ability to respond to and build on peer contributions.

This case study looks at collaboration during three VTT sessions using participant observers, video recordings, and a questionnaire. Analysis techniques include content analysis, pattern-matching, and time-series analysis (Yin, 2003). Five categories of engagement between participants, characterized as levels of collaboration, came out of a grounded approach (Glaser and Strauss, 1967) to looking at the video recordings of the three VTT sessions: 0) no engagement; 1) students engaging with others in the same classroom; 2) teachers engaging with their colleague across the virtual window; 3) teacher-supported student engagement with peers from the other classroom; and 4) self-monitored student engagement with peers from the other classroom.

The five collaboration categories were applied to the activities of the three VTT sessions. A comparison of the collaborative category percentages appears to indicate an increase in students' ability to collaborate independently as the term progresses. Collaboration is affected by factors such as classroom set up, communication protocols, inclusive behaviours, and technology used. Data collected may lead to a clearer understanding of classroom collaboration and interactions across a virtual window.

VTT provides opportunities for collaboration for teachers and students. This case study explores factors that support and inhibit collaboration and provides a framework for reflecting on the way we work together in our classrooms. Further research could use the collaboration codes and/or suggestions for teacher and student behaviours to study collaborative behaviour in the classroom. The collaboration codes could be further refined using specific collaborative behaviours. VTT provides affordances for collaboration through shared learning activities and collaborative creation of artefacts in the shared online space, and also through the need to make one's self understood, and to understand and respond to the group on the other side of the virtual window. VTT encourages a climate of reflective teaching and peer mentoring, and may encourage the creation of a community of practice for this type

of active learning combined with information and communication technology. This work contributes to the discussion of how to prepare students with 21st Century skills by providing opportunities to use 21st Century tools.

RÉSUMÉ

Cette recherche de maitrise présente une étude de cas sur l'Enseignement en Équipe Virtuelle (en anglais, “Virtual Team Teaching” donc, VTT). Le VTT est une forme d'enseignement et d'apprentissage collaboratif au niveau collégial. VTT implique deux enseignants avec leur classe respective qui travaillent ensemble en temps réel à partir de deux salles de classe éloignées. Le chercheur se penche sur la collaboration qui se produit lors de la pratique VTT afin d'examiner les facteurs qui favorisent et inhibent la collaboration. Ce document est destiné aux enseignants, administrateurs, responsables de support technique et aux conseillers pédagogiques concernés par les pratiques de collaboration au niveau collégial. La question de recherche principale est: Quel genre d’opportunité le VTT fourni aux enseignants et aux étudiants en termes de collaboration? La question de recherche principale peut être divisée en cinq questions de recherche spécifiques: 1) Comment les enseignants collaborent pour construire les activités et le contenu d’une session VTT? 2) Quels sont les résultats de cette collaboration entre enseignants? 3) Comment les étudiants collaborent à travers les deux salles de classe? 4) Quels sont les résultats de cette collaboration entre les étudiants? Et enfin, 5) est-ce que la collaboration des professeurs impacte la collaboration des élèves, et vice versa?

VTT crée une situation où les participants doivent communiquer leurs idées et répondre à celles de ceux situés de l'autre côté de l’interface technologique qui permet aux participants de voir, entendre, et interagir avec les gens de l'autre classe. VTT est bien aligné avec les approches socio-constructivistes en créant un cadre de communication pour la compréhension mutuelle et de collaboration pour la création d’objets partagés. VTT est une forme d’apprentissage mixte synchrone qui mélange de façon transparente le face-à-face et des expériences d'apprentissage en ligne telles que la vidéoconférence et la création d'objets partagés en utilisant des outils en ligne de collaboration tels que Prezi, Google Drive et Learning Management Systems tels que Moodle.

Clark et Schaefer (1989) ont expliqué l'importance d'établir un terrain d'entente afin que les individus soient capables de travailler ensemble. Polman (2001) souligne l'importance d'apprendre ensemble en participant à des activités communes. Staples (2007) énumère les comportements spécifiques des étudiants et des enseignants qui favorisent la collaboration. Les enseignants peuvent élever le niveau de collaboration des étudiants en encourageant leurs contributions, en facilitant un terrain d'entente, et en assujettissant les tâches aux besoins des élèves. Les comportements collaboratifs des étudiants sont affectés par leur capacité d'influer sur une situation, leur qualité d'attention, et leur capacité à réagir et à construire sur les contributions des pairs. VTT dispose également d'une collaboration entre les institutions. Hastie, Hung, Chen & Kinshuk (2010) donnent des exemples d'un modèle d'apprentissage mixte synchrone inter-institutionnel qui promouvoit

l'amélioration des compétences académiques et sociales des étudiants, ainsi que le développement professionnel et le réseautage pour les enseignants.

Une étude de cas a été choisie pour cette recherche comme un moyen efficace d'observer un système complexe. Cette étude de cas se limite à regarder la collaboration au cours de trois sessions VTT spécifiques à l'aide d'observateurs participants, d'enregistrements vidéo, d'un questionnaire et d'un groupe de discussion. Les données peuvent conduire à une meilleure compréhension de la collaboration dans la salle de classe en général et particulièrement à celle des interactions à travers une fenêtre virtuelle.

Les techniques d'analyse comprennent l'analyse de contenu, l'appariement de formes (pattern-matching), et l'analyse de séries chronologiques (Yin, 2003). Cinq catégories d'engagement entre les participants, caractérisées comme niveaux de collaboration, sont sortis d'une approche qualitative "grounded" (Glaser et Strauss, 1967) pour analyser les enregistrements vidéo des trois séances de VTT: 0) aucun engagement avec les autres étudiants; 1) étudiants interagissent avec d'autres d'une même classe; 2) les enseignants interagissent avec leur collègue par la fenêtre virtuelle; (3) engagement des étudiants avec ceux de l'autre classe supporté par l'enseignant; et 4) engagement auto-surveillé des étudiants avec des pairs de l'autre classe.

Les cinq catégories ont été appliquées aux trois sessions VTT. La première session a principalement mis en évidence une collaboration modelée et supportée par les enseignants ainsi que l'application par les étudiants à l'intérieur des classes respectives, mais dans la deuxième et la troisième session, nous constatons une augmentation de la collaboration soutenue par l'enseignant à travers la fenêtre virtuelle ainsi que l'augmentation de l'indépendance de la part des étudiants dans leur tentative de collaborer à travers la fenêtre virtuelle. Cette progression peut être simplement un effet secondaire des activités spécifiques choisies pour ces trois sessions VTT, ou il peut y avoir une progression qui pourrait être vue dans les autres groupes de VTT à mesure qu'ils progressent dans une session. Une interprétation des données est que les enseignants doivent plus soutenir la collaboration au début des sessions VTT, et, au fur et à mesure que les étudiants acquièrent des compétences et de l'expérience, ceux-ci assument plus de responsabilités pour leur participation dans les activités de collaboration. Une comparaison des pourcentages de chaque catégories semble indiquer une augmentation de la capacité des élèves à collaborer indépendamment à mesure que la session progresse. La collaboration est affectée par des facteurs tels que l'organisation de la salle de classe, les protocoles de communication, les comportements inclusifs, et la technologie utilisée.

VTT fournit des possibilités de collaboration pour les enseignants et les étudiants. Cette étude de cas explore les facteurs qui soutiennent et inhibient la collaboration et fournit un cadre de réflexion sur la façon dont nous travaillons ensemble dans nos salles de classe. Des recherches supplémentaires pourraient utiliser les codes de

collaboration et/ou des suggestions pour les comportements des enseignants et des étudiants pour étudier le comportement de collaboration dans la salle de classe. Les codes de collaboration pourraient être affinés en utilisant des comportements spécifiques de collaboration. VTT offre des opportunités de collaboration grâce à des activités d'apprentissage communes et la création collaborative d'objets dans l'espace partagé en ligne, et aussi par la nécessité pour chacun de se faire comprendre, et pour comprendre et répondre au groupe de l'autre côté de la fenêtre virtuelle. VTT encourage un climat d'enseignement réflexif et de mentorat par les pairs, et peut encourager la création d'une communauté de pratique pour ce type d'apprentissage actif combiné avec l'information et la technologie de communication.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS, INITIALISMS, AND ACRONYMS

CEGEP	Collège d'enseignement général et professionnel
ICT	Information and Communication Technologies
MVCU	Mobile Video Conferencing Unit
RepTIC	Information and Communication Technology Representative (IT Rep in English Cegeps)
VTT	Virtual Team Teaching

INTRODUCTION

This research paper explores a practice called Virtual Team Teaching (VTT). VTT resembles traditional team teaching combined with information and communication technology (ICT). VTT teachers create and implement learning scenarios that support collaboration between two classes in distant learning institutions using ICT such as video-conferencing units and online communication platforms. The teacher and students in one class see, hear, and interact with the teacher and students in the other class. From 2006 to 2015 teachers, technicians and administrators in Quebec colleges have supported the practice of VTT. Approximately twenty teachers and five institutions have practiced VTT. Individuals involved in VTT have worked with project coordinators to create a repository of information about the practice[1]. *Effective Social Learning: A Collaborative Globally-Networked Pedagogy* (Loewen, 2014), a recently published book by one of the project's coordinators, provides a practical guide for teachers who would like to try VTT. This Master's paper adds to information being gathered about VTT with the goal of improving the practice.

The researcher chose the case study method to examine the collaboration that occurs during VTT with the goal of describing what this collaboration looks like, and to try to document what supports or inhibits collaboration. VTT offers an advantageous setting to explore collaboration because VTT is *defined* by the interaction between two classes; without collaboration VTT loses its purpose. If nothing is *crossing* the virtual window, how can there be any logic in connecting two groups? Also, the very nature of the "virtual window" —the communication-technology-based exchange conduit between the two groups— facilitates an investigation of collaboration. The "frame" of the virtual window furnishes a naturally bounded system through which to monitor what is "crossing" from one class to the other. Exploration of collaboration during VTT may provide insight into

[1] https://sites.google.com/site/vttnreve/

collaboration in regular college classrooms by exploring types of, and processes involved in, collaboration.

This paper is divided into the following components: Chapter 1) Research Problem, gives a description of VTT, an overview of how VTT is designed and how it is intended to work; and an explanation of general objectives of this research; Chapter 2) Conceptual Framework and Literature Review looks at theories that support VTT practice and reviews articles that discuss collaboration in the context of information and communication technology; Chapter 3) Methods, outlines the case study approach taken by the researcher and looks at the individual tools used to gather the data; Chapter 4) Data Analysis, provides interpretation of the data, and finally, Chapter 5) Discussion, responds to the five specific research questions and includes a framework for thinking about and encouraging collaboration in the college classroom.

CHAPTER ONE

RESEARCH PROBLEM

1. CONTEXT

Teaching, by its very nature, is a messy problem (Lave and Wenger 1991), and Virtual Team Teaching could be considered at least twice as messy, with the introduction of a second classroom and teacher, as well as the communication technology that makes this distant collaboration possible. VTT can also be described as social learning (Loewen, 2014). VTT practitioners attempt to focus on active learning approaches that support collaboration, including significant student collaboration. Regular post session debriefing with VTT teachers across the project has provided anecdotal evidence about teaching practices that make some VTT sessions work better than others. Collective VTT practice underscores the importance of limiting a passive lecture approach, which, because of the nature of VTT, can feel like badly filmed television. Imagine a teacher lecturing to your class from a distant classroom, but the sound and camera angle may not be great, and to add to the frustration, he forgets to look at the camera and may even have his back to it while he speaks to his own group. Awareness of the pitfalls and possibilities of VTT obviously influence the potential outcomes of the practice.

VTT provides an opportunity for students to work together using information and communication technologies. Furthermore, it provides an opportunity for students from an urban college to gain perspective on life in the less central regions of the Province. Regional students, in turn, gain exposure to the wealth of worldviews represented in the urban, multi-cultural mix of typical classes at the urban college, located in a suburb of Montreal.

The researcher for this paper has been involved with the VTT project from its inception in 2007 and practiced VTT with seven different teaching partners, mentored new VTT teachers, and finally acted as the researcher for this paper in

which she also took on a role as one of two participant observers. The researcher gathered knowledge from seven years of practicing VTT and from many hours of in-class presence during VTT mentoring sessions observing VTT interaction. This solid VTT experience drove the decision to take a case study approach to looking at VTT for this research paper. This deep knowledge of VTT practice informed the questions posed and the tools used to explore the practice. The use of Classroom Assessment Techniques (CATs) (Cross and Angelo, 1993) has informed VTT practice over the years and information gathered through CATs has also had an influence on the approach taken in this research. Seven years of VTT has also raised awareness of particular problems associated with VTT, including: our collective lack of experience in telecommunication; the complexity of harnessing potential tools to support communication and interaction easily and efficiently; and the pedagogical challenges of creating learning scenarios that support course objectives within the VTT framework.

For this research project the researcher chose one VTT team and looked at three sessions over one winter term using a variety of tools such as participant observers and student questionnaires to build a snapshot of VTT practice, looking more precisely at factors which support or interfere with collaboration. This case study provides a starting point for analyzing and improving VTT practice.

1.1 History of Virtual Team Teaching

In traditional team teaching, educators collaborate on the preparation, delivery and assessment of a learning scenario. Virtual Team Teaching takes collaboration beyond the physical limitations of teachers working together in one physical classroom by joining two classrooms together via technology in a real-time synchronous learning experience. At two Quebec colleges, a long-term project experimented with VTT over seven years in a variety of configurations. VTT has three main goals: 1) the development of communication skills required for effective collaboration; 2) the acquisition of the knowledge and skills required for effective

collaboration; and 3) the development of the knowledge and awareness of other cultural contexts required for the adoption of an intercultural perspective. The principle factor addressed in this research is collaboration, which is likely to be implicated in the development of the other two goals. It is important to look at all three aspects for the purposes of this paper as the three elements, collaboration, ICT, and interculturalism, are interwoven within VTT practice and will figure in the research paper through questions posed and observational prompts.

The impetus for VTT arose at a meeting of the Deans of Quebec English Colleges, when the Director of Vanier College and the Director of Cegep de Sept-Iles speculated on a collaborative project that would benefit both institutions. After input from teachers, technicians, Deans of Studies, and Academic and Pedagogical Advisors, the idea was proposed to join two humanities classes together using information and communication technology through a "fenêtre de télépresence"[2] or virtual window. This practice of joining two classes together using technology had been pioneered in the French cegep sector in a project that paired technical program classes from distant colleges so they could benefit from each other's expertise.[3] Funding to support VTT project expenses, such as release time for teachers, mentors and coordinators, or travel budgets for conference presentations, came from Entente Canada Quebec.[4]

1.2 Description of Virtual Team Teaching

This section will provide a brief description of a typical VTT experience for both teachers and students. Teachers are usually recruited to the project by current participants or administrators who think they may be potential VTT candidates; namely: good collaborative skills; pedagogically flexible, innovative; and relatively comfortable with technology. Teachers who agree to take part in the project are

[2] Term used in the Cerfrio project.
[3] Cefrio
[4] A federal government organization that encourages the minority official language across Canada, English in Quebec, and French in most other provinces.

paired with a teacher from a distant cegep who is giving a similar course during the upcoming session. Scheduling synchronous time slots for the two courses in their respective institutions is one of the more complex elements in the VTT process. Teachers need at least two concurrent hours that coincide, for example Thursdays from 2 p.m. until 4 p.m. Both colleges must have a room available that supports the use of technology such as video conferencing equipment and personal computers. Powerful bandwidth and reliable Internet connections are important considerations. Computer access for most or all of the students is often a criterion. Once a time slot has been confirmed by both colleges, the teaching pair will schedule three to six VTT sessions over a fifteen week academic term, for example Thursdays during weeks 4, 5, 7 and 9. The teachers will then meet in person, or communicate using online tools such as Skype, to discuss which overlapping learning objectives they will work with for their VTT sessions. Then begins the more fine-tuned planning of each of the individual VTT sessions: evaluations, activities, and content. After a few communication sessions where the teachers talk to each other, the rest of the planning usually continues via emails. Teachers typically connect using a tool like Skype or Google+ Hangouts to debrief verbally after each VTT session; they discuss what went well, and what did not go well, so they can improve their strategies for the next VTT session.

For students, VTT is usually an unforeseen element layered on top of the learning experiences they expect from the course they signed up for. They may be more or less comfortable with technology, and more or less willing to speak in front of a microphone and appear on camera. Students arrive in their classroom to discover video-conferencing equipment and must adapt to the situation. A typical VTT session usually begins with the two classes joining together using some variation of video-conferencing to see and talk with the other group. The very first session begins with the introduction of both teachers, an explanation of the basic idea of VTT, and a quick exchange of greetings between both student groups. There may be a mini-lecture of three to seven minutes from one or both of the teachers on the chosen topic,

and then usually the students will work in groups; sometimes within their own class, or sometimes the groups include students from both classes. After the group activity both classes usually come together as a whole to share what they have worked on and discuss the outcomes. In order for the students to work together across the virtual window, VTT uses a variety of information and communication technology tools such as Google Drive, Prezi, and Moodle.

VTT attempts to provide a model for developing collaborative competencies at the college level. The virtual window becomes a joint problem solving space. One of the distinctive characteristics of this space is the absence of a designated host; in the virtual middle ground between the two classrooms, everyone is both a guest and a host (Loewen 2014). Students and teachers in a Winter 2014 VTT course set themselves the task of contemplating hospitality in the VTT virtual world, and collaborated together to define their new roles in this virtual common ground. One of the teachers (the researcher and author of this paper) coined a new term for VTT participants in that virtual common ground, labelling them "guosts," a term that combines guest and host. "Guosts" take on both the welcoming role of a host who supports the conversation, while also enacting the humble stance of a guest who follows the designated "house rules." The students realize they need to be respectful, ask and answer questions, listen attentively to the other "guosts" and respond to their ideas. A "guost" has more responsibility than the traditional guest because "guosts" must be proactive in facilitating the given undertaking. It would be difficult to make progress if everyone in the virtual space takes on the more passive role of the traditional guest, so it is vitally important that students understand their changing roles in the virtual exchange.

1.3 Problem

VTT brings two classes and two teachers together for the purpose of collaborating in a teaching and learning scenario that aims at specific learning objectives for the students involved. VTT is a complex iterative practice that requires

teacher collaboration before and after the class-time sessions so they can design the activities, it also requires teachers and students to have, or acquire during the process, strong communication skills and a relative comfort with information and communication technology, and finally, during the sessions there should be something crossing the virtual window—that conduit that connects the two groups via some form of communication technology. Teachers who are practicing VTT could improve their practice if given the opportunity to reflect on what is happening during their VTT sessions within a framework that provides a structure for thinking about the processes involved.

Collaboration, information and communication technology experience, and interculturalism work together within the VTT scenarios. Collaboration, the main component of VTT, is modelled by the teachers and is required of the students in group activities. ICT tools provide a vehicle for collaboration and a window into other cultural paradigms. The intercultural exchange inherent in VTT typically begins with an urban-rural divide. Interculturalism promotes the awareness of differing worldviews and aims to develop skills that allow individuals with diverging or even opposing perspectives to communicate and collaborate. Intercultural activities are an important element of VTT. VTT participant and project manager Nathan Loewen, in his report "The Global Classroom: Using ICTs for Intercultural Education," (2012) explains the contrast between traditional "negative" tolerance which promotes complacency and stereotyping through a passive acceptance of difference, and the more constructive "positive" tolerance which actively challenges our perceptions and creates opportunity for improved understanding of the "other" through opportunities for collaboration with individuals with differing world views.

