Teacher Leaders in a Professional Learning Community Focused on Teachers' Integration of Information and Communication Technology Tools: The case of Building Community through Tele-collaboration Network project

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Abstract

The growing presence of technology in everyday facets of student life has created a strong impetus for the education system to reflect this reality in student learning (John & Sutherland, 2004). However, current teacher professional development programs do not adequately provide teachers with the necessary tools and support needed for successful ICT implementation in pedagogy and curriculum (Brand 1997; Fullan 2007). This study investigates the effects of the Building Community through Tele-collaboration Network (BCTN) professional development program on teachers' integration of technology in the classroom from the point of view of the teacher who emerged as leaders through the course of the project. The BCT project, which is a design research, focuses on teachers' professional development through support networks and collaboration within a professional learning community of teachers in Montreal English school boards. Six teacher leaders with extensive pedagogical and technological experience were recruited as participants to discuss their experiences regarding teacher education and leadership within the BCTN project with the researchers within recorded semi-structured interview formats. The interview transcripts were then coded and analyzed by the researchers within a thematic content analysis framework. The results highlight the effectiveness of support-based teacher professional development practices within contexts of cultures of sharing in a professional learning community. Importantly, these teacher leader practices aided the teachers in overcoming previously documented barriers of technology integration in teaching practice (Keengwa, Onchwari, Wachira, 2008; Ertmer, 1999). This study calls for a greater focus on teacher professional development centered on collaboration and teacher leadership by educational institutions. It also invites researchers to turn their focus to the interrelationships between teacher leaders and their fellow teachers as a means to ultimate implementation of the new technology-integrated teaching practices.

Résumé

La présence grandissante de la technologie dans les facettes de la vie estudiantine a créé un fort besoin pour le système éducatif de refléter cette réalité dans l'acquisition des connaissances. (John et Sutherland 2004). Les programmes actuels de développement professionnel des professeurs ne fournissent pas de façon adéquate les outils nécessaires ni le support pour une ICT réussie appliquée à la pédagogie et cursus. (Brand 1997, Fullan 2007). Cette étude recherche les effets du programme de construction communaitaire à travers le programme professionnel de développement par le réseau de télé-collaboration (BCTN), sur l'intégration de la technologie par les professeurs dans la salle de classe, et ceci du point de vue du professeur qui émerge comme meneur au cours de ce projet. Le projet BCT, qui en est au stade de l'élaboration, se focalise sur la formation des professeurs par l'utilisation des réseaux et par la collaboration avec la communauté des professeurs membres des administrations des écoles anglophones de Montréal. Six professeurs meneurs dotés d'une solide expérience pédagogique et technologique ont été recrutés comme participants pour discuter de leurs expériences concernant l'édudation des professeurs et le guidage à travers le projet BCTN, avec les chercheurs au cours d'entrevues semi structurés et enregistrés. Les retranscriptions de ces entrevues ont alors été codées et analysées par les chercheurs au travers d'une analyse thématique du contenu. Les résultats illustrent l'efficacité du dévelopement professionel des professeurs bénéficiant de l'aide de leurs pairs au sein d'une culture d'échange dans une communauté d'apprentissage. Le soutien de professeurs meneurs aide d'autres professeurs à surmonter des barrières d'intégration de la technologie dans les pratiques d'enseignement (Keengwa, Onchwari, Wachira, 2008; Ertmer 1999). Cette étude suggère de porter une plus grande attention sur le dévelopment professionel des professeurs avec l'aide de collaborations et d'aides aux enseignants de la part des institutions éducatives. Ce travail indique également aux chercheurs que les interrelations entre les professeurs meneurs et leurs collègues peuvent être un moyen d'atteindre un mise en place idéale et integrée des technologies dans les pratiques éducatives.

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Introduction

Statement of the Problem

It is widely accepted that in order for students to be successful, they must attain the skills necessary to become proficient in digital literacy (Bingimlas, 2009). Technology plays an important role in society, forming the ways in which "we create, find, exchange, and even think" (Pierson, 2001, p.413). It pervades every facet of life, creating more productive work environments and supporting quality education (Hepp, Hinostrova, Laval, & Rehbein, 2004). Students have lived significantly different experiences than those of their teachers due to the great access of modern technologies associated with their era (Prensky, 2001). Furthermore, the students of today significantly differ from the students of the past, preferring to acquire information quickly through multitasking (Prensky, 2001).

The emergence of new technologies poses a challenge to teachers unfamiliar with the ways in which the ICT tools are operated. The potential downfalls associated with teachers' lack of integration of technology in curriculum and pedagogy are extensive in scope, the most critical of which being students' disengagement. When education does not actively engage students' experiences and identities, students fail to recognize the relationship between schooling and education (Collins & Halverson, 2009). At its worst, student disengagement has been shown to correlate with aggression, depression, sexual activity, and drug use (Carter, McGee, Taylor, & Williams, 2007).

In order for teachers to best serve students' needs and prepare them for the Information Age, teachers must be able to properly integrate technology into their everyday curricula and pedagogy (Koehler & Mishra, 2005). However, such a change in teaching practice does not come naturally to teachers, even to teachers who've grown up with such modern ICT tools (Lei, 2009). Rather, the integration of technology must be incorporated into an effective teaching framework if it is to properly support teachers' pedagogy and curriculum. Research indicates that the integration of technology is best supported when it is implemented into constructivist teaching practices, including teachers' use of collaboration, hands-on learning, and modelling of practices (Keengwe, Onchwari, & Wachira, 2008; Jonassen, Mayes, & McAleese, 1993). Constructivism's main principle in which knowledge is constructed rather than transmitted, and its key component that learning is best performed

through learners' play, experimentation and collaboration, create a framework for ICT tools application in the classroom (Strommen & Lincoln, 1992). Furthermore, the constructivist approach is applicable to both the technology education of students and the professional development platforms of teachers. As teachers are key components in their student's digital literacy development, it is essential they be given the resources and opportunities necessary to integrate technology into the classroom.