The potential to develop the information and communication skills of our students is one of the objectives of VTT. The Information and Communication Technology Representatives (RepTIC) from institutions in the Quebec College network have developed a College-level Information and Communication Technology Leaving-Profile (ICTProfile) in which they recommend ICT skills

college students should master by the time they graduate from cegep. These information and communication skills should be developed not only in isolation, such as in a computer course; they should also be used across the curriculum in the pursuit of content knowledge and interpersonal communication. Online collaboration and communication is a major component of VTT, both between the two classes as large groups, but also in small groups and even between individual students. These communication and collaboration skills should be transferable to other courses and to the workplace. Many students will find themselves in online learning situations in future post-secondary settings, or in the workplace, so the opportunity to acquire online learning skills in class with the support of peers and teachers can be seen as a particularly interesting aspect of the project. Interactions with students who have participated in the VTT project reveals that they are not as ICT savvy as we often assume they are. Loewen states in a short documentary on VTT that he hopes the Virtual Team Teaching experience will help students develop some kind of "technological or digital self-esteem … to feel like they are the master of technology, and not that it's mastering them" (from an audio-taped interview that was used as voice-over in the VTT documentary, Jacmin, 2012).

VTT is in the process of dissemination to a larger population: Entente Canada Quebec, in the 2013 to 2014 academic year, had a project with Vanier College involving VTT pairs in several colleges (including Champlain Saint Lawrence, Heritage College and Cegep de Sept-Iles) in a broader range of disciplines (Humanities, French Second Language, and English). While VTT has been a success in these pilots, in order to scale it up we need to better understand its key features for future VTT practitioners. VTT instructors will benefit from a clearer understanding of the VTT experience for students, especially a framework that describes the process and forms of collaboration, as well as a better understanding of actions that appear to support or inhibit collaboration that occurs during VTT.

1.4 General Objective

The general objective of this research was to examine the activity system of the two classrooms and how their acts of communication develop into a collaborative VTT practice. In doing so this study looked at the communication between teachers before and during the in-class sessions, as well as the nature and length of collaboration occurring among the students. This paper aimed to verify patterns and productive systems of communication that support VTT, especially in the aspect of collaboration, for teachers, administrators, IT Reps and pedagogical advisors who are interested in practicing VTT or who would simply like to understand more about the processes involved in collaboration in the college classroom.

CHAPTER TWO

CONCEPTUAL FRAMEWORK AND LITERATURE REVIEW

2. THE IDEAS BEHIND VTT

In order to discuss VTT we must consider what distinguishes this practice. The significant features of VTT include: the participation of teachers and class groups from two distinct institutions, the use of ICT as the medium of interaction, the synchronous nature of the event, and an active learning approach that aims at the collaborative creation of artefacts. VTT is "an inter-institutional teaching partnership that will promote dialogue amongst geographically separated classrooms in real time. … [VTT puts] the best of the bricks and mortar classroom in touch with the best opportunities afforded by the internet" (Loewen, 2014, p. 3-4). The simplest version of VTT is a live video exchange between two classrooms based on a plan designed by the VTT pair of teachers. Teachers may add to this by having students access material online before (asynchronously) to read background material and during the sessions to work together to create and present shared projects (Loewen, 2014).

> In principle, collaborative networked teaching and learning involves the creation of real-time learning experiences that employ an active learning pedagogy. In every aspect of the basic scenarios described above, the emphasis is on synchrony. The point is not to create a pen-pal learning task, akin to homework or an in-class assignment, but a real-time learning experience. Learners will be confronted with the challenge to communicate effectively, and they will need to engage that challenge actively during the class session. The emphasis on synchronous sessions introduces a certain kind of contextual learning. The added "context" is unconventional. It is the dynamics of communication in real time with others who are not physically present in the classroom. That dynamic heightens the importance of effective communication. This unique context, unlike a pen-pal series of exchanges, can serve to enrich conventional teaching or to reorient

> conventional teaching around these dynamic learning experiences. (Loewen, 2014, p. 5)

The theoretical framework for this paper exploring VTT looks at two constructs: 1) the concept of collaboration as a feature of a Social Constructivist paradigm of teaching and learning, and 2) the practice termed Blended Learning (BL), in the sense that VTT uses ICT[5] as an integral, synchronous element of the teaching and learning scenario.

2.1 Collaboration in VTT

VTT aligns with social-constructivist approaches where knowledge is seen as being constructed in the learner's mind through the collective negotiation of meaning with peers. For constructivists, learners actively engage in reflecting on their knowledge and create new knowledge. For social-constructivists, this way of thinking about learning is taken a step further as the learner creates knowledge in a specific context through interactions with peers and teachers (Raymond, 2008). There is a clear connection between the practice of VTT and Vygotsky's (1978) theory of social-constructivism; in VTT teachers create opportunities for students to interact with peers in a distant classroom, so learners become more aware of their place within their own specific culture, and of the necessity of communicating their reality to their peers through negotiation and representation (Loewen, 2014).

> As an educational experience and a resource for professional development these collaborations require a "double hosting" situation. Externally speaking, each teacher and classroom—indeed, each institution—plays host to the other. Each plays guest to the other too. … Using the Internet's free and open Web-based tools provides a neutral space in which this host-guest/guest-host collaboration may be most effectively actualized.
>
> ……

[5] "The 'C' in ICT usually stands for 'communication'—thus, information and communication technology. The emphasis on communication is missing in most campus deployments of 'IT' (Loewen, 2014, p. 10).

> It is important that teachers press home the specific "double-hosting" nature of networked collaborations so that learners can realize the intercultural dimensions of their learning experience. They are not penetrating or colonizing some far-away other's identity, culture, or knowledge. By interacting with others through media technology in a learning experience of being both host and guest, [Loewen has] repeatedly witnessed students finding themselves in reciprocal, decentralized, and hospitable relationships with other learners. Since they have been led here in a classroom situation, the collaborating teachers can direct them toward the creation of a shared production such as an assignment or presentation. That important step is what leads learners to participate in substantive dialogue as well as develop skills in virtual teamwork (Loewen, 2014, p. 7, 11).

VTT creates a context of communication for mutual understanding and collaboration for the creation of shared artefacts. The Social Constructivist paradigm shifts the teachers' role from deliverers of content towards designers of active learning scenarios. VTT creates an environment that provides opportunity for teachers to collaborate in their practice of social-constructivist pedagogy. VTT provides teachers with an opportunity to work with others in practicing this interactive approach to teaching and learning and may contribute to the creation of a community of practice (CoP). "Members of a teaching team can reflect on their teaching practices to build up their strengths and expertise … marshal the collective strengths … for teaching and learning" (Loewen, 2014, p.9). This CoP aspect of VTT is facilitated through planning and debriefing activities, as well as through the shared teaching and learning experiences in the sessions themselves.

2.2 Blended Learning in VTT

Electronic Learning, or e-learning, refers to courses delivered entirely online. Limitations of e-learning instruction include elevated expenses, insufficient student-teacher interaction, and most importantly, the lack of necessary training for discussion and exchanges in the online environment (Massoud, Iqbal, Stockley and Noureldin, 2011). One of the ways that e-learning has been modified is to combine innovative technologies with traditional classroom instruction to create what is

termed blended learning (BL) (Massoud et al 2011). BL can be described as a judicious mixture of face-to-face and online learning experiences, including the use of tools that support collaboration (Ulmane-Ozolina, 2011). BL uses technology to provide students an alternative vehicle for discussing ideas and opinions using Web 2.0 (Read/Write Web) tools such as forums, blogs, collaborative programs and audio-video communication. One of the challenges for BL cited in the research is the difficulty educators may have in creating an atmosphere of participation and interaction in the online activities (Massoud et al 2011, Ulmane-Ozolina, 2011). BL often replaces face-to-face in-class sessions with online activities, thus reducing the number of course hours spent in a physical classroom.

Timing is a key consideration for any online learning. In e-learning and BL, there are two possibilities: 1) asynchronous, students working in a serial manner, one after the other, not at the same time; and, 2) synchronous, students working together in real-time. Massoud et al (2011) use the term synchronous to refer to traditional face-to-face classroom education and asynchronous to refer to internet-based learning experience. However, in BL, synchronous online activities can happen both during face-to-face sessions and outside of class. When the synchronous on-line activities occur in a classroom setting, BL combines innovative technologies with the real-time shared experiences of traditional classroom learning, creating a situation that has the potential to address some of the limitations of exclusive e-learning and asynchronous BL which occur outside of the classroom without support in the form of the physically present teacher.

VTT can be considered a form of BL because it uses face-to-face and online learning experiences. VTT seamlessly mixes traditional face-to-face in-class learning experiences with synchronous online activities, including video conferencing and the creation of shared artefacts using online collaborative tools such as Prezi, Google Drive, and LMS such as Moodle. VTT layers traditional face-to-face classroom experience simultaneously with synchronous BL interactions with two groups of students and their two teachers in two separate locations. In VTT, BL aims to enrich

the classroom experience rather than replace it. VTT creates what Loewen (2014) terms a "third space;" one can think of this virtual third space as the overlapping area in a Venn diagram where students and teachers from both classrooms interact using ICT on neutral ground in which everyone is both a host and a guest.

Lambropoulos, Faulkner and Culwin, (2012) stress that social awareness (of self and others) improves online collaboration; we need to consider the content *and* the social aspects of online collaboration. "What we learn shows in our talk with others (Abel et al, 2013, cited in Lambropoulos et al, 2012), discussion forums are important, but not enough; Katz, Connelly and Wilson (2005, cited in Lambropoulos et al, 2012) explain that meaning and understanding are negotiated via conversations, and this leads to knowledge construction.

A quick search of the Internet reveals that most of the advice on teaching via video conferencing assumes a single teacher who is trying to reach distant students. VTT differs from this scenario because there are two teachers and two groups of students, and the goals of VTT envision a synchronous experience where all of the participants become part of Loewen's third space, the virtual workspace between the two classrooms. In other words, all of the participants should contribute to what is crossing the virtual window. VTT expands what we know about what happens when two groups interact using synchronous communication. VTT happens inside classrooms with teacher support in both locations providing real-time student-teacher interaction and in-person support for discussion and interaction in the on-line environment. The critical difference in a VTT setting is the presence of a teacher at both ends of the videoconferencing equipment or online interactive tool. These two teachers are working in real time and space as the learning experience unfolds to create an atmosphere that supports participation and interaction in the on-line environment. VTT provides a possibility for spontaneous troubleshooting and modification of the learning scenario that would be difficult to include in an asynchronous e-learning experience, thus addressing some of the limitations of traditional e-learning and asynchronous BL.

2.3 Literature Review

In an attempt to better understand the dynamics involved in VTT, the articles discussed in this section look at collaboration and ICT use in teaching and learning, beginning with research that explores collaborative learning *within* a classroom, followed by research that explores inter-institutional online collaboration.

2.3.1 What is collaboration?

What exactly is collaboration, and how can we support students in collaborating? Clark and Schaeffer (1989) broadened our understanding of conversations by introducing the term "contribution." They explain that a dialogue is more than Sam saying "He's leaving." and Mary responding "Too bad." Behind the exchange of phrases is a shared meaning built up that only allows functional communication if the participants build it together: they both need to know who the word "He" refers to, and they both need to agree on what "leaving" means: is Sam leaving his job, his wife, the building, or the country? So discourse is more than just the words taking turns and building a chain; there is a shared space or "common ground" that "consists of collective acts performed by participants working together" (Clark and Schaeffer, 1989). These two concepts of working together to create meaning and build common ground are a useful starting point for reflecting on collaboration in the classroom.

2.3.2 Supporting Collaborative Learning within a Classroom

Research about collaboration within the classroom raises the following question: if teachers are supposed to set up an inquiry model rather than tell students what they need to know, what exactly are the teachers supposed to do? Within a classroom, teachers wanting to support active student learning using a social constructivist framework need collaborative tools (Polman 2001) that allow them to work alongside their students. "Rugoff (p. 209 cited in Polman, 2001, p.225) recommends a 'community of learners' model based on the premise that 'learning

occurs as people participate in shared endeavours with others, all playing active but asymmetrical roles'" (Polman, 2001, p.225). Polman (2001) in a science classroom and Staples (2007) in a mathematics classroom use the case study method with video recordings and participant observers to look at collaboration on the individual scale, with their focus on teacher-student and student-student interaction at the classroom level. They both propose a model of teacher/student interaction that begins with students' ideas which act as catalysts for further learning, through reinterpretation by teachers acting as Vygotsky's More Knowledgeable Other (MKO), creating opportunities for students to move forward in their learning.

Staples found that teacher support for collaboration had three "components: supporting students in making contributions; establishing and monitoring a common ground; and guiding the [subject specific thinking, and all of this with a goal of helping students make] ... their thinking public—their conjectures, their proposed next steps to problems, their ideas and justifications" (2007, p. 172).

Polman (2001) outlines a four-step discourse sequence to help teachers move towards active learning scenarios as we strive to be a "guide on the side" rather than "a sage on the stage." First, teachers begin with the student's limited act; second, the teacher realizes this is a learning opportunity; third, the teacher works with the student, using their act as a starting point to new learning; and lastly the student can move on to a higher level by appropriating the learning. This is similar to the process Staples (2007) observes in her intensive case study of a teacher who uses collaborative learning in a high-school mathematics classroom. Staples proposes two conceptual collaborative practice models, one that gives advice for the teacher's role, and the other that looks at the class group's collaborative capacity as it increases over time, where the "term collaborative … implies a joint production of ideas, where students offer their thoughts, attend and respond to each other's ideas, and generate shared meaning or understanding through their joint efforts" (Staples, 2007, p. 162). Collaboration is distinguished from cooperation and participation, which solicit sharing without demanding engagement.

Dillenbourg (1999, cited in Staples, 2007, p. 168) gives "three characteristics of collaborative interactions: interactivity, synchronicity, and negotiability. Interactivity requires that participants exert reciprocal influence on one another. Synchronicity indicates that interactions must be coordinated. Negotiability captures the ability of the participants to influence the process in which they are engaged. In her search for information about how students collaborate in a classroom setting" Staples looked for these three indicators as well as other classroom behaviours practised by students and teachers (2007, p. 168).

Counter intuitively, Barron's (2002) research indicates that it is not the cognitive ability or talkativeness of the group that aid successful collaboration; rather it is the ability to get our thinking across to others and have them receive, understand and respond to it that fosters the kind of group synergy we are aiming for. Research indicates that successful groups sustain on-topic discourse and acknowledge it in a positive manner. "Constructing a joint problem-solving space require[s] that one makes his or her thinking visible to the groups (e.g., Brown, Collins, & Duguid, 1989) and bringing out others' thinking" (Barron, 2002, p. 347). The way we present our ideas and the way we listen to each other influence group work.

Barron's (2003) "findings underscore the need to shift from a purely instrumental view of collaboration as a tool for learning to a view that foregrounds learning to collaborate on intellectually challenging activities as a fundamental human competence" (p. 354). In other words, we should not only collaborate to learn, we should learn to collaborate. She suggests key collaborative characteristics: creation of a joint problem solving space; self-management of the attention of both speaker and listener; and management of the social-relational space (p. 310). These research findings provide a context for thinking about collaboration within the classroom.

VTT creates opportunities for collaboration for teachers and students. Collaborative practices that might be observed in a VTT setting include: interpreting

a problem or examining another's interpretation of a problem; justifying or proving ideas for others; reflecting on the nature of a problem or juxtaposing two or more problems; representing one's ideas for others; and understanding and evaluating another's argument (Staples, 2007, p.172, See Table 1, below).

Table 1
Teacher Collaborative Behaviours

Supporting Students in Making Contributions	Establishing and Monitoring a **Common Ground**	Guiding the **[Content Knowledge]**
Eliciting Student Ideas -Request and press -Providing time	*Creating a Shared Context* -Establishing prerequisite concepts -Verbally marking -Affording multiple opportunities to access ideas	*Guiding High-level Task Implementation* -Modifying tasks -Providing "food for thought" -Ongoing assessing and diagnosing
Scaffolding the Production of Student Ideas -Representing -Providing Structure -Extending	*Maintaining Continuity over Time* -Keeping the purpose salient -Pursuing discrepancies	*Guiding with a Map of Students' Learning* -Attending to "pressure points"
Creating Contributions -Expanding what counts -Demonstrating the logic -Linking	*Coordinating the Collective* -Positioning students for collective work -Controlling the flow	*Guiding by Following* -"Going with the [students]" -Flexibility following a student's thinking -Keeping students positioned as thinkers and decision-makers

From Staples, Megan, "Supporting whole-class collaborative inquiry in a secondary mathematics classroom" (2007). *CRME Publications.* Paper 1. P.191.

The table above presents Staples' concepts of what teachers contribute to collaboration in the classroom. VTT creates a situation that draws on social constructivist theories of learning. Collaboration is a mechanism by which to enact

social constructivist theories of learning. VTT can develop thinking by presenting alternative perspectives and develop communication skills through hands-on opportunities to participate in a real educational dialogue. Research suggests that collaboration is supported by instructional strategies such as "explicitly stating expectations and modelling practices (Lampert, 2001; Wood, 1999) as well as assigning roles (Herrenkohl & Wertsch, 1999)" (cited in Staples, 2007, p. 194). "To collaborate, students must listen to, comprehend, and respond to other students. When students identify these practices as beneficial, they engage differently when another student is sharing his thinking and see their responsibilities towards others in a different way as well" (Staples, 2007, p. 205).

2.3.3 Inter-institutional Online Collaboration

The research discussed in this section considers the impact of collaboration across institutional boundaries. VTT, by nature of its inter-institutional collaboration, resembles the inter-institutional Blended Synchronous Learning Model (BSLM) described by Hastie, Hung, Chen and Kinshuk (2010). This research team made a case study survey of a several BSLM settings to get an overview of their similarities and differences, and take a reading on the service they provided to their students. Their blended synchronous learning models come in nine different forms, but all have five standard components: 1) a virtual classroom; 2) a physical classroom, 3) a teacher, 4) student(s), and 5) more than one site (this could be classrooms or participants may be in alternative settings such as a home) (Hastie et al, 2010). Their research lists many benefits of international collaboration: students demonstrated improved academics and social skills, and teachers claimed professional development advantages including possibilities for networking and academic publishing (Hastie et al, 2010). In their case studies, the researchers describe the primary purpose of BSLM is to find a way for students with no access to get education, but their findings indicate that there are payoffs for everyone. Across all levels students "demonstrated higher concentration, motivation and retention of concepts" (Taylor and Francis, 2010, page 9, cited in Hastie et al, 2010). They also saw educational and professional

gains for educators, including a focus on developing ‘habits of mind.’ As they see it, professionals in education need to develop new mindsets and skills. They also note that in order for the inter-institutional project to succeed, participating institutions must support the collaboration. And lastly, the researchers emphasize that it is important to strive for collaborations between organizations that cross boundaries, not simply within institutions (Hastie et al, 2010). These elements of BSLM coincide with the VTT model, with the minor adaptation of thinking about collaborations within the province while still crossing institutional boundaries rather than crossing international borders. And, in fact, the international aspects are an existing element of Virtual Team Teaching through VTT learning activities designed by teachers that reach out on a global level.

2.4 Research Questions

Using the ideas about collaboration outlined in the research above, and keeping in mind the roles institutions, teachers and students play in enhancing collaboration; this research asks the following general research question: What kinds of affordances does Virtual Team Teaching provide for teachers and students in terms of collaboration? This can be broken down into five specific research questions: 1) How do teachers collaborate to build the activities and content for a VTT session? 2) What are some of the outcomes of this collaboration between these teachers? 3) How do students collaborate across the two classrooms? 4) What are some outcomes of this collaboration between students? 5) And finally, does the teachers’ collaborative effort impact the students’ collaboration, and vice versa?

CHAPTER THREE

METHODS

This chapter presents the research questions and the methods used to investigate them.