Research indicates that simply demonstrating the use of technology in the classroom is not enough to engage students in understanding and appreciating the range of possibilities afforded by technology (Koehler & Mishra, 2005). Rather, teachers must be able to demonstrate "the capacity to absorb new technologies and apply them innovatively" (Kozma, 2005, p.127). Teachers experience many barriers in attempting to integrate technology, such as the unavailability of resources, a lack of knowledge and fear (Ertmer, 1999). Current professional development programs usually consist of discrete teaching sessions, in which an independent consultant presents a lecture on the role of technology in education (Schrum, 1999). This model of professional development has proven ineffective, as it does not acknowledge the needs of teachers in practice (Schrum, 1999). Rather, professional development programs that take place in contexts of communities of practice and professional learning communities, providing teachers with the ongoing support, technological and pedagogical expertise, collaborative partners, trust, mentors and leaders necessary for successful learning prove to be much more effective (Koehler, Mishra, & Yahya, 2007; Admiraal, Lockhorst, & van der Pol, 2012).

Professional development programs attempt to help teachers through the learning process by attending to teachers' specific needs and obstacles (Koehler & Mishra, 2005). These communities of teachers promote the leadership qualities of participating teachers, both inside the classroom and amongst their coworkers (Barth, 1987). Teacher leaders that emerge from these communities take on important leadership roles in the integration of technology initiatives, trying to ensure that peer teachers have access to necessary resources, technological support, pedagogical support, and partners in collaboration (Barth, 1987). They also ensure that relevant expertise is available to professional learning communities, viewing themselves as part of the community of co-learners (Beausmith & Barry, 2011). Teacher leaders play an invaluable role in professional development

programs, as they have already earned the trust of their coworkers and are viewed as fellow pedagogues, who better understand their professional experiences and have more expertise in technology tools implementation. As such, teacher leaders have been found to be the most effective agents for inducing school-wide change (Borko, 2004).

This research is an attempt to capture a view of the experiences that teacher leaders in the BCTN project gained through years of participation in this design research for support of fellow teachers' integration of technology in their daily pedagogical practice and to help them in development of their Technological Pedagogical Content Knowledge (TPACK) in Mishra and Koehler's (2006) term.

Definition of the Key Terms

Technology: While technologies have always held an important role in the classroom, such as the use of blackboard and chalk (Koehler & Mishra, 2005), the technologies referred to in this line of research are that of digital technologies rather than that of analog technologies. As the world transitions from analog technologies to digital technologies (Katchen, 2004), it is crucial that teachers and researchers focus on the integration of these new technologies in the classroom.

Information and Communications Technologies (ICT) tools: comprise the technological tools in classrooms that allow for effective communication between educators and students (Castro Sanches & Aleman, 2011). The ICT tools outlined in this project are those with the capacity to be of use in the educational settings, such as Voicethread, Blabberize, blogs, wikis, Audacity software, Prezi, and Skype (Wall, et al., 2012).

Communities of practice (CoP): represent the collaborative efforts of networks of individuals working toward the same objectives, through constant communication (Flogaitis, Nomikou, Naoum, Katsenou, 2012). In the case of the BCTN project, the teachers' communities of practice incorporate all elementary school teachers in English school boards of Montreal. The main function of the communities of practice in this project is teacher support through collaboration, peer support, and trust (Hildreth & Kimble, 2004). As all the members of the communities of practice are pedagogues, the teachers use each other's experiences to relate to each other and create a culture of sharing.

Professional learning community (PLC): The constant discourse present in communities of practice creates a platform for teachers to learn from each other's experiences. This also creates the basis for professional learning communities in which teachers consider each other co-learners (Stoll et al., 2006) and venture to successfully implement a change like integration of technology into their pedagogy and curriculum (LaFee, 2003). Professional learning communities play an important role in the creation and sharing of knowledge, as teacher collaboration generates innovation (Toole & Louis, 2002). When they engage in professional development communities, teachers have access to the expertise of their peers through practices shown to be effective, such as mentoring and action learning (Stoll et al., 2006).

Teacher leaders: Within a professional learning community, oftentimes, teachers with the most expertise will be informally granted the status of 'leader'. Within the BCTN project, leaders with the professional learning communities are referred to as 'teacher leaders'. Teacher leaders in the BCTN project have been informally chosen by their peers to extend their expertise to the community of practice as a whole (Wall et al., 2012). Teacher leaders characterize themselves as learners within the professional learning communities while proving their expertise in the classroom, to further gain the trust of their fellow teachers (Little, 1988; Lieberman, Saxl, Miles, 2000). They act as facilitators for mentorship, collaboration, engagement and serve as the crucial link between initiatives' developers and researchers and the actual integrators of technology (Breuleux, et al., 2009). Without teacher leaders, projects such as the BCTN Project would not be effective in achieving their objectives.

Design research: The BCTN project operates according to the design research framework. The framework allows researchers to implement changes that need to be made, based on their and the teachers' observations through time (Collins, Joseph, Bielaczyc, 2004). The main tenet of this approach is that collaboration and feedback between the researchers and the research participants is essential to designing the best project possible (Reeves, Herrington, & Oliver, 2005).

Technology Integration and Adoption: The adoption of technology into the curriculum

refers to continuous efforts to incorporate technology into every learning endeavor, rather than whenever it is seemingly relevant (Straub, 2009). Many factors contribute to teachers' adoption of technological integration, the most powerful being their discontent with prior teaching practices, failure to effectively meet pedagogical standards and prepare students for the Age of Information (Ely, 1990). Although teacher leaders play an important role in supporting the adoption of technological integration amongst teachers (Ely, 1990), it is ultimately the final decision of the teacher whether or not he or she chooses to make ICT tools a daily part of his or her curriculum and pedagogy, although their decisions are often influenced by surrounding contexts and extraneous factors (Straub, 2009).

Technological Pedagogical Content Knowledge (TPACK): It is a framework in which technological knowledge is placed within contexts of pedagogical and curricular goals (Harris, Mishra, & Koehler, 2009). TPACK comprises knowledge pertaining to curricular topics, appropriate means to pedagogical goals, the operation of technology and the ways in which all of these skills sets combine to create sustained, successful integration of technology (Koehler, Mishra, & Yahya, 2007). TPACK does not outline the ways in which professional development programs should implement TPACK, but rather offers a framework to better inform implementation (Koehler & Mishra, 2008). This form of knowledge is vital to the BCTN project, as the initiative aims to integrate the use of ICT tools within topics and objectives in Québec Education Program (QEP), rather than as an aside to the relevant classroom assignments (Wall, et al., 2012).