3. RESEARCH QUESTIONS

What kinds of affordances does Virtual Team Teaching provide for teachers and students in terms of collaboration? 1) How do teachers collaborate to build the activities and content for a VTT session? 2) What are some of the outcomes of this collaboration between these teachers? 3) How do students collaborate across the two classrooms? 4) What are some outcomes of this collaboration between students? 5) And finally, does the teachers' collaborative effort impact the students' collaboration, and vice versa?

3.1 The Case Study: A Bounded System

The primary characteristic of the case study is its nature as a bounded system. Researchers define their case by setting boundaries of space, time, number, questions, and or focus of interest. The case studied in this research paper on collaboration uses VTT as the first narrowing factor, then chooses one pair of VTT teachers and their classes, and looks at this "slice" through the boundaries of one college term, during three VTT sessions. The research questions serve to further define the boundaries of this case by focusing attention on collaboration that occurs in these three sessions.

For Merriam (1998), the case study "focuses on holistic description and explanation" (quoted in Brown, 2008, p. 3) that allows readers to make sense of their experience through recognition of, and connection with, the situation described in the research. Case studies build a rich picture of a bounded situation by using multiple collection tools that work together to strengthen the reliability of information gathered by triangulating the data. This case study of VTT attempts to build a robust

picture of a specific instance using a variety of data collection tools including: participant observers, video recordings, a questionnaire, and a focus group.

Yin (2003) recommends the case study for current, real-life situations and suggests the use of "analytical techniques that include pattern-matching (finding patterns and building an explanation of these patterns), [and] utilizing time-series analysis (the ability to trace changes over time)" (Brown, 2008, p.5). Both of these techniques, pattern-matching and time-series analysis, are used in this case study of VTT. The role of the researcher in a case study is to be attentively reflective, to use intuition and prior knowledge, including tacit knowledge, to make meaning of the observations gathered from the specific bounded context.

One of the difficulties inherent in a case study is the researcher's task of explaining the research context clearly enough to establish credibility for the method and the data (Brown, 2008). Case study method has been criticized for its inability to be defined by one specific set of rules and its tendency toward open-ended data collection and analysis techniques. The nature of the case study may limit the generalizability of the findings; however, it is a useful research paradigm for exploring complex problems. The information gathered in this case study builds a picture of one specific situation, but the reflections generated may be helpful in thinking about similar situations.

3.2 Overview of the Two Settings

The following table provides an overview of the case study settings and participants through comparison of the two colleges involved by making contrasts between the two sites clear to the reader. The information in Table 2 (below) is explained in more detail in the sections that follow.

Table 2
Overview of the Two Settings

Post-Secondary Institution	**Vanier College** (One of the three largest **Anglophone** colleges in Quebec)	**Cegep de Sept-Iles** (Small **Francophone** college with a small English sector)
Context and Demographics of the college	-Urban (one of the largest cities in Canada) -Multi-ethnic, multi-cultural	-Regional (small city, small town attributes, eight hours drive from closest big urban centre) -Primarily francophone, small Anglophone population, two first-nations groups served by the college: Innu (Francophone) and Naskapi (Anglophone)
Total Student Body Winter 2013	6200	750 (26 students enrolled English First language Courses, the rest in French Programs.)
Students /Class	35	12
Teacher Terms of VTT	4	2
Teacher comfort level with technology	High	High
Teacher experience postsecondary	10	30
Course in which the research was conducted	Worldviews 345-102-MQ -2nd in sequence of 3 compulsory general education Humanities courses -Learning objective: apply a critical thought process to worldviews Title: *Non-Governmental Organizations*	Ethics 345-GTJ-MQ -3rd in sequence of 3 compulsory general education Humanities courses -Learning objective: think critically about ethical issues Title: *Ethics*
Students' year in cegep	First year cegep	Second or third year cegep
Age of most of the students	17 to 18	17 to 25
Classroom type	Active Learning Classroom (See figure 1)	Conference Room (See figure 2)

3.3 Settings: Cities, Colleges

The VTT sessions observed for this research took place in two locations separated by 900 kilometres. Both research sites are post-secondary institutions providing pre-university and vocational programs within the Quebec educational system. These colleges are referred to as cegeps, an acronym which, in French, stands for "Collège d'enseignement général et professionnel." The following section gives an overview of both research settings and Table 2, above, provides the same information in a format where it is easy to see the similarities and differences between the two sites. More detail is provided about the regional setting than is given for the urban setting. This added information allows the reader to better understand the contrast between the multicultural urban setting and the specific traits of the regional setting.

3.3.1 The Urban Setting

The larger institution, Vanier College is one of four large Anglophone cegeps in the province of Quebec, all of which are in or near the city of Montreal, one of the largest cities in Canada. Quebec is a Francophone province, meaning that the official language is French; most cities across the province function primarily using French as the principle language of communication and business. Montreal, however, has many English-speaking residents and visitors are likely to hear both French and English spoken as they move about the city. With 6200[6] students, Vanier is a multi-ethnic, multi-cultural English College situated in a suburb of Montreal.

3.3.2 The Regional Setting

The smaller institution in this case study is the only cegep in Sept-Iles, a small city of 27,000 people located on the north shore of the Saint Lawrence River, at the 50th parallel, which guarantees long winters featuring three to four metres of snow. The people living in and around Sept-Iles are primarily French speaking. Three

[6] Equivalant Full Time Students, 2012-2013, http://www.vaniercollege.qc.ca/publications/annual-report/archives/2012-2013.pdf

first nations peoples account for 10% of the students at the College. At two nearby Innu reserves residents speak French as a second language, and far to the north, by train or plane, there is a Naskapi reserve where English is the second language. Students with Naskapi and/or Innu heritage make up part of the students who choose to take their cegep courses in English as the language of instruction, along with English or bilingual students from the Sept-Iles area, especially those who have attended the single local English high school. To get a clear picture of the Francophone context in which these students are taking courses with English as the language of instruction, one must understand that they live much of their daily life in French, including most sports activities, movies at the cinema, visits to the doctor, shopping, and even casual conversations between classes.

The college itself, Cegep de Sept-Iles, is a Francophone college with a small English Sector. The entire college hosts 750[7] students, of which at most thirty take all or some of their courses with English as the language of instruction. In the Winter 2013 Term, 16 students were enrolled in Social Science, the only program offered in English out of twelve programs. Several other students were enrolled in the Bilingual Option, which allows them to be part of one of the French programs while completing their general courses (First Language, Second Language, Humanities and Physical Education) in English.

3.4 Settings: Description of the Two Classrooms

The rooms used in both colleges were atypical classrooms, although VTT can and has been practiced in a regular classroom with the addition of some computer equipment or a portable video-conferencing unit that is rolled in on the days the groups connect. Descriptions and drawings of the two atypical classrooms used in this case study will help the reader to visualize the specific settings of these VTT sessions.

---

[7] http://www.cegep-sept-iles.qc.ca/CLIENTS/1-cegepsi/docs/upload/sys_docs/PresentationCegepMai13Anglais.pdf

3.4.1 The Vanier Classroom

The Vanier classroom where the VTT sessions took place is not a typical college classroom with the classic organization of desks in rows facing the front. The VTT team had requested the use of an active learning classroom, which at Vanier is called the Vanier Alternative Learning Classroom (ALC) (see figure 1, below).

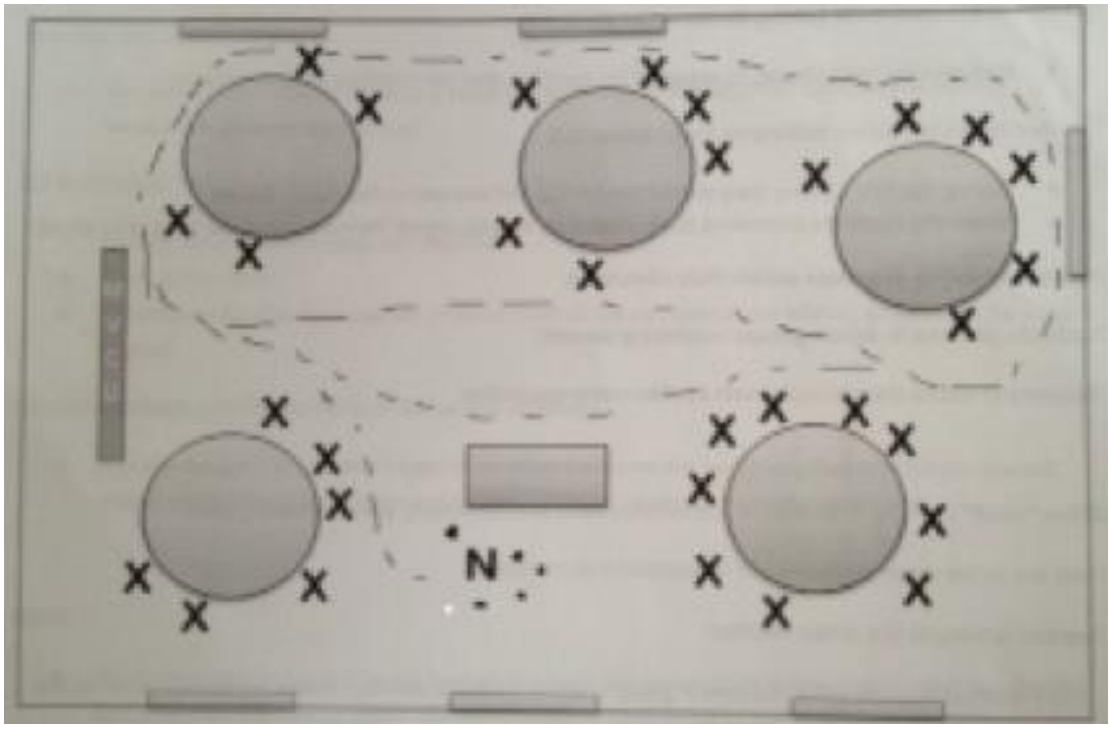


Figure 1: Drawing of the Vanier Classroom from Participant Observer's Notes

The ALC is rectangular with a teacher's console placed in a central location surrounded five large circular tables that seat ten students each, and brightened up by one wall of large windows. This specially designed room is equipped with six interactive white-boards that connect to three computers on each large circular table and also to the computer at the teaching console. For the VTT sessions, there was also a Mobile Video Conferencing Unit (MVCU) rolled into the room and set up at one end of the classroom to provide reliable, high-quality sound and video interactions between the two sites (see Figure 1).

3.4.2 The Sept-Iles Classroom

Sept-Iles does not have an active learning classroom or a portable video conferencing unit, so the VTT class took place in one of the rooms at the college where video conferencing is available. This room is a typical boardroom (see Figure 2, below).

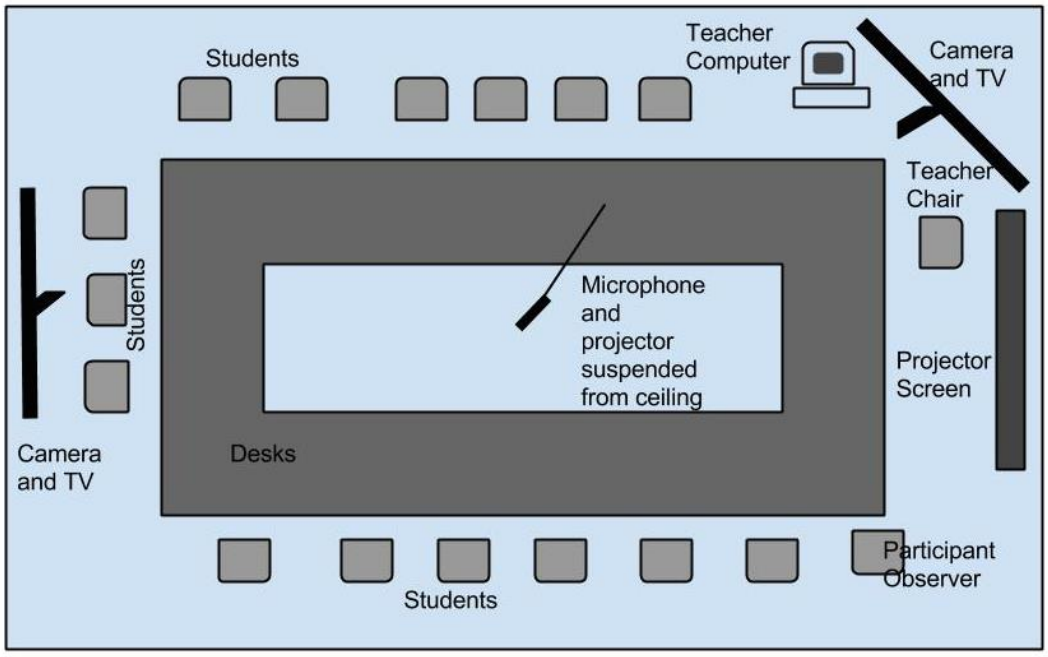


Figure 2: Drawing of the Sept-Iles Classroom from the Participant Observer's Notes

The wall along the hallway is glass with horizontal blinds drawn, there are no windows open to the outside, and table-type desks are arranged in a rectangle around an open centre of unused space. Students generally sat on the three sides, while the teacher placed himself on the fourth side. The room features a video conferencing set-up permanently installed with the microphone suspended from the ceiling in the middle of the room, as well as two cameras and two televisions screens, one at each end of the room, and a projector with a screen connected to a computer in the corner that the teacher used as his teaching station. The Sept-Iles class also used a cart of

portable computers loaned from the College library for each of the sessions to provide individual computers for student use.

3.5 The Courses Featuring the VTT Sessions

Both courses used for this case study are Humanities courses. Cegep students across the Province of Quebec must take twelve General Education courses to fulfill graduation requirements. Three Humanities courses, part of these core courses, are usually taken in the following order: Knowledge, Worldviews, and Ethics. Most often, VTT teams are teaching courses with the same course number, description, and learning objectives, but the VTT team that participated in this research project, were teaching two different Humanities courses. The Vanier course featured in this case study is Worldviews: *"Non-Governmental Organizations."* It is the second course in sequence of three general education Humanities courses all Cegep students must take to receive their diploma. The main learning objective for the course is to promote the student's ability to apply critical thinking to worldviews. The Sept-Iles Humanities course is the third and last course in the sequence of three, called Ethics, and the teacher used "Ethics" as the title for his course. The learning objective of the course is to promote students' ability to think critically about ethical issues. The VTT teaching team was able to work together to find overlapping sub-components of their courses that allowed them to orchestrate common learning activities that were relevant to both sets of students, for example they did a session that explored the ethical issues surrounding globalization (see the list on the next page of the specific topics and activities used).

Both the Vanier "Non-Governmental Organizations" worldviews class and the Sept-Iles "Ethics" class met once per week for a three-hour session on Thursday afternoons from one o'clock to four o'clock. The VTT team planned five VTT sessions, spaced evenly throughout the term, with about three weeks in between each VTT session. Only three of the five VTT sessions observed are included in this case study.

Session One: The researcher used the first session to explain the research to the students and distribute consent forms and answer any questions that arose. For this first VTT session, the researcher was physically present in the Vanier classroom for the only time during the case study.

Session Two, Three and Four: For sessions two through four there was one participant observer in Vanier, and the researcher/participant observer was at the distant site in Sept-Iles. The following is a list of the three VTT sessions included this case study with information on the activities that made up each session.

VTT Session (2) A: The Ethics of Industrialization, February 26

- small group work on Pete Singer
- small group work on Millennium goals
- discussion between the two groups on material

VTT Session (3) B: The Bhopal Disaster, March 12

- introductory mini-lecture on Industrial Revolution by Sept-Iles teacher
- guest speaker spoke to both groups using a three way Skype call
- use of guest's blog to share photos and information
- question and answer session between students and guest speaker
- group work on the ethics of industrialization
- discussion between the two classes

VTT Session (4) C: Parc Forillon Expropriation, April 9

- mini-lecture by guest speaker using Prezi with links to music and information on the expropriation
- whole group discussion
- beehive activity on National Parks
- teacher guided questions and responses
- small group work using Prezi as a common document to allow students in distant classes to work together
- whole group discussion

Session Five: The fifth VTT session included a short focus group where students were asked to provide feedback on their VTT experience.

3.6 Participants

The study's participants were made up of two teachers and two student groups. The students were college level, enrolled in Humanities courses at two post-secondary institutions Quebec, Canada: Vanier College in the Montreal area and Cegep de Sept-Iles on the Lower North Shore of Quebec. The participating students were a convenience sample made up of the students who signed up in two courses in Winter 2013[8].

At Vanier College the group of students was one group out of more than a hundred groups (45 possible courses, some with multiple sections) of students taking Humanities courses. The Vanier group was made up of thirty-five students out of a population of 5500 (approximately three-quarters of the student body are enrolled in a Humanities course each term).

In Sept-Iles there are just two Humanities courses offered in the Winter Term, and only one group in each, so the sample group of students was approximately half of the entire population for that college, which was 26 in Winter 2013[9]. Twelve students is a typical class size for the Anglophone courses at the Cegep de Sept-Iles, although it can vary from under four to over twenty. The Francophone classes at the Cegep de Sept-Iles have more standard class sizes of twenty to thirty-five students per group, but the limited number of students enrolled reduces the Anglophone class sizes.

The Sept-Iles Humanities course in the case study is the last course in the sequence of three compulsory courses, so most of the students in Sept-Iles were in their second or third year of cegep, and therefore a year older than the students in the Vanier Worldviews course, which is the second Humanities course in the sequence, and usually taken in the second term of a student's first year. The majority of students

[8] These specific teachers were chosen for observation because they were willing to be part of the study and were used to the presence of the participant observers in their classrooms from past sessions of VTT practice.

[9] The population, made up of students who take courses with English as the language of instruction, equals 26: 16 in Social Science plus ten in the Bilingual Option.

in both groups were either seventeen or eighteen. There were seven slightly older students who gave their age as 19, 20 or 21. And there were three mature students who listed their ages on the questionnaire as 23, 28, and 32.

The teachers for these two Humanities courses in two separate institutions were also participants in the case study. The Vanier teacher, a veteran of post-secondary teaching with ten years of experience, had been practicing VTT for four terms. The Cegep de Sept-Iles teacher had two sessions of VTT experience prior to the start of the given session. Both teachers in this case study are best described as having a high comfort level with technology. The teachers of both classes were used to having the researcher/participant observer in their classroom while teaching, as the same observers had been present as support for VTT sessions in previous years. The researcher was present in the Sept-Iles class for the sessions as a participant observer, but was not the teacher of the class.

3.7 Data Collection Tools and Procedures

This case study uses holistic description and explanation to allow readers, especially VTT practitioners, to make sense of their experience through recognition of and connection with the situation described in the research (Merriam 1998). Data collected for this case study was chosen for its potential ability to shed light on collaboration between teachers before and during VTT sessions and collaboration among students during the VTT sessions. Methodology used was primarily qualitative with some quantitative aspects, such as the percentage of similar items, frequency of behaviours observed, and duration in time spent of various types of collaboration. To analyze the data gathered in this case study, the researcher used Yin's (2003) analytical methods of pattern matching and time-series analysis, along with content analysis within a grounded research approach where themes emerge while working with the data. The data was looked at through the lens of the derived themes to see if they had the potential to illuminate the processes observed.

The table below lists this case study's tools, how they were used and the researcher's main focus during analysis of the data. (See Table 3)

Table 3
Tools Used to Gather Data

Tool Used to Gather Data	**How the Tools were Used**	**Focus during Data Analysis**
Participant Observers in both Classrooms	Took notes, made sketches of classroom set-ups, and set up video cameras to record the VTT sessions. Paid attention to collaboration, including teacher and students practices that supported or interfered with collaboration.	**Collaboration.**
Video Cameras, one in each distant location	Set up to pick up the most salient information possible: the virtual window, the teacher, and some students. Microphones on cameras provided audio recordings that established type and length of activities when the video footage was difficult to interpret.	**Record type and length of activities occurring during the VTT sessions.**
Emails Exchanged between VTT Teaching Partners	Number and frequency. Content of emails broken down into topical phrases; content analysis using themes that arose (grounded research) out to the reading of the emails.	**Topics discussed.**
Focus Group in class during the final VTT session	The researcher used grounded research content analysis of responses to look for themes and frequencies. (See Appendix A: Data Collection Tools for the list of questions)	**Student perception of technology in VTT sessions and their lives.**
Student Questionnaire	Online using Survey Monkey. Content analysis of open-ended questions using a grounded research approach where the themes arise out of the data. (See Appendix A: Data Collection Tools for the list of questions)	**Common themes raised by students.**

The following sections discuss each data collection tool in detail.