Research Questions

The BCTN project aims to gain insight into the conditions and factors that support successful integration of technology in pedagogy and curriculum. As the circumstances and factors the researchers wish to analyze are multifaceted and complex, so are the research questions around which the project is structured.

One of the main objectives of the BCTN Project is to "facilitate the learning, use and evaluation of ICT-supported learning tools" (Wall, et al., 2012, p.13). As such, the researchers seek to find the key components implicated in teacher leaders' roles that support teachers in learning about the integration of technology in education. Moreover, the researchers aim to determine the ways in which teacher leaders perceive their peers to

learn the integration of technology and the ways in which teacher leaders themselves view the role of technology in education.

The BCTN project also aims to support teachers' opportunities to learn about and practice integration technology into everyday teaching practices, as a professional learning community (Wall, et al., 2012). As such, the researchers aim to determine the obstacles that professional development projects, such as the BCTN project, face when situated within professional learning communities. They also seek to ascertain the benefits teachers' professional learning communities bring to the integration of technology in schools.

Regarding these objectives this work is an attempt to answer the following research questions:
RQ1. What are the major features and central aspects of teacher leader role in teachers' integration of ICT in their teaching practice?
RQ2. What are the major challenges of the initiatives like the BCTN project that focus on teachers' integration of ICT in practice within a professional learning community?
RQ3. What are the elements of success of a professional learning community in facilitating teachers' professional learning in integration of ICT tools in their practice?
RQ4. What are teacher leaders' views of ICT integration in education and how teachers learn to integrate a new ICT tool in their practice?

Significance of the Study

The significance of the findings of the BCTN project is great in scope. First and foremost, the project will help to elucidate the role that collaboration, teacher networks and teacher leaders play in the integration of technology in education. While prior research demonstrates the value of communities of practice and professional learning communities, few inquire into the ways in which these collectives actually function within professional development dynamics. By critically observing the ways in which teachers interact in these contexts, and through a design research framework, researchers can gain a better understanding of the effective and ineffective teacher behaviours affecting their learning and technology adoption behaviours. Evidence demonstrating the BCTN network's practices to be more efficient than those of various other professional development programs would

force school administrators to re-evaluate their current integration of technology training programs. This research would also speak to the feasibility of network-based programs.

Furthermore, this project will also gain insight into teachers' practice of the TPACK framework. While the TPACK framework has been the focus of much research, the representation of actual implementation of the framework in real-life professional development programs in the literature is not prevalent. Such data is needed, as the integration of technology in education is a present necessity in schools. The study's focus on the integration of technology within a constructivist-teaching framework also speaks to the reality of many teachers' classroom practices and offers teachers a strong foundation within which to base their technology practices.

While the BCTN project's findings will not be applicable to all school settings, the design research approach taken by the research ensures that a multitude of real-life situations and behaviours are analyzed (Collins, Joseph, Bielaczyc, 2004). The design approach allows for researchers to attend to the initiative's problems in real-time, with resolutions that educators are likely to apply (Reeves, Herrington, & Oliver, 2005). As such, the BCTN project's methodology allows for data to be gathered in a way that is most amenable to the actual practice of teachers.

The significance in this study's findings lies within its amenability to real-life practice. By utilizing methodology that allows for immediate resolution in cases of instability, researchers are able to strengthen their applicability to practice. As this project was created with the aim of improving conditions for the integration of technology within pedagogy and curriculum, the findings of the project are crucial to the success of evidence-based teacher development programs.

Review of the Literature

Introduction

As technology skills increasingly become a necessity in everyday life (Harvey & Purnell, 1995; Jonasson, 1993), the education system holds a heightened responsibility to facilitate meaningful learning through the integration of technology in pedagogy and curriculum (John & Sutherland, 2004). However, teachers have become overwhelmed with the technological sophistication undertaken by schools, and therefore need both technical and pedagogical assistance with regards to technology (Brand 1997; Fullan 2007; Harvey & Purnell, 1995; Hofer 2004; Jonasson 1993; Ware 2009).

In 2008, UNESCO published the Information and Communication Technology Competency Standards for Teachers (ICT-CST) to emphasize various "curricular goals and teachers skills" that should be met and embraced by teachers (UNESCO, 2008). The researchers indicate that in order for the integration of technology into the classroom to be successful, the technology must act as a means to a more complete pedagogy rather than as an independent goal (UNESCO, 2008). Shelton and Jones (1996) explain that teachers must be trained not only in how to use the technology, but also in the ways the technology can be implemented within each unique teaching curriculum. Keeping up-to-date with the rapid advancement of technology necessitates ongoing learning if meaningful technological use is to occur (Niederhauser & Wessling, 2011; Liu, 2013). It further nourishes teachers' knowledge of integration of technology in pedagogy while presenting the target subject matter, thereby increasing teachers' self-efficacy beliefs and easing their fears (Harris & Hofer, 2011). Specifically relevant to the integration of technology in the classroom, is Mishra and Koehler (2006)'s Technological Pedagogical Content Knowledge (TPACK) framework which creates a framework for teachers to achieve their pedagogical and curricular goals through technological integration.

It has become evident that full integration of technology has not yet been realized, nor has it been able to wholly transform learning and pedagogy (Becker 2001; Mann, Shakeshaft, Becker, & Kottkamp, 1999; Reeves 1998; Schacter 1999). While numerous studies have demonstrated the effects of ICT integration in curricula (Redmann & Kotrlik, 2004),

significantly fewer research initiatives have analyzed the factors that impede teachers' use of technology with students (Kotrlik & Redmann, 2009).

To address the current issue of lack of integration of technology in schools, various frameworks have been proposed. Some of the proposed solutions and methods of implementation of change in school environments available in the literature include Self-Teaching Method when teachers learn IT on their own time and there is no leader showing them how ICT tools can be used. (Fullan 2007; Glazer, Hannafin, & Song, 2005); Top-Down Approach when the school board or other levels of administration taking charge of forcing or encouraging teachers to use ICT tools in their practice (Fullan, 2007) and Group Teaching Method which consists of having group seminars, where the teachers get together and share knowledge (Brand 1997, Glazer, Hannafin, & Song, 2005). In addition to these methods, the literature consistently points to the support of teacher leaders as a means to the integration of technology into pedagogy (Little, 1988).

Modern approaches facilitating teachers' adoption of technology integration acknowledge the importance of learning through collaboration and group work within teacher communities (Kopcha, 2010; Glazer, Hannafin, & Song, 2005). These communities of support are integral to the real use of technology in the classroom as teachers will often abandon their technological goals once they are met with obstacles and limited support (Guhlin, 1996; Schrum, 1999). Such learning environments offer teachers the opportunity to share their own personal teaching experiences with other teachers, receive feedback and ultimately learn the tools needed to successfully integrate technology autonomously in their own classrooms (Glazer, Hannafin, & Song, 2005).

In the following section we will review and present the related literature on technology in education and factors that support and impede their use in teachers' practices, teachers' learning and professional development. Different methods of introducing technology to teachers, the development of teacher leadership, the role of collaborative learning in communities of practice, the roles of teacher leaders in supporting teachers' professional development and the increase of their knowledge of pedagogical use of ICT tools for presentation of the content matter will be presented. Lastly, we introduce the BCTN project as a design research, which focuses on the role of teacher leaders in aiding the community of practice achieve its goal of integrating technology in the QEP curriculum (Heo &

Breuleux, 2011) and how it utilizes many of the effective components of competing methodologies, without the accompanying less effective techniques.

Technology as the Innovation

Technology in the classroom has the power to change the ways in which teachers facilitate learning (Demana & Waits, 1990). Within the constructivist framework, ICT tools serve as cognitive tools within learning processes (Nanjappa & Grant, 2003). Teachers' use of ICT tools supports active learning by students, cyclically encouraging teachers' engagement in constructivist teaching methods (Nanjappa & Grant, 2003). The integration of technology into curriculum also produces immediate and direct learning outcomes. For example, by introducing graphing calculators to math classes students are empowered to think more deeply about the problems at hand, and are better prepared to solve realistic problems with logic, all the while improving their evaluation performances (Demana & Waits, 1990).

Individuals worldwide are transitioning from analog devices to digital technologies (Zhang & Nunamaker, 2003), rendering analog data systems "obsolete" Katchen, 2004, p.1). Classrooms act as a microcosm of this shift, with teachers exchanging cassette players for CD players and VCR players with DVD players (Katchen, 2004). This technological transition aids in resolving prior "quality control, flexibility, and portability" issues in traditional classrooms (Hardaway & Will, 1997).

Digital multimedia technologies serve as important teaching tools in modern day classrooms by supplementing teachers' instructions to further demonstrate concepts, allowing students to review content presented in class outside of class, and by giving students infinite access to information through portable means (Hardaway & Will, 1997). While most teachers readily use analog technologies such as the conventional use of the chalkboard, many teachers experience difficulty in both operating and integrating digital technologies in to the classroom (Katchen, 2004) as the result of insufficient or improper training.

Duncker (1945) mentions that teachers are involved in technological tools' functional fixedness, meaning that they cannot envision use for the tool outside of the tool's intended use. One of the reasons for this is that functions of digital technologies are not as explicitly

outlined as those of analog technologies, which sometimes hinders the use of digital technologies. (Koehler & Mishra, 2009). Furthermore, as many of the ICT tools used in classrooms were not created for that sole purpose of being used in classrooms, teachers must also work to overcome functional fixedness (Koehler & Mishra, 2008).

Digital technologies afford teachers the opportunity to further engage the experiences of students, as teachers and students alike interact with digital technologies inside and outside of school (Katchen, 2004). In Koehler and Mishra (2009)'s tools' affordances and constraints concepts, tools' practical uses and limitations respectively, digital technologies provide teachers and students with many more affordances than do analog technologies. Unfortunately the constraints of traditional technologies inhibit teachers' engagement in the types of teaching shown to be effective, namely that of hands-on, collaborative practices.

Teachers' technological competencies must go beyond understanding basic technological operations as technological developments emerge often and must also include the skills needed to overcome the technological glitches that are bound to arise with all ICT tools (Koehler & Mishra, 2008). Rather than the responsibility of technology developers to create ICT tools conducive to pedagogical needs, it is the responsibility of teachers to use the tools at their disposal to support everyday learning (Katchen, 2004).

Research indicates that more focus needs to be given to preparing teachers for integrating technology into the curriculum, as many lack the necessary skills to do so (Lei, 2009). By affecting the formation of connections in the brain, technologies have made the brains of today's students into those of digital natives, rendering them significantly different that those of their teacher digital immigrants (Prensky, 2001). Digital natives process information differently than their older counterparts, with students preferring multitasking rather than work step-by-step, multimedia-based tasks to traditional paper and pencil and quick mental processing rather than gradual learning (Prensky, 2001). Hence, digital immigrants must overcome their fear if they are to engage digital natives and realize that technologies are already very much present in classrooms in forms like chalkboards and projectors and with practice and proper professional development training, ICT tools can become a part of every teaching practice as well (Koehler & Mishra, 2008).

UN's ICT Competency Standards for Teachers

According to UNESCO (2008), classroom teachers are "key individuals" in integrating technology into the curriculum and promoting its value within the pedagogy (P.1). As such, it is necessary that certain standards be met by educators in order for all students to be afforded equal opportunities to fulfilling educational experiences. The UNESCO ICT Competency Standards for Teachers (ICT-CST) program outlines the goals for technological integration in education in order to meet these demands.