3.7.1 Videos

Case study methods involve multiple data collection tools that work together to provide a rich picture and logical interpretation of the specific situation. For this case study the data included video recordings of the three VTT sessions. Each video was approximately two hours long.

The video recordings were analyzed using pattern matching and time-series analysis (Yin 2003) to map out the sequence of activities in terms of type and length in minutes. Once there was a complete list of the activities for all three sessions, the researcher then sifted through the activities, looking at the types of collaboration occurring between the teachers, classrooms, and students, until patterns emerged from the data. The collaboration patterns were then labelled as the categories of collaboration into which each activity was placed. As an illustration, VTT Session A was 70 minutes long and made up of eight different activities, some as short as one minute, others as long as 25 minutes. The eight activities were grouped into three basic types of collaboration. The collaboration patterns, and length of time spend in each type of collaboration over the three sessions, were then looked at using time-series analysis (Yin 2003) to see if there seemed to be patterns that emerged, and to explore what those patterns might mean.

3.7.2 Field Notes

Two participant observers, one in Montreal and one in Sept-Iles, took notes on what was occurring during the three VTT sessions plus the original session introducing the research project to the students and the fifth and final debriefing session in which the students filled out the online questionnaires and participated in the online focus groups. The participant observers had the dual role suggested by their name; they were both participants in the activity and observers of the activity.

The role of the participant observers as VTT participants was to support the classroom teacher during the VTT sessions, primarily with technology issues, for example: helping individual students figure out how to access online tools, or trouble shooting technical difficulties such as microphone or speaker problems with the teacher. The role of the participant observers as collectors of data for the case study was to film the VTT sessions, make sketches of classroom set-ups, and take notes on what they saw happening during the sessions paying particular attention to what was crossing the virtual window or, in other words, instances of collaboration[10].

Neither participant observer was a teacher of one of the courses featured in the case study. Both teachers of the courses were comfortable with the presence of the participant observers in their classrooms while they were teaching as both observers had been present during previous terms for support with the VTT project before the research began. The participant observer at the Vanier site was a Pedagogical Advisor/IT Rep with two years of experience helping teachers practice VTT. The observer in Sept-Iles, a college teacher with seven years of experience practicing or helping other teachers with VTT, acted, for the purposes of this case study, as the researcher/participant observer and author of this paper.

3.7.3 Emails

The researcher was included in the email group for all correspondence for the three Virtual Team Teaching sessions for the Winter 2013 session and colour coded the emails as they entered. Emails exchanged between VTT Teaching partners were collected from four weeks before the first observed VTT session until the focus group VTT session and analyzed for number and frequency. These were gathered and read in an effort to discover recurring themes in the communication using content analysis. Once the themes were established the content analysis was performed on these data.

[10] The participant observers also took responsibility for seeing that students signed consent forms and permission for video footage and photos to be taken.

3.7.4 Focus Group

The focus group is a data-gathering tool that allows participants to know what the other participants are contributing. One of the advantages of a focus group is that one participant's comments may act as a prompt for the other participants. Usually focus groups happen in-person, as a verbal discussion, but in order to orchestrate a situation where the students from both classes could access ideas from both locations, the researcher chose to use Prezi, an on-line presentation tool that can host multiple participants as they contribute to a single document. Therefore, the focus group for this case study happened synchronously, in real time, but it happened in writing rather than in spoken conversation. At the larger, urban college, there were two or three students per computer, so there would have been one typist recording the verbal suggestions of three people for each computer. In the smaller, regional college each student had access to a portable computer so they recorded their thoughts individually. Each Prezi document can only host about eleven students, so the two classes where broken down into three sub-groups of about fifteen students each. There were three exact replicas of the Prezi with the focus group questions already on it and designated fields for their responses. (see Appendix A) All three sub-groups had students from both classes; in other words, each of the three sub-groups had about ten students on three computers from the urban college and about three students on three computers from the regional college.

The focus group was held during the last VTT session of the term to encourage students from both classes to work together to list their perceptions of their ICT communication and collaborations skills and to consider whether these skills had evolved during the VTT experience. Three text zones on the Prezi provided a place for students to record: 1) their thoughts on the importance of online communication; 2) the tools they had worked with previous to their VTT experience; and 3) what they thought they had learned about distance communication from the VTT experience. Data from the focus group Prezis was gathered and listed in units of distinct ideas and analyzed by looking for recurring themes in the comments. Frequency of response

was considered less important in the analysis of the Prezi Focus Group data as it was clear that within a group, an individual student would be unlikely to give a response similar to one that already appeared on the group document.

3.7.5 Student Questionnaire

Students participated in an individual online questionnaire during the last VTT session of the term (the same session in which students participated in the online Focus Groups). The questionnaire began with demographic questions regarding age, gender, college attended and years in cegep. Then the following questions regarding VTT were posed (Questions 2 through 9 were open ended written response):

1. Comfort level with Technology, Collaboration, Cameras and Microphones. (Likert Scale)
2. Has your comfort level with technology changed during this course? (Yes/No)
3. List three good things about VTT.
4. List three bad things about VTT.
5. List student behaviour that improves the VTT experience.
6. List teaching practices that improve the VTT experience.
7. What did you think of the technology used in VTT?
8. What did you think of the other class?
9. Additional comments.

Data collected from the questionnaire was divided into meaningful units, in this case short phrases. The researcher used a grounded research approach to sift through the phrases to look for themes that came out of the student responses. The phrases were then coded and counted. The data gathered from Question 2 would have been more useful if the wording had been: “Has your comfort level with technology *improved* (rather than *changed*) during this course?” as their comfort level could have changed for better or worse.

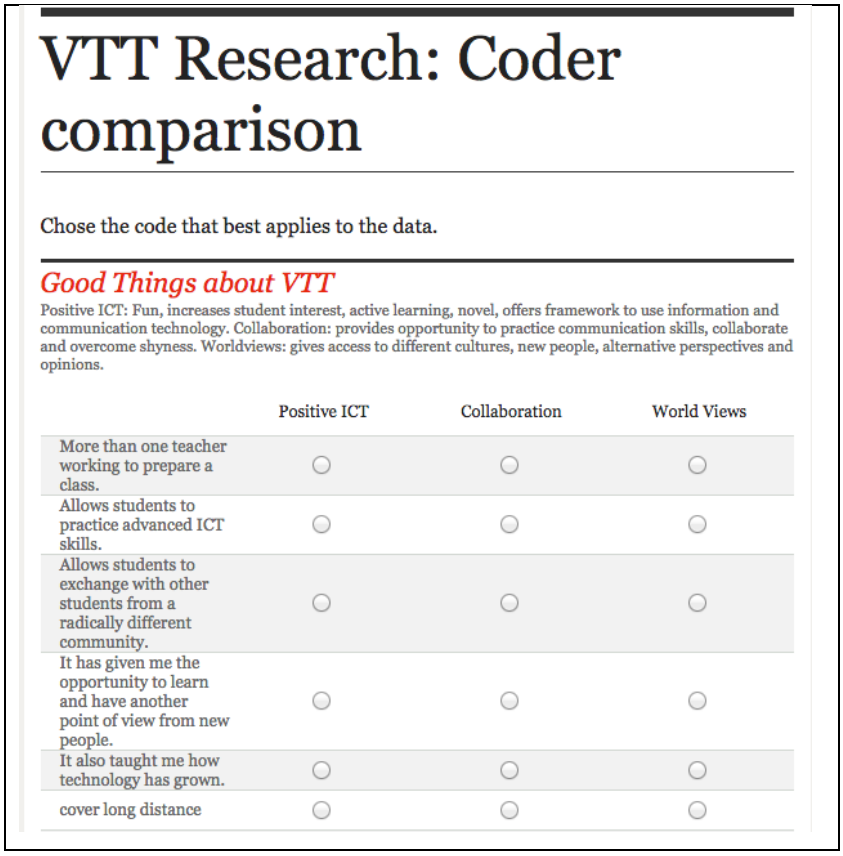
3.8 Validity and Reliability

The data collection tools used in this research was, for the most part, designed for this study. As with all qualitative case studies, the issue of assessment tool validity is a concern. To address this issue, this research used multiple data collection methods and tools to triangulate the analysis and support any findings. Analysis of the data provides information about collaboration occurring in the classroom from several points of view: students, teachers, outside observers (the participant observers were not participants in the class activities, but rather participated in the technical processes of the VTT sessions), and the objective lens of the video camera. The data was also collected from three time perspectives: before (emails), during (participant observers, video recordings), and after (student questionnaire and focus groups).

Having been involved in the VTT project since its inception, and having used classroom assessment techniques to monitor and support student metacognition as well as to improve teaching practice, the researcher for this paper was aware of certain aspects of VTT practices going into the case study, and this knowledge informed the way the research was set up. For example, a previous content analysis of a VTT team's emails during a period of a few weeks had indicated a potential source of information on the collaboration occurring between teachers, and also the place of importance social interaction could take in the exchanges. The teachers involved in this case study obviously knew the research was occurring, but in an effort not to skew the data they were not apprised of the focus on collaboration or the specific attention to what was crossing the virtual window.

Because this is a case study that uses a narrative form, the demands for reliability are not the same as in other research methods. Nonetheless, the researcher wished to achieve some levels of reliability for her coding and used a highbred method, which is described next. The researcher did the initial phase of data analysis. A second phase was done by two VTT teachers who were provided with a Google Form (see figure 3, below) with the codes listed as choices, and instructions, which

gave information about the various categories (as training), and they attempted to code the data to see if they sorted the data into the same categories as the researcher.



VTT Research: Coder comparison

Chose the code that best applies to the data.

Good Things about VTT

Positive ICT: Fun, increases student interest, active learning, novel, offers framework to use information and communication technology. Collaboration: provides opportunity to practice communication skills, collaborate and overcome shyness. Worldviews: gives access to different cultures, new people, alternative perspectives and opinions.

	Positive ICT	Collaboration	World Views
More than one teacher working to prepare a class.	○	○	○
Allows students to practice advanced ICT skills.	○	○	○
Allows students to exchange with other students from a radically different community.	○	○	○
It has given me the opportunity to learn and have another point of view from new people.	○	○	○
It also taught me how technology has grown.	○	○	○
cover long distance	○	○	○

Figure 3: Coder Comparison Form

This was done for two data sets: student open-ended responses from two questions from the questionnaire. This was a somewhat onerous task for the volunteers, and if the researcher were to do it again she would only use a sampling of the data rather than the whole data set, and she would do more coder training prior to the coding attempts. The first set of codes the researcher defined did not have very high inter-coder reliability, 49/95 or 47.4% coding match for "Good Points about VTT" and 30/80 or 37.5% coding match for "Bad Things about VTT." The researcher worked with colleagues to rethink the codes and once a clearer set of codes had been defined, another reliability test was run. This version of codes gave higher inter-coder

reliability rates: 74/95, or 77.8% coding match for Good Points About VTT and 71/80, or 88.7% coding match for Bad Things About VTT.

3.9 Research Ethics

This research conformed to the requirements of the Research Ethics Boards of the two respective institutions. The Research Proposal was submitted to and accepted by the Vanier College Research Ethics Board in February 2013 (see Appendix C: Research Ethics Board Documents). Cegep de Sept-Iles had not yet struck a Research Ethics Board, however the Dean of Studies approved the research and a letter of approval is included in Appendix C.

Self-reporting can lead to bias if students are concerned their responses could influence academic outcome, so it was made clear to the students that their data would remain anonymous to their teachers. Only the researcher had access to data collected and the identity of participants remains confidential. The researcher intends to share results with the teachers involved and students were informed as to how they can contact the researcher for a copy of the results. Students were informed as to the purpose and format of the research during in class sessions before the research began and signed permission letters acknowledging their willingness to participate. They also signed a permission form allowing for photos and video recordings of the sessions (See Appendix C).

CHAPTER FOUR

DATA ANALYSIS

4. AFFORDANCES PROVIDED BY VTT

The general research question for this case study asks: What kinds of affordances does VTT provide for teachers and students in terms of collaboration? This general research question is broken down into five specific research questions, and while all the data sources work together to build a picture of collaboration during VTT sessions, certain data sources target each of those five questions as elaborated on below. The significance of question 1 is such that it is better presented at the end as a way of confirming the processes involved in preparing these kinds of pedagogy and curricula.

4.1 Research Question 2): What are some of the outcomes of this collaboration between these teachers? And Research Question 3): How do students collaborate across the two classrooms?

Analysis of the videos and field notes provides insights on the outcomes of teacher collaboration: specific research question two, and student collaboration across the two classrooms: specific research question three. Below, the video recordings of the three VTT sessions are analyzed. This information is followed by an analysis of the data gleaned from the field notes. While the two sources are analyzed separately, they were also considered together as each was able to inform the other; for example, when it was unclear as to timing for transitions in the videos, the video data could be compared with the field notes to confirm the length of a given activity.

4.2 Five Collaboration Categories

These video data were analyzed using a grounded approach (Glaser and Strauss, 1967). Recall that this is a typical method of letting the categories emerge

from the data rather than imposing *a priori* categories. In this study, the grounded approach results in five categories of engagement between participants, that can be characterized as indicators of levels of collaboration: (0) no engagement with other students (no collaboration); (1) students engaging with others in the same classroom (collaborating within one classroom, but not across the virtual window); (2) teachers engaging with their colleague across the virtual window, but not with students (teacher collaboration across the virtual window); (3) teacher-supported student engagement with peers from the other classroom (teacher supported student collaboration across the virtual window); and finally, (4) self-monitored student engagement with peers from the other classroom (students collaborating across the virtual window independently). The four diagrams that follow illustrate each of the collaboration codes. Each diagram is supported with a brief description plus examples taken from the case study videos.

4.3 Overview of the Collaboration Categories

Table 4, below, gives an overview of all five codes for the various types of collaboration, along with a description of what that collaboration looks like in the classroom and an explanation as to its significance.

Table 4
Collaboration Categories

Category	Type of Collaboration	What It Looks Like	Why It Is Important
0	**no collaboration**	-down-time, -technical problems, -individual work	-normal part of classroom activities, however, VTT sessions aim at minimizing this
1	**student collaboration within a classroom on separate sides of the virtual window**	-small groups of students finding solutions or creating together towards sharing with the larger group	-skill building: roles, communication, planning, timing, tools (Google Drive and Hangout, Prezi, etc.)
2	**collaboration between teachers across the virtual window**	-teachers communicating across the virtual window: -giving and confirming instructions, -offering information or feedback, -includes some informal social exchanges	-models collaboration for students; -keeps session running smoothly -models "double-hosting"
3	**teacher supported collaboration across the virtual window**	-teachers from one side talking to students on the other side in a whole group discussion, -or students responding individually to teachers or other students across the virtual window, -or can be student spokespersons for small groups who share their group findings; -teacher organised and supported	-provides practice and modelling for collaboration in a low-risk setting; -each group must report, so pushes comfort level; -provides opportunities for discussion about roles of host and guest in the online environment or the concept of "double-hosting"
4	**self-monitored student collaboration across the virtual window**	-individual students speaking directly to each other across the virtual window; -"less" teacher presence (for example, a teacher may "lurk" in Google Drive Document to support and monitor progress)	-self-directed collaborating, -students have the opportunity to develop metacognitive awareness of their personal skill set for online communication and collaboration; -provides practice at "double-hosting"

Table 4: Collaboration Categories

The categories in Table 4 are explained in the sections that follow.

4.3.1 Category 0: No Collaboration

Category 0 designates that there is no ongoing collaboration within the classroom or across the virtual window. In the video recordings it indicates a period of time when the learning scenario is not moving forward due to technical difficulties. The longest example of Category 0 from the case study occurred when the three-way Google+ Hangout communication failed to work in the urban classroom, possibly due to internal technical issues at that college. The guest speaker was talking to both groups from London, England, and a three-way form of communication other than videoconference, which she did not have access to, was needed. It took about fifteen minutes for this problem to be resolved. The solution was a three-way Skype call. One of the important take-away messages VTT teachers have derived from Category 0 events is to always have a plan B ready for times like these. This alternative activity can be as simple as a paper and pencil exercise or a link to a video students can watch while waiting. There is no illustration for Category 0 (zero) as it is self-evident (no collaboration).

4.3.2 Category 1: Collaboration within a Classroom

Category 1, Collaboration within a Classroom, (see figure 4, below) looks like small group work in any regular college classroom whether they are practicing VTT or not.

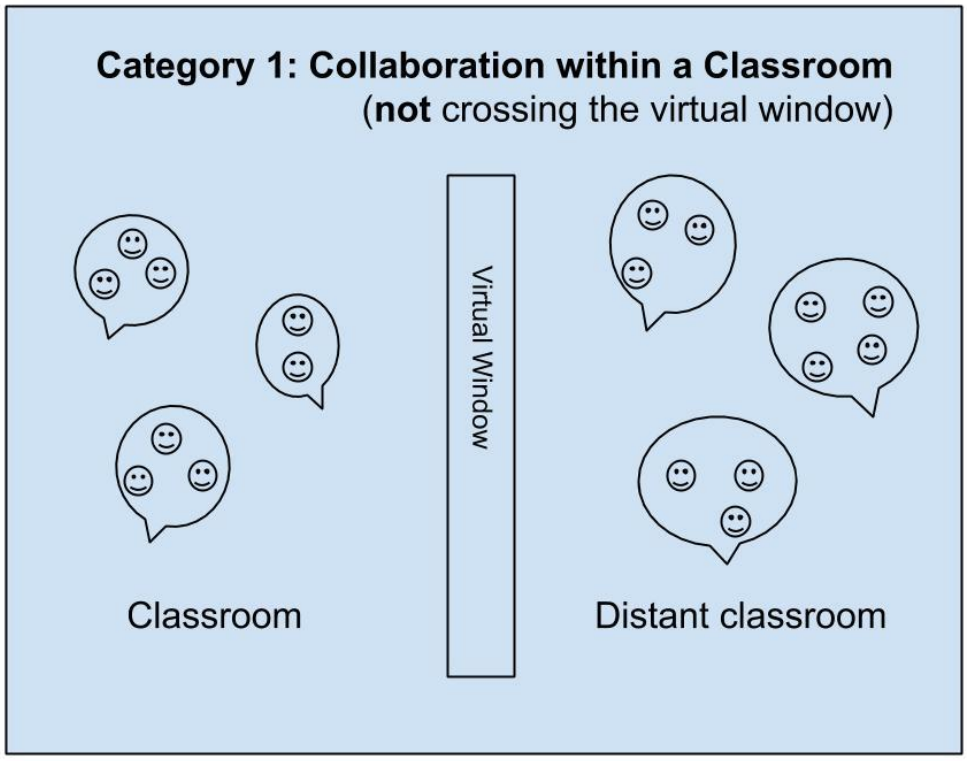


Figure 4: Illustration of Category 1, Collaboration within a Classroom

Students are discussing an issue around their table with a partner or small group. The only difference in the VTT classroom is that often the virtual window (in this case study, a video-conference screen) is left open between the two classes to help build the impression that the two classes are involved in a learning experience as one whole group. Usually teachers mute the microphones to reduce the cacophony. Some examples of Category 1, Collaboration within a Classroom (not crossing the virtual window) from the video footage are: small groups work apart (separate classrooms), students work in pairs (separate classrooms), and a beehive (talk to the person sitting next to you about a specific topic).