The ICT-CST consists of a curriculum framework based on three levels of educational capacity development (technology literacy; knowledge deepening; and knowledge creation) with 6 educational components (policy; curriculum; pedagogy; ICT; organization; and teacher training) (UNESCO, 2008). Various objectives are considered for each level of teachers' capacity of learning. By focusing on the advancement of 'technology literacy', teachers aim to develop individuals who are "capable of taking up new technologies so as to support social development and improve economic productivity" (UNESCO, 2008, p. 10). Within a higher level of teachers' learning capacity, which is 'knowledge deepening'; students gain the skills needed to apply lessons learned in the classroom to external situations. Teachers foster the acquiring of these skills by preparing lessons with problem-based learning to be solved using more complex technological tools and within collaborative groups. Finally, at the highest level of learning capacity teachers are prompted for 'knowledge creation' whereby students gain the 21st century skills and prepare themselves to be "life-long" learners (UNESCO, 2008, p. 8). At this level teachers are model learners and the target pedagogical skill is self-management and autonomy. Teachers at this level are involved in "problem solving, communication, collaboration, experimentation, critical thinking, and creative expression" and seek development of the same skills for their students (UNESCO, 2008, p. 12).

Meaningful Use of Technology

Meaningful use of technology comprises of students creating their own knowledge actively with the aid of ICT tools (Sadik, 2008), making knowledge building a constructivist approach in nature as the constructivist approach argues that knowledge is created rather than transmitted (Rovai, 2004). In order for meaningful technology use to be effective, teachers must view ICT tools as "integral component[s] of the curriculum" (Strommen &

Lincoln, 1992, p. 469), serving to reach pedagogical goals (Otero et al., 2005). Among the projects that have documented the effectiveness of meaningful technology use, a study by Svensson (2000) showed that students interact significantly more when performing computer-related tasks than when completing other tasks. This is an important finding, as collaboration is an important component in the constructivist approach (Svensson, 2000). Research suggests that teachers are engaging students in more meaningful technology use rather than rudimentary technological tasks (Niederhauser & Lindstrom, 2007), a promising finding.

Bush (2003) emphasizes the pedagogical framework through which technological integration should be practiced: improving students' understanding of curricular topics and pedagogical objectives; and affording students the opportunities to apply their knowledge and reinforcing students' technological engagement. The use of ICT tools can help students develop critical thinking skills and inspire creativity (Reeves, 1998). Meaningful technology use can allow students to engage in self-directed projects, where their metacognitive skills are fostered as they follow their own progress from start to completion (Strommen & Lincoln, 1992) in such cases teachers' traditional roles change from focusing on instruction to an advisor when called upon as students show them their findings (Strommen & Lincoln, 1992).

Barriers in Technology Integration and Meaningful Use of Technology

Although consistently shown to be effective in in attaining pedagogical goals (Kotrlik & Redmann, 2009), more than half of teachers do not integrate technology into their curricula consistently (Abbot & Fouts, 2001), While many teachers believe in the value of integrative technology (Balanskat, Blamire, Kefala, 2006) and are excited about its execution (Bingimlas, 2009), the presentation of a multitude of barriers often impedes the process (Ertmer, 1999).

Barriers are factors that disallow or impede teachers' ability to effectively integrate technology into the curriculum (BECTA, 2003), Even a single barrier can halt the meaningful use of ICT tools in the classroom (Hadley & Sheingold, 1993). Barriers to the integration of technology result in teachers' superficial implantation and general underuse of the ICT tools in daily tasks (Keengwa, Onchwari, Wachira, 2008), threatening the practice of technology

use in the classroom and the ability of students to engage in meaningful learning through the use of ICT tools. Ertmer (1999) classifies barriers in the integration of technology as 'first order' and 'second order' barriers. First order barriers include circumstances that occur outside of the teacher's cognitive realm, such as the unavailability of ICT tools, lack of access to up-to-date ICT tools (Ertmer, 1999), time constraints (Sicilia, 2005), lack of support by IT personnel (Keengwa, Onchwari, Wachira, 2008), "institutional support" (BECTA 2003, p. 631), lack of IT training (Pelgrum, 2001) and feedback (Park & Ertmer, 2008) Second order barriers are obstacles present in the teacher's cognitive appraisal of the ICT tool integration in curriculum, representing low self-efficacious beliefs of teachers, insufficient technological expertise, and teachers' unwillingness to change their teaching methods have been demonstrated (Binglimas, 2009). Teachers' low estimation of their abilities to work with ICT tools in front of their students is highly related to their technological competencies (Ertmer, 1999). Because it is thought that first order barriers can be more easily remedied through the allocation of resources, namely that of funding issues, administrators more readily tend to these challenges first (Fisher, Dwyer & Yocam, 1996).

It has been proposed that teachers' refusal to use technology in the classroom could be due to factors relating to their (lack of) adoption of innovations (Kotrlik & Redmann, 2009). Adoption of innovation occurs when individuals begin to value a new 'innovation' more than the present one (Rogers, 2003). One of the most detrimental barriers, inhibiting teachers from adoption of innovation, is the "lack of a clear, shared vision" by teachers and administrators (Park & Ertmer, 2008, p. 631). Also important to teachers' ability to adopt technology as a consistent curricular tool is the unavailability of ICT tools in schools (BECTA, 2003; Redmann & Kortlik, 2004). Other barriers include "lack of time, lack of necessary knowledge, and lack of self-confidence in using technology" experienced by teachers and "access to equipment, technical support, availability of up-to-date software, and institutional support" with administration (BECTA, 2003, p. 631). Furthermore, teachers also used "lack of knowledge and skills, unclear expectations, and insufficient feedback" as reasons to explain the lack of adoption (Park & Ertmer, 2008). Teachers have also experienced anxiety toward the use of ICT tools, which generally stems from their improper training on the technologies (Budin, 1999). Teachers have also cited insufficient classroom layouts, and increased workloads due to the adoption of technology as obstacles

in their experiences (Tezer & Ertarkan, 2010). By addressing teachers' technology skillsets, administrators would be successful in alleviating some of the potency associated with both this expertise-based barrier and the barriers created due to anxiety caused by technological implementation.

Teacher Learning and Professional Development

Students' learning parallels that of their teachers; the more teachers engage in professional development undertakings, the greater the likelihood these skills will be used to improve classroom learning (Lieberman & Mace, 2008). Generally, professional development activities implement various factors of meaningful, ongoing learning whereby teachers' cognitive, social and intellectual capacities are engaged (Greeno, 1997), where teaching practices are improved as a result (Little, 1993). Unfortunately, many initiatives claiming to be professional development programs are unresponsive to the needs and experiences of teachers, detached from their everyday teaching realities (Lieberman & Mace, 2008).

However, effective professional development programs have been shown to successfully improve teachers' teaching practices by supporting the notion that learning is ongoing, encouraging the use of appropriate modeling behaviours, facilitating collaboration (Liu, 2013) and encouraging the incorporation of ICT tools in both teachers' professional and personal lives (Karagiorgi & Charalambous, 2006). Professional development programs encourage meaningful learning in a multitude of ways. Most of the programs necessitate that teachers be treated and viewed as co-learners (Niederhauser & Wessling, 2011). Programs that utilize collaboration and peer coaching over significant periods of time have shown to be effective in transforming teachers' teaching practices (Garet et al., 2001). In cases of failed professional development programs, a lack of technological availability, an inability to motivate participants, a lack of understanding of teachers' experiences and a miscalculation of necessary components needed to produce change were insurmountable obstacles (Conlon, 2004). When surveyed, participant teachers of an ICT in-service instructional professional development program suggested that they would have preferred the use of examples relevant to their specific curricular and pedagogical realities, supplemented with just-in-time assistance and counselling (Karagiorgi & Charalambous, 2006). Conversely, participants of non-technological backgrounds suggested further time

spent explaining the ways in which the ICT tools were used (Karagiorgi & Charalambous, 2006).

Teacher Knowledge

Current professional development programs centre the integration of technology in classrooms around the constraints and affordances of ICT tools, emphasizing the notion that all pedagogical goals and curricular needs are the same across classrooms (Harris, Mishra, & Koehler, 2009). Such generalized approaches do not account for the multitude of contexts in which learning takes place (Koehler & Mishra, 2009) and incorrectly assume that once teachers gain the necessary skills to operate technological tools, they will automatically possess the expertise to integrate them effectively in everyday pedagogy and curriculum (Koehler & Mishra, 2005). Teaching is an "ill-structured discipline" in which day-to-day decisions bear no clear cut answers, and where teacher knowledge plays a critical role in how curricular and pedagogical needs are met (Levin & Wadmany, 2008). The Technological Pedagogical Content Knowledge (TPACK) framework encourages teachers to look past "technocentric" implementations of technology into more holistic integrations of technology by modeling the interconnections of main facets of teaching with technology (Harris, Mishra, & Koehler, 2009, p.393).

The TPACK framework is comprised of 7 interdependent and equal facets of teacher knowledge including their knowledge of integration of technology into the classroom (Koehler, Mishra, & Yahya, 2005). The components include: content knowledge, the teacher's expertise in the domain he or she is teaching; pedagogical knowledge, the knowledge the teacher demonstrates executing teaching practices such as classroom management, performance evaluation and lesson planning; pedagogical content knowledge, teachers' abilities to appropriately pair pedagogical goals with curricular topics; technology knowledge, teachers' proficiency in operating classroom technology; technological content knowledge, teachers' understanding of the role of technology in specific curricular topics; technological pedagogical knowledge, teachers' adeptness at knowing which technological tools serve as a means to attaining pedagogical objectives; technology, pedagogy and content knowledge, the combined knowledge for effective technological integration (Koehler & Mishra, 2009). The combinations of various types of knowledge fuse to create a knowledge that is deeper and more meaningful than simply the summation of its parts.

Rather, TPACK knowledge enables teachers to think beyond a set of prescribed behaviours in order to deal with the various extraordinary circumstances they are likely to encounter (Koehler & Mishra, 2005).

The acquisition of TPACK can be gained through many means (Harris, Mishra, & Koehler, 2009). Professional development programs using the TPACK model have demonstrated teachers' shift in their knowledge, from viewing pedagogical, content and technological knowledge as independent concepts to viewing different aspects of teaching knowledge as interrelated and dynamic (Koehler & Mishra, 2005).

Processes and Conditions of Technology Integration

While commitment to the integration of technology generally begins within the administrative levels of education, it is the level of adoption by the teachers that determine the level of success associated with the project (Straub, 2009). Change agents must take into account the unique contextual characteristics of each integration-of-technology endeavour in order to maximize its chances for success (Donaldson & Center for American Progress, 2012).

Ely (1990) outlines ten contexts in which the promotion of the adoption of integration of technology is supported: "dissatisfaction with the status quo; knowledge and skills exist; resources are available; time is available; rewards or incentives exist for participants; participation is expected and encouraged; commitment by those who are involved; leadership is evident" (p. 299). Educators generally become dissatisfied with their teaching practices once they realize they are not effective at attaining their pedagogical and curricular objectives (Ely, 1990). If technology is to be accepted by teachers as a means to improving teaching methods, teachers must be given access to the appropriate ICT tools as well as the time and resources needed to learn how to properly integrate the technologies into their curricula and pedagogies (Wall, et al., 2012). Furthermore, Donaldson & Center for American Progress (2012) indicates that while teachers should be expected to fully immerse themselves in the change, some form of reward should be associated with the teachers' participation, be it intrinsic pride for participating in an effective project or monetary compensation.

Various theoretical frameworks have been created in an attempt to predict adoption and diffusion of innovation patterns. These adoption and diffusion theories describe an individual's decision to embrace a new concept (adoption) and a population's adoption of the innovation (diffusion) (Straub, 2009). For the purpose of this line of research, the 'innovation' to be discussed is that of the integration of technology in curriculum and pedagogy.

Rogers' Innovation Diffusion Theory (1995) attempts to explain the mental processes that individuals experience when choosing to either adopt or reject behaviours. The theory was ground-breaking for its time, informing many subsequent theories (Pennington, 2004). Rogers' framework outlines main 4 elements that influence the diffusion of innovation: a) the innovation itself, b) communication channels, c) social system and d) time. The ways in which an individual estimates the innovation to be more advantageous than prior devices, the ways in which an individual perceives the innovation to be compatible with their objectives, the level of complexity an individual expects the adoption of innovation to entail, the availability of the innovation for experimentation by the individual and the pervasiveness of the innovation's adoption within an individuals' environment all interact to form the ways in which an individual perceives the innovation (Rogers, 1995). In the case of the integration of technology in the classroom, professional development facilitators play a critical role in influencing the ways teachers perceive the use of ICT tools in curriculum and technology. Teacher leaders utilize meaningful teaching methods to demonstrate the added benefits of ICT tools to the classroom thereby encouraging the teachers to experiment with the technologies and allowing them to discern for themselves the complexities of the programs. The channels of communication within the social system it pervades play an important role in determining the extent to which the innovation will be adopted amongst the masses (Rogers, 1995). Finally, Rogers argues that time plays a significant role in the diffusion process.