4.3.3 Category 2: Collaboration between Teachers across the Virtual Window

Category 2 (see figure 5, below) happens rarely and is usually brief. It may be important in the first session to provide modelling of effective collaboration for the students.

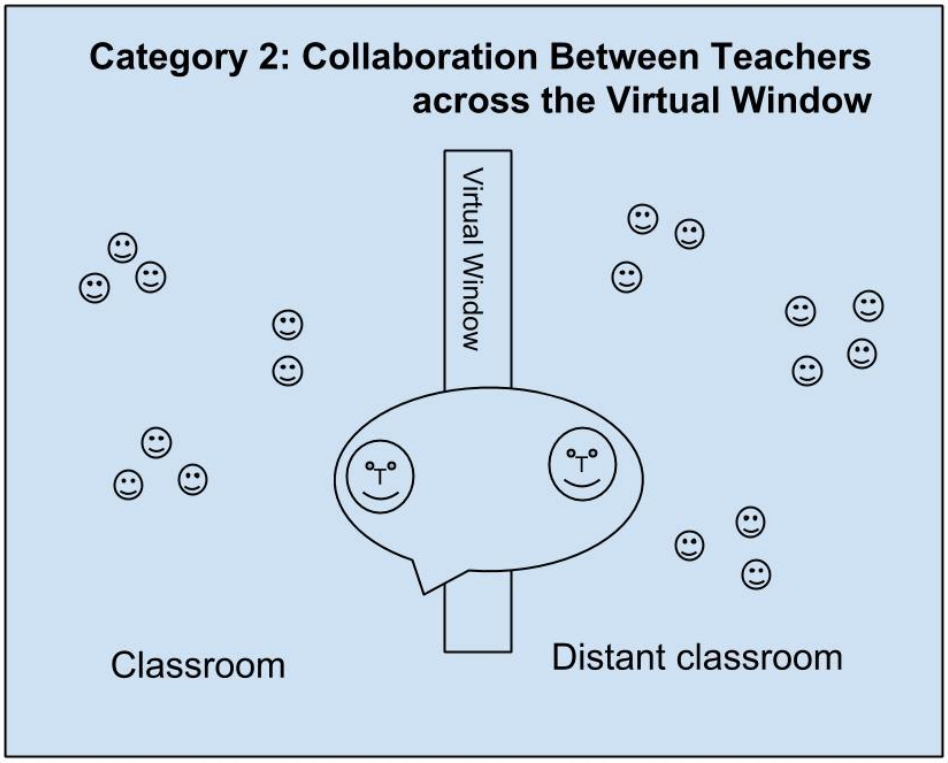


Figure 5: Illustration of Category 2, Teachers Collaborating across the Virtual Window

As mentioned in Table 4, this type of collaboration provides students with a concrete example of how to listen, speak and interact with a view to mutual benefit across the virtual window. In Category 2, teachers are collaborating across the virtual window, giving and confirming instructions, offering information or feedback, and even participating in short social exchanges about the weather or local events. These interactions provide concrete examples of creating common ground and reinforcing

social presence. They are also modeling the double host nature of interactions in the neutral "third space" between the classrooms. Examples from the video footage are: teachers organize an event or teacher confirms instructions.

4.3.4 Category 3: Teacher Supported Collaboration across the Virtual Window

Three is the first category (See Figure 6, below) that has students involved in what is crossing the virtual window.

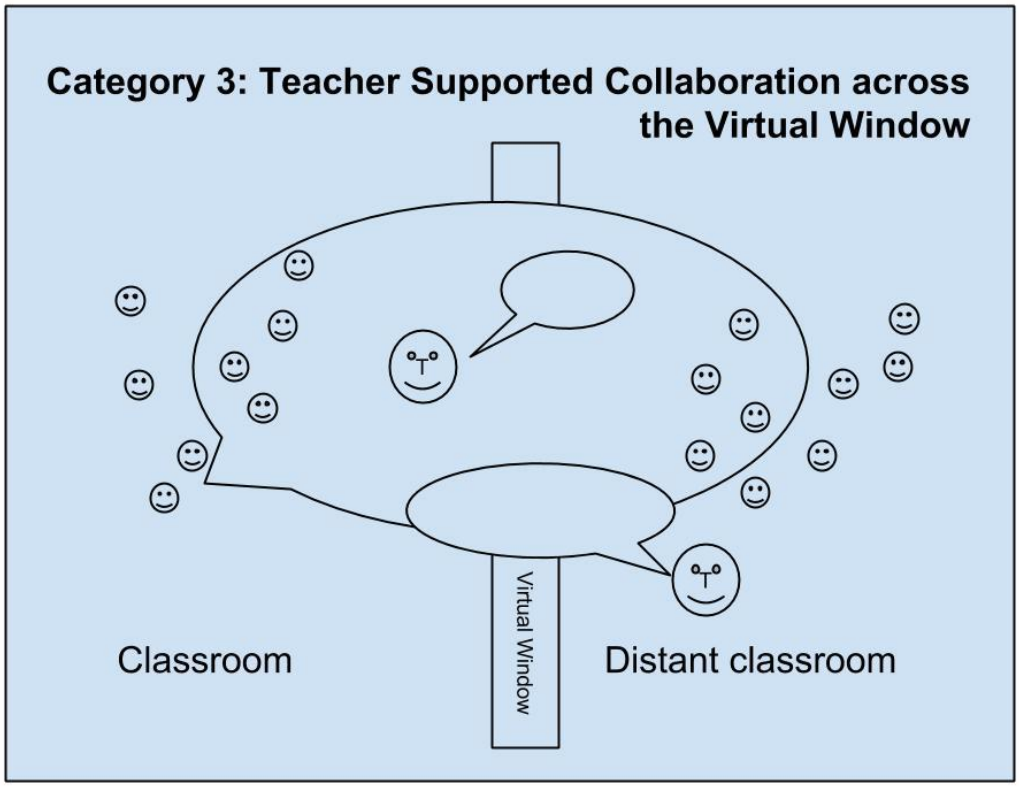


Figure 6: Illustration of Category 3, Teacher Supported Collaboration across the Virtual Window

Category 3 is different from Category 4 in that Category 3, Teacher Supported Collaboration across the Virtual Window, has greater teacher presence. Often, in Category 3, the teacher is leading a discussion that includes student input from both sides of the window. If collaboration lags the teacher is there to find a way to get

things back on track. Category 3 also opens up opportunities for discussion about the double host/guest role of participants in the neutral space between the virtual windows. Examples from the video footage include: introductions, instructions, mini-lectures, guest speakers, spokesperson for student groups sharing their group's responses, discussion among both classes, and a vote polling both classes.

4.3.5 Category 4: Self-Monitored Student Collaboration across the Virtual Window

Self-Monitored Student Collaboration (See Figure 7, below) across the Virtual Window, designated Category 4, is the ultimate objective of VTT.

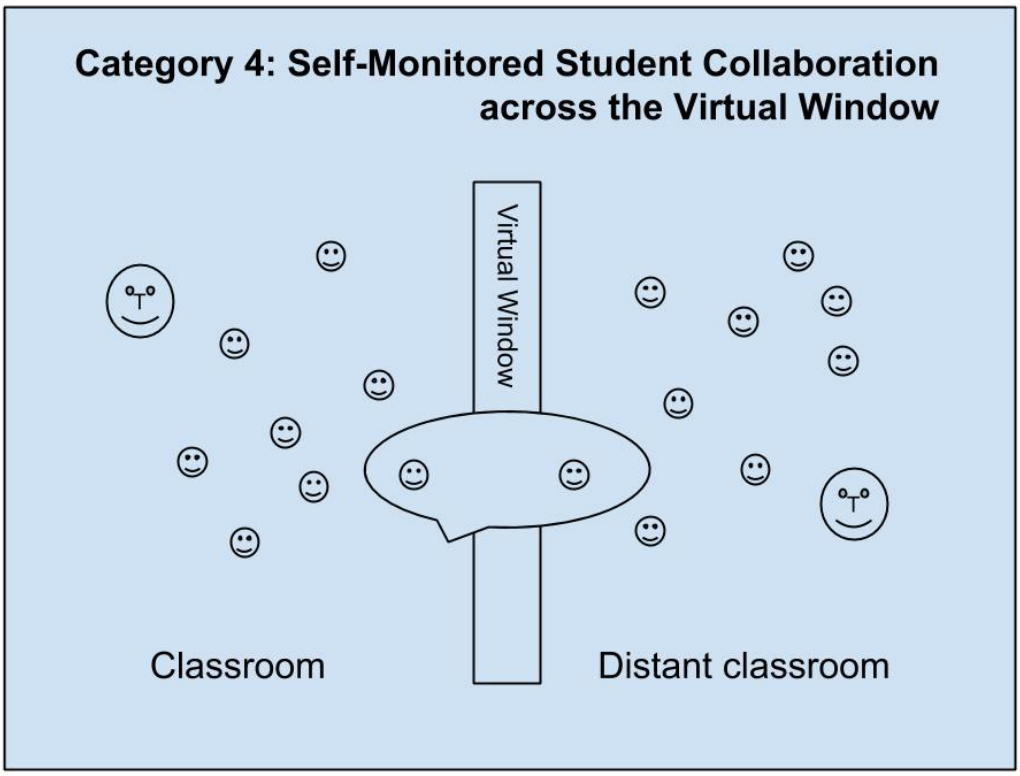


Figure 7: Illustration of Category 4, Self-Monitored Student Collaboration across the Virtual Window

That does not mean that the other codes are less important than Category 4, in fact they seem to be necessary to help students acquire the skills needed for independent

communication and collaboration across the virtual window. The difference at this level is that the students must take responsibility for moving the collaboration forward as there is less teacher support. For example, in Category 4 students may be in small groups mixed with individuals from both classes, yet working together in the same workspace, for example online on a Prezi. The teachers are in their respective classrooms, and they can be available to answer questions, but they cannot be in all of the Prezi groups at the same time, so the students within those groups need to communicate and negotiate to complete the assigned task. Category 4 gives students an opportunity to enact their double role as a simultaneous host and guest. Examples from the video footage are: students ask questions outside of a teacher guided discussion; a student generated discussion starts up spontaneously and is maintained without teacher intervention; or students from both groups work on the same Prezi.

4.4 Collaboration Categories Applied to the Video Recordings

The next section depicts how the collaboration categories were applied to the three videotapes. Using the categories the researcher was able to distinguish what seem to be various types of collaboration, and then to trace changes in the kinds of collaboration the two groups engaged in over time (Yin 2003). Table 5, below, provides and overview of all three sessions with the Activities, Time Spent per Activity, and designated Activity Categories.

Table 5
Collaboration Categories Applied to Three Sessions

Unit	Activity Description	Min.	%	0	1	2	3	4
Aa	small groups work -apart (separate classes)	14	20%		20			
Ab	teachers organize event	1	1%			1		
Ac	groups share answers across window	6	9%				9	
Ad	teachers talking to both groups	6	9%				9	
Ae	teacher gives instructions to both groups	3	4%				4	
Af	teacher confirms instructions	1	1%			1		
Ag	small group work -apart (separate classes)	25	36%		36			
Ah	Discussion among both classes with both teachers	14	20%				20	
Total A	**Totals**	**70**	**100%**	**0**	**56**	**2**	**42**	0
Ba	failed communication/troubleshooting in Montreal	20	14%	14				
Bb	mini-lecture from Sept-Iles teacher	7	5%				5	
Bc	Vanier teacher introduces guest speaker	1	1%				1	
Bd	guest speaker presents blog photos and information	37	25%				25	
Be	students (mostly Sept-Iles) ask guest questions	15	10%					10
Bf	teacher gives instructions	2	1%				1	
Bg	student work in pairs (separate classrooms)	25	17%		17			
Bh	group discussion among both classes, both teachers	33	22%				22	
Bi	mini-lecture Vanier teacher	2	1%				1	
Bj	mini-lecture Sept-Iles teacher	2	1%				1	
Bk	vote polling both classes	1	1%				1	
Bl	discussion between Sept-Iles and Vanier students	2	1%					1
Total B	**Totals**	**147**	**100%**	**14**	**17**	**0**	**57**	**11**
Ca	introduction by Sept-Iles teacher	3	4%				4	
Cb	technical problem	2	2%	2				
Cc	lecture by guest speaker	7	8%				8	
Cd	song and discussion, mostly guest speaker	7	8%				8	
Ce	"beehive" (local discussion of topic)	2	2%		2			
Cf	mini-lecture	2	2%				2	
Cg	Vanier teacher questions guest across window	7	8%				8	
Ch	Sept-Iles teacher gives instructions	4	5%				5	
Ci	Prezi activity explained	2	2%				2	
Cj	groups from both classes on same Prezi	30	36%					36
Ck	discussion both classes across window	17	20%				20	
Total C	**Totals**	**83**	**100%**	**2**	**2**	**0**	**57**	**36**

4.4.1 Collaboration Categories for VTT Session A

Table 5, above, shows the collaboration categories for the first VTT session in the case study, Session A: The Ethics of Industrialization, February 26. The pie chart below, Figure 8, illustrates this table and shows that during more than half of the session students are collaborating with students in their own group.

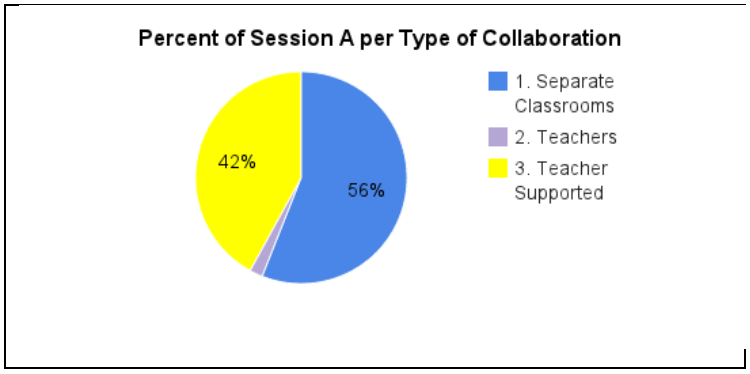


Figure 8: Session A, Collaboration Categories, Pie Chart

The students spend a small amount of time watching their teachers interact across the virtual window, and they do a moderate amount of collaborating across the window with teacher support. There is no official category 4, independent student collaboration across the window, but the field notes do show evidence of Category 4, self-monitored student collaboration across the window, near the end of the class when students began speaking back and forth across the virtual window without teacher intervention within the larger context of a teacher supported group.

4.4.2 Collaboration Categories for VTT Session B

In Session B: The Bhopal Disaster, March 12, the pie chart (See Figure 9, below) shows that within classroom interaction is reduced to one-fifth of VTT session.

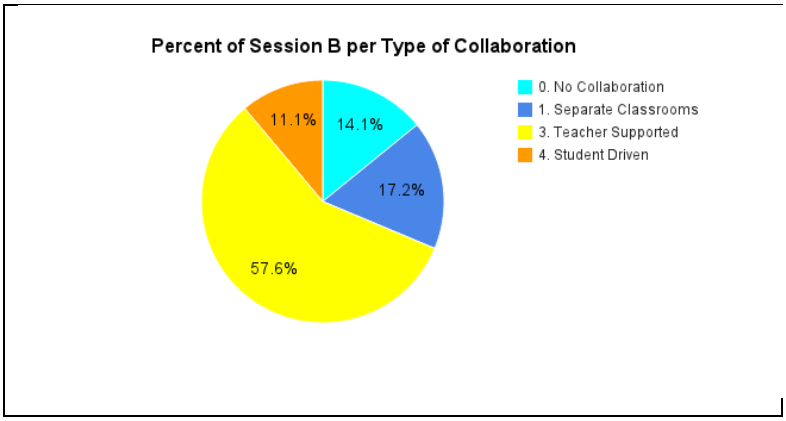


Figure 9: Session B, Collaboration Categories, Pie Chart

More than half of the time is spent in teacher-supported collaboration, and a little more than 10 percent is spent in student driven collaboration. Unfortunately there is also 14% of the session with no collaboration due to technical difficulties in connecting the three-way conversation with the guest speaker who was addressing the students from London England.

4.4.3 Collaboration Categories for VTT Session C

In Figure 10, below, we can see indications of increased student control of their collaboration in the third VTT Session, Parc Forillon Expropriation, April 9.

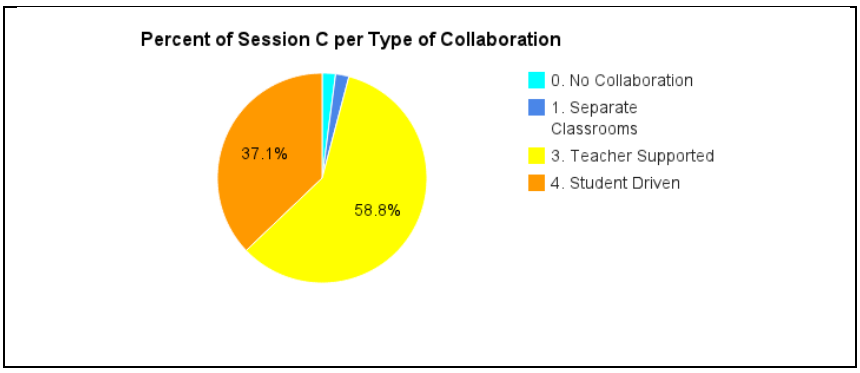


Figure 10: Session C, Collaboration Categories, Pie Chart

Collaboration was occurring for almost the entire session with the exception of a very brief technical problem and a very brief activity in separate classrooms. More than

half the session was spent in teacher supported collaboration, and 36% was spent in student driven collaboration

4.4.4 Summary of Collaboration Results for Sessions A, B and C

The percentages and pie chart below (See Figure 11) give an overview of the collaboration categories for all three sessions.

	Code 0	Code 1	Code 2	Code 3	Code 4	
% of all three sessions	5%	25%	1%	52%	16%	99%

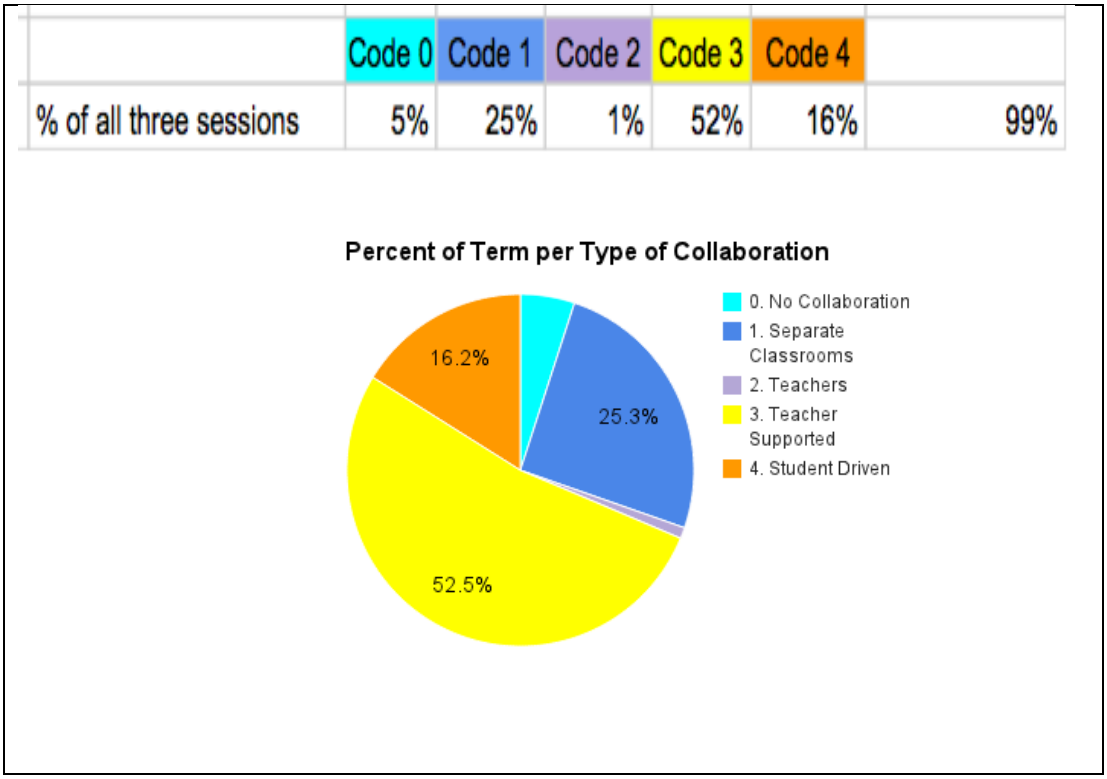


Figure 11: Three Sessions Combined (A, B and C) Percentages of Categories with Pie Graph

We can see that about half of the total time for all three VTT sessions was spent in teacher supported collaboration, a quarter in separate classroom collaboration, and slightly less than one-fifth of the time was spent by students monitoring their own collaboration. Juxtaposition of the three, already presented, session pie charts (see Figure 12, above) allows us to visually compare the types of collaboration occurring in Sessions A, B and C. The analysis of the video recordings using pattern matching and time-series analysis (Yin 2003) to map out the sequence of activities in terms of

type and length in minutes helps build a picture of what kinds of collaboration were occurring, how often and how long they occurred, and whether or not there seems to be a pattern in the way the types of collaboration change over time. Seeing all three graphs side by side (Figure 12, below) illustrates the changes in types of collaboration over time.