In an attempt to further narrow the focus of the adoption and diffusion theories relating to implementation of new programs amongst teachers, Hall's Concerns-Based Adoption Model (CBAM) theoretical framework focuses on the concerns of adoptees (Straub, 2009). The CBAM model guides facilitators such as school administrators through the implementation process by focusing on model's 3 main components: "stages of concern, levels of use and

innovation configuration" (Straub, 2009, p. 634). The stages of concern are comprised of 7 levels: awareness, in which teachers are not yet familiar with the project; information, in which teachers have been introduced to the idea and begin to seek information concerning its role; personal, in which teachers begin to concern themselves with the project's required personal investments; management, centered on the ways the innovation can be incorporated into their lives; consequence, in which the consequences of the incorporation are weighed; collaboration, when teachers consider the project's collaborative opportunities; and refocusing, comprising the contemplation of the ways in which they can better contribute to the implementation (Hall, 1979). Additionally, there are also 6 different stages comprising the levels of use component: non-use (teachers do not integrate the innovation her teaching), orientation (teachers are researching the innovation and its value in education but have not yet made the commitment to utilize it); preparation (teachers prepare to integration the innovation into their teaching); mechanical (teachers begin to incorporate the innovation but face some obstacles; routine (teachers are successful in incorporating the innovation); refinement (teachers refine the implementation of the innovation to meet their specific classroom needs); integration (the teachers encourage the implementation of the innovation amongst their colleagues); and renewal (the teachers implement the innovation in such a way that improves the innovation (Loucks & Hall, 1979). The innovation configuration outlines the ways in which the implementation project will be implemented and sustained (Hall & George, 2000).

The Unified Theory of Acceptance and Use of Technology (Venkatesh, Morris, Davis, & Davis, 2003) describes 3 key determinants in the successful integration of technology, in addition to 5 moderators that influence the strength of the likelihood for success by analyzing the components of other theoretical frameworks in order to ascertain the factors with the greatest predictive validity. The researchers found performance expectancy (the teachers' expectation of the ICT tools' value in daily tasks), effort expectancy (the teachers' expectation of the level of difficulty involved in integrating of technology into the curriculum, social influence (the teachers' comparison of their ICT tool use compared to that of their colleagues) and finally, facilitating conditions (the teachers' perception of the school and administration's support for the project) to be key indicators in the success or failure in integration-of-technology initiatives.

The adoption and diffusion models contain many similarities between them. First and foremost, the models do not investigate individuals in isolation but rather individuals as products of their environments. The perspectives used contain components relevant to Bandura's Social Cognitive Theory (Bandura, 1997), taking into account the social influences acting upon the individual, such as the effects of peer support and the teachers' self-efficacious beliefs. Understanding the role of social environment in the adoption process, the adoption and diffusion models also acknowledge the importance of teacher collaboration, a component that supports the adoption process. Furthermore, the models understand the adoption process to occur over an extended period of time rather than as a singular event (Straub, 2009). Finally, innovation facilitators are viewed as holding much responsibility in ensuring that promising situational contexts are in place and barriers to the integration of technology are overcome. Within the Concerns-Based Adoption Model, teacher leaders are implicitly given the responsibility of quelling teachers' concerns whereas in Rogers' Innovation Diffusion Theory, teacher leaders affect the ways in which teachers appraise the innovations' value. Facilitators of successful integration of technology must acknowledge that the adoption process is the product of situational, social and cognitive forces and thus must plan according, and that teachers' perception of ICT tools affect their adoption outcomes (Straub, 2009)

Competing IT Integration Methods

Various frameworks have been proposed to resolve the current issue of lack of integration of technology in schools. Common to all of these approaches is their creators' recognition of the need for change in educational practices. Each framework focuses on various solutions to overcome the barriers associated with the implementation of technology in curriculum. The various methods listed focus on means to supporting teacher training, as they are integral to increased effectiveness of technological integration (Glazer, Hannafin, & Song, 2005).

Self-teaching method

In many occasions, due to the high speed of technological advancement and the lack of support of teachers' integration of technology, it is the responsibility of teachers to ensure their expertise are current and up-to-date once they have completed their teacher educations (Shiian, 2000). As a result, some teachers engage in self-teaching methods

(Dubin, 1977). In such cases, teachers tend to teach the use of ICT tools that they themselves were not taught, nor worked with during their education (Ruzic-Dimitrijevic & Dimitrijević, 2010). In order to overcome this gap in knowledge, teachers most often resort to experimenting with the use of textbooks and online tutorials (Dubin, 1977). By engaging in self-teaching, teachers confront many challenges including the amount of time spent on self-teaching, insufficient learning guides, loss of motivation and exploration of the tool without support (Ruzic-Dimitrijevic & Dimitrijević, 2010). While it is noble for teachers to engage in self-teaching using guides and tutorials to compensate for the lack of resources at the administrative level, relying on teachers' self-teaching is less than sufficient in encouraging teachers' adoption of technology, as majority of teachers due to the barriers like time management do not adopt to self-teach to resolve problems. Moreover, self-teaching does not recognize the barriers concerning the integration of technology in pedagogy and therefore has very little power in overcoming them.

Top-down approach

In many cases, the introduction of programs concerning technology integration has been the result of top-down government-mandated measures (Schraw, 2010). In such cases, teachers can be asked to work within prescribed guidelines and frameworks. Much of teachers' experiences and project outcomes are dependent on factors relating to the administrators of the project such as school principals rather than on the dynamic of the community of teachers itself (Berrett, Murphy, Sullivan, 2012). Although these administrators sometimes receive some professional development education concerning technological integration, they are often conceived by teachers as generally far from fitting their day-to-day practices and context-based needs (Reichman & Artzi, 2012). Top-down approaches put the responsibility of teachers' outcomes on the administrators, as they are usually the executors of the grant budget (Berrett, Murphy, Sullivan, 2012). However, the inability of administrators to relate to teachers' experiences as integrators of technology, due to their detachment from the learning and actual implementation process, significantly affects the administrators' abilities to determine the types of support needed by their teachers and thus their ability to provide this support.