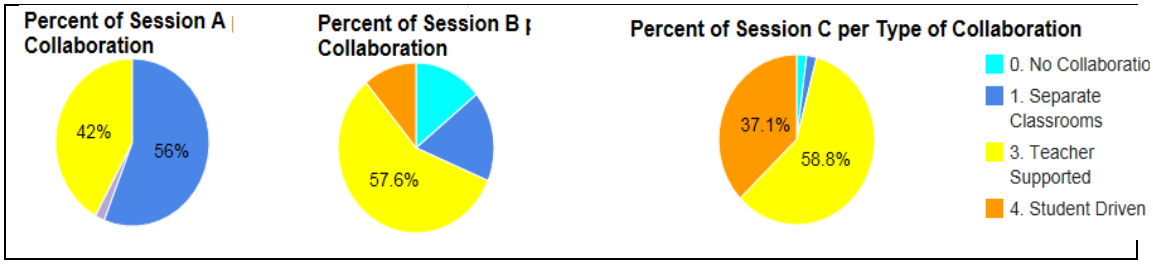


Figure 12: Comparison of the Three Session Pie Charts

The first session, Session A, has more teacher modelled collaboration combined with student practice within the classrooms, but as we move to the second session, Session B, and the third session, Session C, we see an increase in teacher supported collaboration across the virtual window with increasing independence on the part of students in their attempt to collaborate across the virtual window. It would be interesting to see if this progression is simply a side effect of the specific activities chosen for those three Virtual Team Teaching sessions in this particular case study, or if there is a progression that can be seen in other VTT groups as they progress through a term. One interpretation of the data is that teachers need to support the collaboration more at the beginning of the VTT sessions, and then, as the students gain skills and experience, the students themselves take on more responsibility for their participation in the collaborative activities. A comparison of the percentages in the pie charts above appears to indicate an increase in students' ability to collaborate independently as the term progresses.

4.4.5 Reflection on the Collaboration Categories

It is important to note that these categories can be examined further, the parameters for "collaboration" were set very large, for example, a teacher talking to

both classes of students was counted as category 3, student group collaboration across the virtual window, because both class groups were engaged in an activity together, even though students were not necessarily actively contributing verbally. These categories can be helpful to build a picture of the kind of collaboration that goes on during the VTT sessions, and even provide information on how that collaboration changes over time as the term progresses and students acquire more experience. When shown the five categories after the VTT sessions were finished, one of the teachers in this case study declared that the categories and their descriptions helped him think about his VTT practice, both to reflect on past experience to frame what had already happened, and also as a way to think about planning for future VTT sessions. An interesting insight to come out of this research is the understanding of Virtual Team Teaching as a process that seems to begin with certain practices and grow to other more challenging acts; for example, the teachers involved need to collaborate outside of the sessions to create activities that support collaboration, and they need to be aware of the ordering of activities that increases the possibilities for student success. One of the techniques teachers can use is to practice teacher collaboration in front of their students by exchanging ideas and information with their VTT teaching partner in class through the virtual window. By doing this they model active listening, social interaction and negotiating skills. The participant observers notes and analysis of the videos seem to support the practice of teachers modelling basic VTT practices like looking at the camera, making verbal contact with people on the other side of the virtual window, using people's names to make them feel included, or speaking clearly and with enough, but not *too* much volume, into the microphone. There are going to be times during a VTT session when there is no collaboration, that is a normal occurrence as activities are prepared or students work independently, but it is important to be aware of these times and minimize them since the objective of the VTT session is collaboration. There will also be times in early VTT sessions when students will collaborate within their classes on opposite sides of the window and only exchange at the end of that in-class collaboration, and that is part of the learning process. But again, the optimum VTT experience aims at *students*

collaborating across the virtual window, so teachers should take this into consideration in their planning of the learning scenarios. The ultimate objective of VTT is to have students collaborating across the virtual window with minimal teacher intervention, but students need to acquire the necessary skills before they will be at ease practicing self-monitored collaboration across the virtual window.

4.5 Factors that Support or Inhibit Collaboration

The field notes recorded by the participant observers raise several issues that help clarify some factors that support or inhibit collaboration: 1) the physical classroom set up; 2) the protocol of communication in this artificial environment, for example: whom do you address and where should you look when speaking; 3) how can you help include both groups in the conversation; and 4) the best type and use of technology.

The field notes point to the idea that learning to collaborate is a process that takes place over time: “as the discussion continues, students at Vanier start to become more comfortable asking questions” (field notes, session 2). Three themes that run through the participant observers’ notes are: 1) factors that support or interfere with sustained attention; 2) factors that support or interfere with various types of collaboration; and 3) the understanding that Virtual Team Teaching is a multifactorial process whose success or lack of success is difficult to attribute to one specific element. Contributing factors can include things that have nothing to do with VTT specifically, and may even be issues common to all teaching and learning situations such as information overload, or topics that students have trouble relating to. Table 6, below, gives an overview of some of the factors that influence student attention and collaboration according to the field notes.

Table 6
Factors Impacting Student Attention and Collaboration

	Positive Factors	**Negative Factors**
Attention	Teachers… -talk to both groups; -look at the camera and their class; -ask both classes to respond; -repeat what their class is going to do as an explanation for the other teacher or for confirmation of the task; -make connections with the students; -add personal stories; -use visual prompts such as images or videos to support dialogue; -support interaction from both sides of the virtual window; and, -limit unidirectional "lectures."	Teachers… -speak too quickly or cover information too fast; -have back to the other class and is only facing their group; -look only at the camera when talking to both groups and forget to look at own class; -Another situation where attention lags occurs when students respond only to the camera and not to their class, or only to their class and not the camera. -The field notes indicate that it is more difficult to pay attention to someone you cannot see.
Collaboration	Teachers… -mute the microphones while they work with their own class to keep a visual connection and maintain the awareness that eventually the students will be sharing their ideas with the larger group; -make a point of asking the other teacher if his class has any questions on the activity; -call on specific students on the other side of the window to answer questions or contribute to the discussion; -respond to students on both sides of the virtual window. Students… -start a discussion where they are responding directly to each other across the virtual window; -are willing to contribute when called on; -volunteer to speak on their own; -respond to questions posed by the teacher in the other classroom; -participate in technical aspects such as operating the remote control for the camera.	Teacher's… -movement is constrained to one small area when communicating with the video-conferencing unit as he tries to position himself someplace where both the distant students and those in his class can see him. Students… -present their ideas aiming their discussion solely at their own class. Technical factors… -camera is poorly positioned; -camera image is poor; -sound quality is poor; -classroom layout makes it difficult to use camera and microphone; -classroom layout isolates students from communication; -the room scheduled for the VTT sessions is governed by the availability of the needed equipment, and it may not be the optimal organization for student teacher interaction.

Ultimately, like regular classroom teaching, the field notes show that collaboration during VTT is influenced a variety of factors. The passage of time appeared to facilitate collaboration; as students got more comfortable in the VTT situation they may became more willing to participate in the collaborative process.

4.6 Research Question 4: What are some outcomes of this collaboration between students?

Research Question 4 is: What are some outcomes of this collaboration between students? Analysis of individual student questionnaires provides insights on the outcomes of collaboration between students. The insights gathered from the student questionnaires triangulate the data gathered with the other tools. The student's self-reported reflections on VTT connect with the theoretical framework discussed earlier, that of Polman (2001), Staples (2007), and Barron (2003), which provides a way to think about collaboration that can help teachers create learning situations that support collaboration. There must be a shared space where the group can work together to solve problems. Also, in order for the group to communicate the individuals need to take responsibility for the quality of their attention. Individuals need to find ways to make their ideas available to the group. Finally, they need to remember that a vital skill in collaboration is the ability to respond to the other members of the group. These are all skills that seem to develop over time. Data from the student questionnaires indicates metacognitive awareness of these processes and their importance to the successful functioning of a VTT session.

Q1: Comfort Level with Technology (Likert Scale): Table 7 (below) shows the data for Q1, how students perceive their comfort levels with technology and working together.

Table 7
Comfort Level with ICT

How comfortable are you with…	Very uncomfortable	Uncomfortable	Neutral	Comfortable	Very Comfortable
Technology	11%	3%	6%	42%	39%
Group Work	14%	0%	17%	47%	22%
Microphones	14%	11%	39%	22%	14%
Cameras	11%	22%	28%	31%	8%

Table 7 indicates that only 14% of the students feel they are uncomfortable with technology and group work, while 79% are comfortable with technology and 69% are comfortable with group work. It would have been interesting to take a baseline survey before the students participated in the VTT sessions to see if these figures have changed. 39% of students feel neutral with regards to their comfort level with microphones, and a similar level, 28%, appears to be comfortable with cameras. Only 14% feel very comfortable with microphones and only 8% feel very comfortable with cameras. Even with their VTT experience, students are still working on their comfort level for talking in front of a camera.

The remaining questions on the student questionnaire are open ended. Table 8 (below) shows a summary of the questions and the categories chosen from the content analysis with the percentages of responses per total of responses for each question.

Table 8
Category Percentages, Questions 2 through 9

Number	Question (Open Ended, categories derived using content analysis)	Categories (with Percentages of Total Responses)	
Q2	Do you think your comfort level with technology changed during this course?	Yes No	37% 63%
Q3	List three good points about Virtual Team Teaching.	Process Intercultural Collaboration	42% 32% 26%
Q4	List three bad things about Virtual Team Teaching.	Technical Difficulties Time Consuming Interpersonal Difficulties	40% 16% 44%
Q5	What do you think you should do during the VTT sessions to get the most out of the experience?	Receptive Communication Expressive Communication	29% 71%
Q6	What should teachers do during the VTT sessions to improve the experience for students?	Nothing (Good As Is) Improve the Organization Choose Better Topics Encourage More Student Participation Improve the Technology	23% 14% 9% 34% 20%
Q7	What do you think of the technology used in the VTT?	Positive Negative	75% 25%
Q8	During the VTT sessions, what did you think of the people in the other class?	Positive Negative	76% 24%
Q9	Is there anything else you would like to add about the experience you had as part of the Virtual Team Teaching sessions?	Positive Negative	92% 8%

Below the questions in Table 8 are addressed individually in detail.

Q2: Do you think your comfort level with technology changed during this course? 63% of the students felt their comfort level with technology had not changed during the course. 37% felt their comfort level with technology changed during the course. A few students mentioned ways they felt more comfortable with technology such as: “I am getting more comfortable with cameras.”

The list of problems students perceive with VTT (see Table 9, below) may help teachers improve their VTT practice by considering these issues during the planning stages.

Table 9
Good and Bad Aspects of VTT

Student Responses for Good and Bad Things about VTT	Themes	Explanation and/or Subcategories
Positive Aspects	Process	fun different active uses technology
	Intercultural	work with people who provide a variety of perspectives
	Collaboration	overcoming shyness improve team work skills
Negative Aspects	Technical Difficulties	poor sound poor visual image slow connection
	Time Consuming	waiting for connections waiting for the other group waiting during technical problems
	Interpersonal Difficulties	shyness hard to share opinions in large group lack of participation

Q3: List three good points about Virtual Team Teaching. This is a low level type of analysis. Answers were sorted into three categories, two of which: "Intercultural" and "Collaboration," indicate student awareness of the "shared space" discussed by Polman (2001), Staples (2007), and Barron (2003):

1) Process: "high-tech," "something new", "makes the class more interesting," "different way of learning," "makes class more enjoyable," "fun," and "it keeps you active."
2) Intercultural: "allows students to exchange with other students from a radically different community;" "it has given me the opportunity to learn and

have another point of view from new people;" "you have an opportunity to speak with people you'll never get to meet in person;" "we communicate with people we do not know, who have different/similar opinions;" "helps compare cultures;" "more students with different opinions, and you get to see how other people are living in a different city;" and, "can bring experiences and thoughts of many cultures into play."

3) Collaboration: "it was good to do this because students heard from a wider range of voices;" "you get to hear more opinions from others, other than your classmates;" "improve team-working ability;" "see how other teachers teach;" "we have to overcome our shyness;" "we can communicate with other institutions of education;" "share information and opinions much more directly and efficiently," and "interaction."

Q4: List three bad things about Virtual Team Teaching. This is a low level type of analysis. Answers were sorted into three categories:

1) Technical Difficulties: Technical difficulties can be broken down into four main types of comments: voice, sound, hearing problems; for example: "hard to understand everything being said"; trouble seeing what is happening: for example "can't always see everyone"; connection problems; general technical difficulties "relying on technology so if it doesn't work you can't go on with the lesson."
2) Time Consuming: The time consuming category is fairly self-descriptive; it included comments such as "it takes a lot of time and patience."
3) Interpersonal Difficulties: The three subcategories in interpersonal difficulties are: difficulty sharing ones voice in the large group; sample comments include: "our group is too big so not everyone gets to be heard," "not everyone gets to share their opinions or ideas," and "people don't pay attention in large groups;" students are shy or uncomfortable with the camera or strangers; examples of student comments are: "Some people are too shy to be on camera and because of this they do not give their opinions. Makes

people more likely to pay less attention." "I don't like to be filmed!" and "Puts people on [the] spot;" and lack of participation.

The table below (See Table 10) provides an overview of student suggestions for things teachers and students can do to improve VTT.

Table 10
Student Suggestions for Improving VTT

Student Suggestions for Improving VTT	**Themes**	**Explanation and/or Subcategories**
Students can	-use active listening	-quality of attention
	-participate more	-give opinions -talk more -do not be intimidated by camera or microphone -get involved in the dialogue -ask other students questions
Teachers can	-use effective technology	-poor sound -poor visual image -slow connection
	-improve organization	-waiting for connections -waiting for the other group -waiting during technical problems
	-encourage more student participation	-shyness -hard to share opinions in large group -lack of participation
	-choose engaging topics	-students have something to say

Examples of the student suggestions for improving VTT are outlines in more detail below.

Q5: What do you think you should do during the VTT sessions to get the most out of the experience? Student comments about "Receptive Communication" indicate an awareness of the necessity of taking responsibility for the quality of their attention during the VTT sessions. Student comments about "Expressive Communication" indicate awareness of the importance of being able to make their ideas clear to the group. Some of the statements in "Expressive Communication" also indicate the awareness of the importance of the ability to respond to the other members of the group, a skill the researchers rank as vitally important to successful collaboration. These findings are consistent with Polman (2001), Staples (2007), and Barron (2003) who all found that in order for the group to communicate the individuals need to take responsibility for the quality of their attention and that in order for collaboration to be successful, individuals need to find ways to make their ideas available to the group.

Answers were sorted into two categories:

1) Receptive Communication: use active listening strategies including "listening attentively" and "pay more attention to what there is to learn."
2) Expressive Communication: There were 27 comments on the importance of participating, contributing to the dialogue and fighting shyness. The data shows that students are very aware that they learn more when they participate, share their opinions and interact with fellow students. Students gave the following suggestions: "Let me become more active in the class and talk a lot with my classmates." "Give my opinions," "I should talk more," "To get the most out of a VTT session you need to get involved and communicate at most you can, this way you will have a good experience of a VTT session." The data also indicates that students are aware of the role they play in maintaining the dialogue and creating common ground: "Address others so that it keeps a conversation going." and "Always ask questions and challenge the teachers as much as possible."

Q6: What should teachers do during VTT sessions to improve learning experiences for students? Eight comments stated there was no need for improvement. The remaining answers were sorted into four categories:

1) Improve the organization: “Systems should be up and running when students come in, that way, no time is lost so we get as much done as we can during these sessions.”
2) Choose better topics: “It is better to choose some popular topics that related to the college students and they are like to [be] concerned.”
3) Encourage more student participation: “Students should be told that all opinions are valid and will be treated respectfully.” “Make more people talk, I like to hear from everyone!” “Interact with the students as well.” “Encourage participation and communication as much as possible.”
4) Improve the technology: “Teachers should maybe assign homework to familiarize students with the online tools used before the VTT sessions.”

Q7: What do you think of the technology used in the VTT? Answers were sorted into two categories: Positive and Negative comments. Students responded with a ratio of three to one for positive over negative comments. Negative comments were mostly directed at practical concerns such as microphones that did not work well or poor screen resolution. The positive comments stated that students found it interesting to work with new technology and that it made this course different from their other courses.

Q8: During the VTT sessions, what did you think of the people in the other class? (Open Ended) This is a low level type of analysis. Answers were sorted into two categories: Positive and Negative comments. Positive comments about the other class outweighed negative or neutral comments three to one.

1) Positive comments are: “I thought they had good ideas and that everyone did a good job participating.” “The students from the other class are more active

than the students from our class." "They have a lot of good ideas" "They have interesting opinions" "Very active. The student in other class is more comfortable with speaking in front of the camera." "It is very interesting to interact with people that live in rural area compared to only interacting with people in urban areas." "The people in other classes are very nice people and are fun to talk with, even if everyone is shy at the beginning it is fun to see what other people think in a different city."

2) Negative Comments: The three comments with a negative overtone come from the smaller regional group of students and may indicate awareness that it may not be as easy to participate during the VTT sessions in a larger class as it is in their small group: "They [the urban students] communicate well, but they do not talk as much as we do. I feel that, since we are a small group, we know each other very well and we are not scared or shy to give our opinion on different subjects. When a question is asked, they are not very fast at answering." "I thought our class was more spontaneous. Then again I can place in my shoes of the other students in a bigger [urban] class where everyone is scared to talk over someone. I would like to see more concern of the situations presented." "I find it is a lot easier during these sessions to see who truly wants to participate because it is much easier to sit quiet in a big classroom like they [the urban students] have and just listen."

All the comments in the data for question 9, positive or negative, about the other class may indicate that VTT provides an opportunity for Loewen's (2012) "positive tolerance" which actively challenges our perceptions and creates opportunity for improved understanding of the "other" through collaboration with individuals with differing world views.

Q9: Is there anything else you would like to add about the experience you had as part of the Virtual Team Teaching sessions? (Open Ended) This is a low level type of analysis. Answers were sorted into two categories: Positive and Negative comments. 11 out of 12 responses were positive.

1) Positive Comments: “I think this is a good idea and that it is the beginning of a new and improved technology.” “It has been a nice experience and I am glad I had the opportunity to experience this.” “We should [have] more VTT sessions.” “It was very fun to take part in and gave me a different outlook on teaching.” “As a trial it was awesome, lots to improve but lots to keep. Maybe by doing more people will develop a better purpose and attitude of serving. An important aspect in becoming an active member of our society.” “It made a three hour class a lot less boring.”
2) Negative Comment: “There is already too much concentration in today's society on technology, this enforces that concentration even more and in my opinion, should not be done.”

4.7 Research Question 5: Does the teachers’ collaborative effort impact the students’ collaboration, and vice versa?

Analysis of the focus group data addresses research question five. There were three focus groups. Students were asked questions designed to reveal their thoughts on the topic of ICT and prior experience with forms of communication. Table 11 (below) gives a summary of the data.

Table 11
Focus Group on ICT: Communication Skills

Questions from the Focus Group Prezi	**Examples of Student Responses**	**Researcher's Observations**
Communication Skills: *What do students need to learn when it comes to using ICTS?*	-multitasking skills; -quick comprehension; -learn to use the computer and the internet world because they need it for school and jobs; -they need to learn how to make their own presentations in order to bring up their points; -how to fix their own issues with internet or computer without needing assistance, -and they need to know how to use collaboration tools.	-Students demonstrate a metacognitive awareness of the significance of acquiring communication and collaboration skills.
Before this course… *What experience did you have in distance communication?*	-Facebook, -Skype, -msn, -texting, -and a variety of other communication tools, including tools used when gaming that allow voice communication.	-Students listed online tools they had used to communicate with prior to the course. They listed an impressive variety of tools, including written, spoken and visual communication.
Distance Communication *What have you learned here?*	-"A sense of technology, how to operate the camera." or "How to use Prezi and Moodle" -"We shared our opinions and accepted those of others. We were able to evaluate situations and come up with solutions." -"That there are much less boundaries that we think when it comes to relaying your message across to other people." -"Even though we live in the same province, we share different opinions and views on different topics." -"I've learned that there are differences between the way people think in big cities, but there are also more resemblances that I ever could have thought possible."	-Students seem to confirm their acquisition of a variety of practical ICT distance communication Skills. -Students also report improved intercultural awareness and collaborative skills.

Students came to the VTT sessions with previous experience. They indicate an awareness of the importance of developing their communication and technology skills. They also indicate that these sessions gave them an opportunity to gain experience in using technology to communicate and work with their distant peers.

4.8 Research Question 1: How do teachers collaborate to build activities and content for a VTT session?

The email communication among the VTT team can provide data for specific research question 1) How do teachers collaborate to build activities and content for a VTT session? The researcher collected the email data of the teacher communications. They showed that communication was most critical just before the sessions and that the issues discussed in the emails were equally divided between the 4 topics: organization, technical, social, and content (see figure 13). More discussion of the emails can be found in Appendix B, Emails.

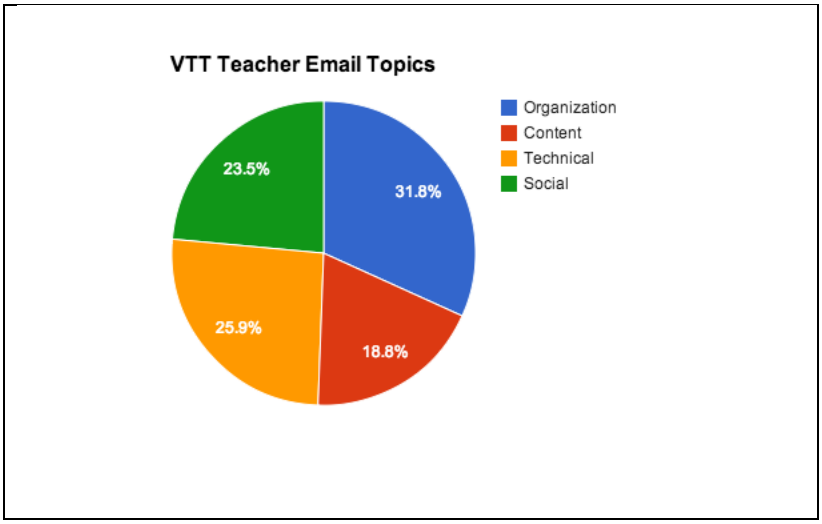


Figure 13: Topics Discussed in Teacher Emails

Communication within the VTT team needs to be frequent and clear. There is no possibility for impromptu discussions in the hallway because of the distance factor, yet both teachers need to arrive in class with a clear, shared, picture of how classroom activities will proceed: who will do what, which tools they will use, how long each element of the class will take, and how they will transition from one activity to the next. Emails are one way the VTT pair communicates to decide on mutual class plans.

CHAPTER FIVE

DISCUSSION

5. COLLABORATION IN VTT

This case study asks, What kinds of affordances does VTT provide for teachers and students in terms of collaboration? with the goal of exploring the opportunities and constraints the VTT program provides for teachers and students to collaborate. The researcher looked at three VTT sessions occurring between two distant college classrooms using a variety of data collection tools including teacher email communications, participant observers in both classrooms, video recordings of the sessions, a focus group interview, and a student questionnaire. The general research question is broken down into five specific research questions, addressed in the following paragraphs.

5.1. How do the teachers collaborate to build the activities and content for a VTT session?

VTT teachers collaborate in person or using online tools such as Skype to negotiate the initial plan for their collaboration, and after that they use a combination of emails and online tools that allow them to see and hear each other. The importance of this visual connection is highlighted in *Effective Social Learning* (Loewen, 2014). The emails analyzed in this case study indicate that social interaction and negotiation of technical issues play a significant role in the communication regarding collaboration, alongside the more predictable topics of content and organization. Loewen (2014) emphasizes the necessity for thinking about teacher collaboration using the rule of three: before, during and after. This research focussed mainly on the "before" communication. The fact that content is the smallest category in the emails is counter-intuitive; one might think that negotiation of the content of the sessions would be the primary topic of discussion, however it is organization that gets the most attention, with technical discussion and social interaction each taking about a

quarter of the material discussed. Loewen provides anecdotal evidence that underscores the impact of teacher collaboration and provides systems to support that interaction, such as templates for planning and debriefing that can be downloaded and used by prospective VTT teams.

5.2 What are some of the outcomes of this collaboration between teachers?

The data from this case study, especially the participant observers' notes and the video footage, indicate that successful teacher collaboration supports student collaboration through well-planned and organized learning scenarios, well-chosen technical tools, modelling of collaborative practice, and scaffolding built into the collaborative process through progressively more challenging collaborative tasks and learning activities that create common ground and provoke dialogue.

5.3 How do students collaborate across the two classrooms?

Analysis of the videos and the participant observers' notes provide evidence that addresses specific research question three. Student collaborative activity in the case study changes over time. In the first session students collaborated within their classrooms and the teachers modelled collaboration across the virtual window. In the second session teachers supported students as they attempted to collaborate with peers on the other side of the virtual window. In the third and final session students collaborated directly with peers in the other classroom without teacher intervention. This progression can be characterized as a development from simpler to more complex types of collaboration.

A contribution to the literature is the five collaboration categories derived from the research. These codes may be helpful for teachers who want to create learning scenarios that support collaboration. The five collaboration categories are: 0, No Collaboration; 1, collaboration within a classroom; 2, Teacher Collaboration Across the Virtual Window; 3, Teacher Supported Student Collaboration Across the Virtual Window; and 4, Self-Monitored Student Collaboration Across the Virtual

Window. These categories seem to be useful both as diagnostic a tool for considering previous VTT sessions, and also as a way of thinking about collaboration during planning for VTT over an entire term as well as within an individual VTT session.

5.4 What are some outcomes of collaboration between students?

Analysis of individual student questionnaires provides insights on research question four. Researchers in the field have remarked that in order for collaboration to occur, first, there must be a shared space where the group can work together to solve problems, second, individuals need to take responsibility for the quality of their attention, third, individuals need to find ways to make their ideas available to the group, and forth and finally, they must respond to the other members of the group (Polman, Staples, and Barron). These are all skills that seem to develop over time. The results of the student questionnaires suggest a growing metacognitive awareness of these processes and their importance to the successful functioning of a VTT session.

5.5 Does teachers' collaborative effort impact the students' collaboration, and vice versa?

Analysis of the focus group data combined with the interpretation of all the data in the case study provides insights into these interactions. The comments of students in the Focus Groups indicate that students have an awareness of the necessity of acquiring communication and collaboration skills for educational and employment purposes, as well as insights into the interpersonal issues that impact communication.

A case study should be more than the sum of its parts. This synergistic view aligns well with specific research question five, “Does the teachers’ collaborative effort impact the students’ collaboration, and vice versa?” If we think first about VTT teachers’ collaborative efforts, these can be broken down into before, during and after the VTT sessions. This teacher collaboration is outlined in *Effective Social Learning:*

A Collaborative, Globally-Networked Pedagogy, (Loewen, 2014). When a pair of VTT teachers collaborates successfully, it follows that this should support effective student collaboration. Successful teacher collaboration will include attention to appropriate learning objectives, wisely chosen topics, well-organized learning scenarios, well-chosen technology to support collaboration across the virtual window, and scaffolding (for example, modelling collaboration or working through the various types of collaboration) to support the learners as they progress from the stage they are at to as far as the experience can take them. Students, for their part, can impact the collaboration through their quality of attention, their willingness to express their ideas and opinions, their openness to using the technology to make themselves seen and heard on the other side, their ability to hear and respond to the ideas and opinions of the other students, and the responsibility they take for advancing the task in the online "third space" where they must act as both the host and guest. The data indicates that when teachers orchestrate effective VTT sessions, and students commit to their part in the activities, VTT provides affordances for collaboration in the college classroom.

5.6 Affordances for Collaborative Learning

The data collected in this case study of VTT offers a portrait of the collaborative affordances provided by this method of Social Learning (Loewen 2014). VTT uses Blended Learning strategies synchronously with traditional face-to-face in class presence. "Some have argued that making individuals' thought processes available to others needs to be at the heart of collaboration" (Engestrom, 1999; Schwartz, 1999 in Staples, 2007, p.209). Teachers working within a Social Constructivist paradigm must do more than simply lecture; they must provide opportunities for their students to think and engage in authentic academic discourse. One method is by presenting alternative perspectives (Massaud, Iqbal & Stockley, 2011). VTT offers a framework that presents interesting possibility for collaboration.

There is evidence in this case study, and in Loewen's (2014) book exploring this type of practice, that VTT creates a reflective Community of Practice (CoP) for

the teachers involved. The email exchanges can be viewed as adding to the reflectiveness of the teachers involved in the VTT, and the VTT program itself has brought teachers together as a CoP to look at teaching practices that use new pedagogies and technology. The very nature of Loewen's (2014) rule of three, that structures VTT exchanges before, during and after each session, helps create a workshop atmosphere and an opportunity for debriefing with colleagues in a way that is almost impossible when one teaches alone. In VTT, teachers can model effective collaboration and provide an opportunity for students to improve their ability to collaborate through firsthand experience.

VTT is a practice that provides opportunities for collaboration for both teachers and students. The findings of this case study support the claim that the practices associated with the VTT approach enrich the students' learning experiences. Students in the case study developed skills required for collaboration both within their class and between the two classes, for instance approximately one third of the students indicated that their comfort level with technology had changed since the beginning of the course. The researcher hopes this change was in a positive direction! Most of the individual responses indicate that is the case, for example: "I am getting more comfortable with cameras."

This research provides concrete descriptions of a range of collaborative practices and suggests specific actions that support or inhibit collaboration including: the physical classroom set-up; the protocol of communication; techniques for keeping both groups active in the conversation; and choice of technology. Some factors that support attention are teachers directing their talk towards both groups, looking at the camera, and making connections with students; and factors that support collaboration across the virtual window are teachers specifically calling on students on the other side of the window, and students who respond to questions posed by the teacher in the other classroom.

The information the researcher gathered will help VTT teachers improve their practice, especially how they can actively foster collaboration. Additionally, it could be argued that these findings can help teachers, in general promote better collaboration among their students.

5.7 Potential Contribution of the Research

In Virtual Team Teaching teachers create a collaborative learning scenario where students contribute and then reflect on, and respond to, each other's contributions. The teacher's role shifts from disseminating information to acting as a catalyst for further learning by creating opportunities which help students move their thinking forward. As Staples (2007) proposes, VTT teachers, in order to support collaboration, perform three simultaneous tasks: they encourage students to share their thoughts; they sustain the shared learning experience; and they guide the interactive publicly shared dialogue. Table 12, below, is not new information; it is a juxtaposition of information taken from Table 1, Teacher Collaborative Behaviors, and Table 4, Collaboration Categories (above). It is included here to highlight the connections between previous research on collaboration and the categories of collaboration that came out of the Grounded Research Approach to looking at the data from this case study. The researcher realized the codes were influenced by the literature; the codes connect with Staples' teacher behaviours that support collaboration (see Table 12, below). If we think about Staples' (2007) table of teacher behaviours that support collaboration, we can connect them with the collaboration categories that came out of the grounded research approach to analysing the videos of the VTT sessions.

Table 12
Connecting Collaboration Codes with the Literature

Category	Type of Collaboration	Teacher Behaviours that Encourage Collaboration (Staples, 2007, p. 191)
1	**Student collaboration within a classroom on separate sides of the virtual window**	Supporting students in making Contributions: • Eliciting Student Ideas (Select and press; Providing time) • Scaffolding the Production of Student Ideas (Representing; Providing structure; Extending) • Creating Contributions (Expanding what counts; Demonstrating the logic; Linking)
3	**Teacher supported collaboration across the virtual window**	Establishing and Monitoring a Common Ground: • Creating a Shared Context (Establishing prerequisite concepts; Verbally marking; Affording multiple opportunities to access ideas) • Maintaining Continuity over Time (Keeping the purpose salient; Pursuing discrepancies) • Coordinating the Collective (Positioning students for collective work; Controlling the flow)
4	**Self-monitored student collaboration across the virtual window**	Guiding the [Peer Collaboration] • Guiding High-Level Task Implementation (Modifying tasks; Providing "food for thought;" Ongoing assessing and diagnosing) • Guiding with a Map of Students' Learning ("Going with the [students];" Flexibility following a student's thinking; keeping the students positioned as thinkers and decision makers)

Table 12: Connecting Collaboration Codes with the Literature

Certain teacher behaviours connect nicely with categories 1, 3 and 4, as shown in Table 12, above. Category 3 is where everything is happening from the teacher's

point of view. There is a great deal of learning collapsed in this category that could be expanded on. Category 3, however, is confounded, as there is also quite a bit of monitoring common ground that occurs in category 4, so it is not just what the students are doing, but also what the teachers are doing to support the peer collaboration.

The data indicates some students are aware of their role as host and guest in Loewen's third space (2014). We can see this in the case student questionnaire in their responses to the question "What can students do to improve the VTT experience?" Students report that they must listen attentively and pay attention, they know they need to talk, keep the conversation going, ask questions and "challenge the teacher." This may indicate that VTT is successful in supporting students in acquiring collaborative skills.

5.8 Future Research

This Master's paper provides a description of a case study looking at collaboration at the college level in the context of Virtual Team Teaching. Future research could follow similar steps to see if similar or comparable results ensue. Alternatively, future research could use the codes developed here to assess recordings from three VTT sessions designed by a different VTT team over one term and then compare the new data with this research. Teachers participating in the VTT project could also use the codes and/or other data to help structure VTT activities across a school term and keep anecdotal evidence on whether this supports growth in student collaboration. This research explores affordances provided in VTT learning scenarios with a relatively coarse tool that looks for "something" to be crossing the virtual window, and then tries to identify the type of interaction occurring at that point in time. It would be informative to analyze VTT practice at a more refined level using a checklist to note characteristics of collaborative interaction: interactivity, synchronicity and negotiability (Dillenburg, 1999, cited in Staples, 2007) and collaborative practices (see Table 1, Staples, 2007). Multiple case studies of several

different VTT teacher teams using the collaboration codes developed in this research might build a more robust picture of collaboration that occurs during VTT practice.

CONCLUSION

This case study has a narrative aspect. It is a "novel" situation and hard to categorize. It can be considered a form of action research, which entails studying a practice while practicing it. This research is an attempt to document the fine-grained aspects of a practice that is already established. It is an attempt to look at the features that we have put together to create VTT to see if we can scale them up as we hand off the practice to other VTT teams. Blended Learning and Social Learning enrich the VTT classroom by providing alternatives to the lecture mode of instruction and supporting a dialogical approach (Loewen 2014). Loewen's book, *Effective Social Learning: A Collaborative, Globally-Networked Pedagogy* (2014) provides a practical guide supported with pedagogical theory for teachers who are thinking about trying VTT. This research paper adds to Loewen's contribution by providing an in-depth look at one specific VTT situation, and through an exploration of what collaboration looks like at the classroom level as the two groups work together across the virtual window in the neutral third-space. The researcher distils the information gathered in this paper into five main ideas:

1) Collaboration in the virtual world may need a different set of skills, especially with regard to communication technology use and online collaborative applications, and also with regards to the double hosting aspect that requires participants to act as simultaneous hosts and guests, or "guosts."
2) What we learn about collaboration in the virtual world may be helpful in thinking about collaboration in general; the virtual window may function as a lens through which we can look at collaboration with a specific focus.

3) There appear to be different kinds of collaboration, and they seem to work in a progression that builds on skills acquired at previous levels.
4) If teachers apply concepts regarding collaboration that have come out of the research, they may improve their students' ability to collaborate. My anecdotal experience testifies to the fact that teachers can get discouraged when their attempts at facilitating group work are negatively received by students. Collaborative activities may meet with more success if teachers and students have a better understanding of concepts such as establishing common ground, making contributions, monitoring one's attention and responding to other people's ideas.
5) There are some really practical, concrete factors that support or inhibit collaboration, and if we can think about them ahead to include or avoid them it would give us a better chance at facilitating successful collaborative activities.

Information and communication technologies give students a vehicle to have their voices heard by their peers and their teachers. In VTT, students take on an important role in academic discourse. They are required to improve their ability to get their thinking across to others, and then to receive, understand and respond to the thinking of others. In a collaborative situation the group must sustain on-topic discussion and acknowledge it in a positive manner. Teachers may express concern about technology taking over their domain, but this research shows that there is an irreplaceable role for the teacher. What the teacher does in the classroom may change as we improve our understanding of technology and how it supports collaboration. Over time, students appear to take on a bigger role in the collaborative process, and when nurtured by supporting teachers, students will take on roles of responsibility and even be aware of the significance of their actions at a metacognitive level. Teachers need to put more emphasis on metacognition, to help students recognize that they are undergoing these processes and to appreciate their significance.

Teachers need to keep in mind the nature of collaboration: what it looks like and how to support it; the acts, attitudes and environment that sustain the interaction required. Teachers also need to understand the significance of collaboration, to have a clear idea of why collaboration is important; and, they need to know how to encourage students' metacognition regarding collaboration. The answer to the question, "What is crossing the virtual window?" seems straightforward: words, images, and sounds. But this case study helps us understand the complexities behind those concrete aspects. Personalities, ideas, and cultures can cross the window. Teachers and students can contribute to the success of VTT, and the collaboration that underlies it, through their understanding of, and engagement with, the processes involved. This case study should help VTT participants to better understand and participate in collaboration. This work contributes to the discussion of how to prepare students with 21st Century skills by providing opportunities to use 21st Century tools.

BIBLIOGRAPHICAL REFERENCES

Angelo, T., & Cross, K. (1993). *Classroom Assessment Techniques: A Handbook for College Teachers* (Second ed.). San Francisco: Jossey-Bass.

Barron, B. (2003). When smart groups fail. *The Journal of the Learning Sciences, 12*(3), 307-359.

Brown, J. S., Collins A. and Duguid P. (1989). Situated cognition and the culture of learning. *Education Researcher*, 18, 32-42.

Brown, P. A. (2008). A review of the literature on case study research. *Canadian Journal for New Scholars in Education*, 1(1), 1-13.

Clark, H. H. and Schaefer, E. F. (1989). Contributing to discourse. *Cognitive Science 13*, 259-294.

Glaser, B., & Strauss, A. (1967). *The discovery of grounded theory: Strategies for qualitative research*. Chicago: Aldine Pub.

Hastie, M. Hung, I.C., Chen, N.S. and Kinshuk, (2010). A blended synchronous learning model for educational collaboration. *Innovations in Education and Teaching International, 47*:1, 9-24.

Jacmin, S. (2012). *J@nus Project film document*, Vanier College and Cegep de Sept-Iles.

Lambropoulos, N., Faulkner, X., & Culwin, F. (2012). Supporting social awareness in collaborarive e-learning. *British Journal of Educational Technology*, *43*(2), 295-306. doi: 10.1111/j.1467-8535.2011.01184.x

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge England: Cambridge University Press.

Loewen, N. (2014) *Effective social learning: A collaborative, globally-networked pedagogy*. Minneapolis,MN: Fortress Press.

Loewen, N. (2012) The global classroom: Using ICTs for intercultural education. Unpublished Preliminary Report for the Plenary Session at the *Dialogue of Civilizations and Intercultural Cooperation 5th International Seminar* "Cross-Cultural Education within Globalization Modern Practice and Prospective Trends" conference. UNESCO. Moscow, Russia.

Massoud, A., Iqbal, U., Stockley, D. & Noureldin, A. (2011). Using blended learning to foster education in a contemporary classroom. *Transformative Dialogues: Teaching & Learning Journal*, *5*(2), 1-11.

Polman, J. L. and Pea, R. D. (2001), Transformative communication as a cultural tool for guiding inquiry science. Sci. Ed., 85: 223–238. doi: 10.1002/sce.1007

Raymond, D. (2008). Yes, but what do we know about learning? In *What is learning and what is teaching? A tandem in motion* (p. 154). Montreal, Quebec: AQPC.

Staples, Megan. (2007). Supporting whole-class collaborative inquiry in a secondary mathematics classroom. *CRME Publications.* Paper 1.

Ulmane-Ozolina, L. (2011). Technology use for collaboration in blended learning. *Problems of Education in the 21st Century, 33*, 83-91.

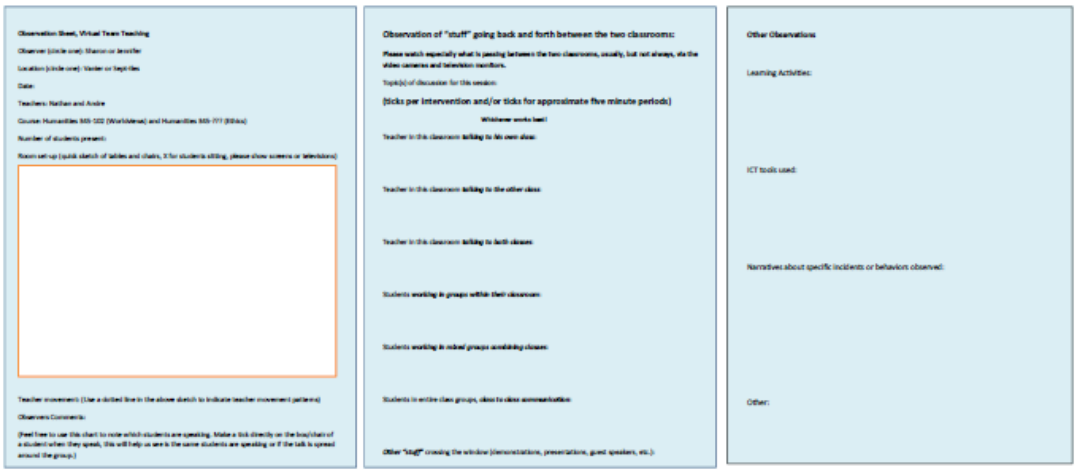
Vygotsky, L. (1978). Interaction between learning and development. In *Mind and Society* (pp.79-91). Cambridge, MA: Harvard University Press.

Yin, R. (2003). *Case study research: Design and methods* (3rd ed.). Thousand Oaks, Calif.: Sage Publications.

APPENDIX A

DATA COLLECTION TOOLS

Observation Sheet used by Participant Observers



Observation Sheet, Virtual Team Teaching

Observer (circle one): Sharon or Jennifer

Location (circle one): Vanier or Sept-Iles

Date:

Teachers: Nathan and Andre

Course: Humanities 845-102 (Worldviews) and Humanities 845-777 (Ethics)

Number of students present:

Room set-up (quick sketch of tables and chairs, X for students sitting, please show screens or televisions)

Teacher movement: (Use a dotted line in the above sketch to indicate teacher movement patterns)

Observers Comments:

(Feel free to use this chart to note which students are speaking. Make a tick directly on the box/chair of a student when they speak, this will help us see is the same students are speaking or if the talk is spread around the group.)

Observation of "stuff" going back and forth between the two classrooms:

Please watch especially what is passing between the two classrooms, usually, but not always, via the video cameras and television monitors.

Topic(s) of discussion for this session:

(ticks per intervention and/or ticks for approximate five minute periods)

Whatever works best

Teacher in this classroom talking to his own class:

Teacher in this classroom talking to the other class:

Teacher in this classroom talking to both classes:

Students working in groups within their classroom:

Students working in mixed groups combining classes:

Students in entire class groups, class to class communication:

Other "stuff" crossing the window (demonstrations, presentations, guest speakers, etc.):

Other Observations

Learning Activities:

ICT tools used:

Narratives about specific incidents or behavior observed:

Other:

1. Prompts for Participant Observers. One form per session. After attempting to use these forms for VTT session A, the Participant Observers did not find the forms helpful so they simply recorded the field notes in their own fashion.

Virtual Team Teaching Research Participant Questionnaire Winter 2013

This information will remain confidential. Your teacher will receive a summary of this information with no names included after your course is over and marks have been handed in. If you have any questions or prefer that your data is not used you can withdraw your participation at any time. If you have questions please ask Sharon (coys@cegepsi.ca) or Jen (mitchelj@vaniercollege.qc.ca).

Name:

Class (circle one): Vanier/Sept-Iles

Age:

Gender:

Comfort with technology (computers, cameras, microphones, etc.): 1 2 3 4 5

Comfort with group work: 1 2 3 4 5

Three good points about Virtual Team Teaching (VTT):

Three bad things about Virtual Team Teaching (VTT):

What was the role of the other students in the VTT sessions?

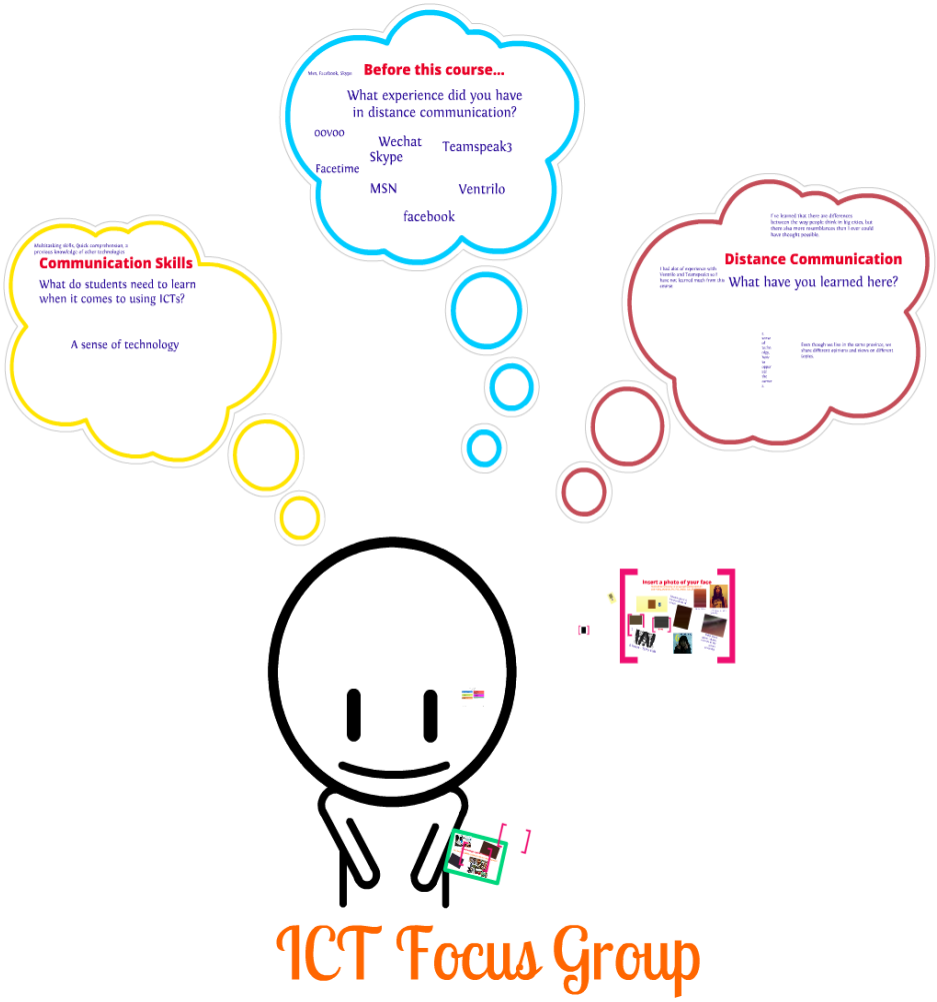
What was the role of the teachers in the VTT sessions?

What did you think of the technology used in the VTT sessions?

During the VTT sessions, what did you think of the people in the other class?

Is there anything else you would like to add about the experience you had as part of the Virtual Team Teaching sessions?

2. Items on the student questionnaires completed online using Survey Monkey.



3. Example of one of the filled in focus group pages (one was collected for each of three small groups) completed online using Prezi. The Questions are difficult to see in the image and are included below:

   1) Distance Communication: What have you learned here (in the VTT sessions)? Questions in the Focus Groups: 2) Communication Skills: What do students need to learn when it comes to using ICTs? 3) Before this course, what experience did you have in distance communication?

APPENDIX B

VTT TEACHER EMAILS

Email communications set the stage for VTT practice. In this case study, four people were usually included in mailings that circulated regarding the planning for the VTT sessions: the Vanier Humanities teacher, the Sept-Iles Humanities teacher, the Vanier Pedagogical Advisor/IT Rep who was acting as the Vanier participant observer for this research, and the researcher for this paper who was acting as the participant observer in the Sept-Iles classroom. 42 emails exchanged by the two Humanities teachers were examined using content analysis. Both teachers on the virtual team sent a similar number of emails while preparing for each of the three VTT sessions, slightly less for the first session, about five emails each, and eight to ten emails while planning for the second and third VTT sessions. 37 of the emails were sent in the week leading up to the VTT session. Five outlier emails were sent three or four weeks before the sessions; these advance emails usually have a logical explanation such as planning for a guest speaker, which needs to happen well ahead of the proposed date.

Basic outlines for the entire term are established well before it commences, but the organization of the individual VTT sessions appears, according to this research, to happen mostly during the week of the VTT session itself. These email exchanges add a burden to the teacher's agenda, and depending on the number of years the teachers have been practicing VTT, they can take up a varied amount of time. The two teachers in this case study had a few years of VTT experience, and had, in fact, already worked as a VTT team together for two terms, but not for this particular combination of courses, so they seemed to have an average number of exchanges, however this would need to be verified by further research with other VTT teams.

The most frequently mentioned topics in the teacher emails were technology and organization, which were discussed more often than content (see figure 13, Topics Discussed in Teacher Emails). The amount of discussion about content varies from one VTT session to the next, however content differences between sessions and teachers can be explained with background information about what was happening

during the VTT sessions: the first session content was negotiated between the two teachers, so they needed to reflect longer on how they would proceed. For the next two sessions, the host (Vanier in session two and Sept-Iles in session three) of the session's guest speaker made decisions about content, so there was less need for negotiation. The data collected suggests that social interaction takes an important place in the team's dialogue. The technical issues are also important to discuss, as the team needs to decide which ICT tools they will use to collaborate. As mentioned previously, the content for VTT sessions is often negotiated in audio conversations during the term preceding the practice using a tool such as Skype, so the content was established at an earlier time, before the term began, when the teachers decided on overlapping learning objectives and content that would facilitate them.

The teacher emails exchanges are usually short and practical in nature, but there are some VTT session exchanges that provide evidence of the opportunity VTT affords for reflective practice. Two excerpts from emails sent after the focus group demonstrate VTT practitioners' metacognitive perspective on this complex adaptive system:

> [Comment from the teacher in the Montreal classroom, April 30] "Well, that wraps up our final VTT session. I think the session revealed a lot about where VTT needs to go. In other words, we discovered that we barely scratched the surface of intercultural communication." [The teacher then lists specific cultural elements that came up in the class, and ends with the comment] "I am also really concerned/confused about the question of computers vs. conventional room." [When asked to give the advantages to a conventional room he replies] "it seems like the 'circle the wagons' [all students gathered in front of the screen] approach works much better. Students are face to face with 'the other side,' and something like the awkwardness of yesterday would be immediately present and discuss-able. With my students scattered all across the room, and even SI students around the U-table, the roving camera does not really create that sense of immediate intimacy of a dialogue. I found that this term it was mostly teachers speaking to teachers, or teachers paraphrasing students, or teachers speaking to their own students, or teachers speaking to students on the other side. I don't really think [we] constantly accomplished groups of students dialoguing with

> groups of students. I see that as the 'gold standard' for VTT, and I think it is a problem to be addressed."
>
> [Comment from the observer in the Montreal classroom, April 30] "I would agree with [the teacher]'s assessment of the interactions between members of the VTT experience. There was very little student-to-student interaction. I noticed the same thing when I attend the class between [two other VTT teachers]. I think it is a result of having only one window, the MVCU (mobile video conferencing unit). I think the reaction is to treat the MVCU as the object to be addressed instead of the people on the other side. I noticed that when students spoke during the VTT sessions, they talked to the TV instead of talking to their own class. I also think the MVCU emphasizes a 'one at a time' approach to conversation through the window, and for the sake of managing that it often fell to the teacher to communicate on behalf of the class. The only remedy I can think of at this point is to do more synchronous activities on things like Google docs or Prezi where students are asked to work in groups with students from the other side. This will give them the chance to interact with each other more directly, without the sense that they have to wait their turn to talk through the window. I think we also need to give them more opportunities to use type [texting] chat interfaces so they can talk to each other." (Excerpt from the VTT team's email exchanges, after the final meeting of the groups)

It is interesting to note in the two comments above that the first speaker, one of the teachers, sees the screen, or virtual window, as a helpful tool to focus discussion between distant class groups, while the other speaker, one of the observers, highlights some of the drawbacks of the screen: the object becomes the focus, or it leads to individual turn-taking. For any ITC tool, VTT practitioners must think about its affordances to attempt to harness the potential of the tool, avoid its pitfalls, and include other tools that are more conducive to the learning purpose. These emails excerpts provide evidence of the reflective practice that is part of their collaborative dialogue.

APPENDIX C

Research Ethics Board Documents

VANIER
CÉGEP/COLLEGE

February 13, 2013

Sharon Coyle
Cégep de Sept-Iles

Dear Sharon,

The Vanier College Research Ethics Board, *Virtual Team Teaching: An Observational Study* has reviewed your research request and has granted their certification for your project.

Regards,

Marc Belanger
Chairperson
Research Ethics Board

encl. Certification
nb

VANIER COLLEGE
RESEARCH ETHICS BOARD
RESEARCH CERTIFICATION

This is to certify that the Research Ethics Board of Vanier College has examined the research proposal by

_____Sharon Coyle_____
name of applicant(s)

entitled: __Virtual Team Teaching: An Observational Study_____
title of project

Ethics approval is granted for a period of one year from the date of this approval. After that date, all research must cease unless an application for renewal has been approved. A final report summarizing the findings of the study should be submitted to the Vanier College Research Office within six months of study completion.

RESEARCH ETHICS BOARD MEMBERS

Amanda Assaf

Marc Belanger

Valerie Broege

Marielle Beauchemin

Kelly Purdy

Karen White

February 11, 2013
Date

Board Chairperson

Participant Consent Form for
Virtual Team Teaching: Digital Literacy, Interculturaism and Collaboration
An Observational Study _____

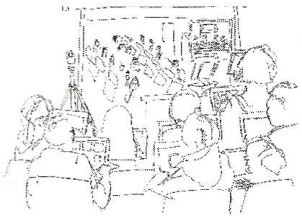
You are being asked to participate in a research project being carried out by Sharon Coyle from the Cegep de Sept-Iles for her Masters Research Paper with Performa under the University de Sherbrooke. There will be some questions for you to answer at the end of your Humanities course at Cegep de Sept-Iles, for the 2013 Winter semester.

Your participation is entirely voluntary, and if you decide to participate, you may stop your participation at any time, without obligation or explanation. The results of your research participation will be analyzed with that of other participants, without any identifying information. All results are confidential.

If you have any questions about this study, please contact the researcher, Sharon Coyle at coys@cegepsi.ca, or your teacher Andre Alizzi at Andre.Alizzi@cegep-sept-iles.qc.ca.

I, _____, agree to participate in the research.
(Please print your name here)

_____
Student's signature



_____
Parent or Guardian's signature if under 18

*The essay question for students and teachers:
Reflect on your experiences in the Virtual Team Teaching sessions (when your class worked with the other class using ICT). Discuss good and bad aspects, especially what it was like working with the other students and teachers, what you thought about using technology, and your impressions about the people in the "away" group. This self-evaluation is anonymous and will not count for marks.

If you do not want your data to be part of the research, please sign here.

_____
You must still complete the questions since they are learning activities, but your data will not be used.

CÉGEP DE SEPT-ÎLES

COMITÉ D'ÉTHIQUE DE LA RECHERCHE
AVEC DES ÊTRES HUMAINS

RÉSULTATS DE L'ÉVALUATION ÉTHIQUE

TITRE DU PROJET

Virtual Team Teaching : An Observational Study

NOM DU CHERCHEUR

Sharon Coyle, enseignante de *Humanities*

DATE DE DÉPÔT

Janvier 2013

DATE D'ANALYSE

10 août 2015

RAPPEL DE LA NORME DE RISQUE MINIMAL

Lorsque l'on a toutes les raisons de penser que les sujets pressentis estiment que la probabilité et l'importance des éventuels inconvénients associés à une recherche sont comparables à ceux auxquels ils s'exposent dans les aspects de leur vie quotidienne reliés à la recherche, la recherche se situe sous le seuil de risque minimal. Au delà de ce seuil, la recherche doit faire l'objet d'un examen plus rigoureux et être réglementée de façon plus stricte afin de mieux protéger les intérêts des sujets pressentis[1].

DÉCISION DU COMITÉ

En janvier 2013 soit, avant la création du comité d'éthique de la recherche avec des êtres humains, M[me] Sharon Coyle présentait à la Direction des études un projet portant sur l'observation des réactions des étudiants inscrits dans un cours dispensé en mode *Virtual Team Teaching*. Sur la base de l'analyse du projet et de concert avec ses homologues du Collège Vanier, la Direction des études du Cégep de Sept-Îles confirmait son appui à la mise en œuvre dudit projet de recherche.

Au terme du suivi continu de l'avancement des travaux de M[me] Coyle, la Direction des études est à même de confirmer que le projet a respecté à tous les égards les règles énoncées dans la Politique d'éthique de la recherche avec des êtres humains du Cégep de Sept-Îles et évalue qu'il comporte un risque plus que minimal.

Marc Lavoie
Président du CÉR

[1] Énoncé de politique, p. 1.5.