Group teaching method

The group teaching method endorses the use of training sessions conducted in groups. Proponents of this approach argue that training sessions should be facilitated by a resource agent outside of day-to-day teaching activities in order for teachers to be able to focus on acquiring the necessary knowledge without concerning themselves with everyday affairs (Brand, 1997; Shelton & Jones, 1996).

The group training method does not utilize many of the factors shown to be effective in teachers' professional development. It misses the element of creating a culture of sharing and the social interactions present in a community of learners. By facilitating training sessions outside of the teachers' daily teaching activities, the group training session decontextualizes the behaviors learned and decreases their individualized meanings in the teachers' teaching experiences. Furthermore, the weak points in teachers' teaching methodologies cannot be easily detected as the group teaching approach prescribes general solutions to general problems with teachers only convening with the resource teacher upon the acknowledgement of a problem (Brand, 1997).

Teacher Leaders as Agent for Fostering the Change

Reform models in schools are getting more supportive of the leadership role of teachers in the improvement of the quality and relevance of the education that the 21st century learners received (Becker & Riel, 2000; Partnership for 21st Century Skills, 2003). Lieberman & Miller (1999) assert that school improvement programs not centered on teachers' development and leadership are doomed to fail.

Traditional school structures and teaching attitudes defines teaching as an "individual enterprise" (Little, 1988, p. 81) and encourage and reinforce teachers' unwillingness to seek help from colleagues (Little, 1988). The current focus on collaboration and culture of sharing by educational researchers and present-day educators is the result of recent research highlighting the importance of learner-centered constructivist approaches (Heo & Breuleux, 2011). However, although collaboration by teachers and administrators has been demonstrated to be beneficial to the practice of education (Lieberman, Saxl, & Miles, 1988), many of the mentalities and behaviours moulded by traditional views of education persist (Little, 1988).

Stimulated by the current educational dominance of constructivist learning (Applefield, Huber, Moallem, 2001), school administrators and researchers have begun to implement programs in which teachers are trained in how to strengthen the pedagogy and curriculum of their students. As the use of teacher leaders has demonstrated significant effects, many schools have implemented the teacher leader system into their schools.

Becker and Riel (2000) identify teacher leaders as teachers who engage in sharing their experiences and construction of knowledge with their peers. Teacher leaders, who are identifiable by being passionate and accountable in their workplace believe in collaboration among peers for developing a culture of change and improvement in the school (Darling-Hammond, 2005) and personally are engaged in reflection on their teaching (Katzenmeyer & Moller, 2001). Murphy (2005), in his systematic review of the literature on teacher leadership, asserts that all teacher leaders share the core elements of having visions of school goals and conducting good relationships with other school members including other teachers and administrations. The major differences of teacher leaders as source of teacher change in comparison to other sources such as top down agendas for improvement prescribed by government is that teacher leaders, being a member of the school, are already familiar with the environment and their fellow teachers' needs, and are most often either informally chosen by other teachers because they are trusted and pioneer in taking up or initiating changes (Murphy, 2005) or the principal of the school designates them (Pankake & Moller, 2007).

Teacher leaders play an important role in changing school practices, knowledge, attitudes and culture. They provide guidance to other teachers through formal and informal presentations, discussions, mentoring, their peers and sometimes presenting in educational conferences and publishing in academic journals (Becker & Riel, 2000). Teacher leadership oversees the execution of curriculum, pedagogy, and collaboration all with the end objective of creating a more gainful experience for students and teachers alike (Little, 1988). It can be viewed as an opportunity to work toward and foster communal objectives in response to newly discovered evidence-based knowledge and changing realities (Stoll, Bolam, Collarbone, 2002).

On one hand, teacher leaders must demonstrate what their colleagues consider to be leadership qualities if they are to be regarded as a leader, in other words teacher leaders' power is contingent on their abilities to gain the trust of their colleagues and to lead them (Little, 1988). As teacher leaders work to strengthen workplace relations between teachers, the evocation of teachers' emotional intelligence proves to be an important tool in gaining their trust (Stoll, Bolam, Collarbone, 2002). On the other hand, teacher leaders sometimes have to downplay their expertise in order to be viewed as equal entities to other teachers to win their trust, and this sometimes create a contrast in terms of teachers' trust in their ability as pedagogical technology experts and help resources (Mangin & Stoelinga, 2011).

Based on Goleman (2000) leaders generally execute their leadership through 6 approaches: "coercive, authoritative, affiliative, democratic, pace-setting, or coaching" styles and it is at the discretion of teacher leader to decide which style or combinations of styles he or she will use, depending on the context. In addition to acquiring and demonstrating certain skillsets, teacher leaders must also model a mindset that is receptive to others' needs and the objectives of the project (Lieberman, Saxl, Miles, 1988). Many of the teachers do not possess these skills at the start and earn them throughout the project (Lieberman, Saxl, Miles, 2000). Teacher leaders work hard to facilitate collaboration between teachers (Du, 2007). In order to achieve such norms, teacher leaders use the term "we" instead of "I" when speaking about group objectives (Du, 2007, p. 195). In working with the group of teachers, teacher leaders remain conscious of their role as both peer and leader and create environments where teachers feel they can openly and honestly speak about their experiences (Mangin & Stoelinga, 2011). By allowing flexibility in the ways the teachers' responsibilities are performed, teacher leaders ensure teachers do not feel their autonomy is being taken from them (Du, 2007). Teacher leaders also model correct behaviours for teachers, conduct workshops on ICT tool operation, delegate leader roles to teachers and facilitate the creation of support systems (Miles, Saxl, Lieberman, 2000). Principals' aid in teacher leaders' integration within the teachers' learning communities by helping teacher leaders negotiate their new role in the school (Little, 1988).

Teacher leaders also pay special attention to the ways communication takes place in their schools. It is vital that teacher leaders are able to communicate to fellow teachers that they are equally invested in the same goals, understand the needs and realities of teachers

(Mangin & Stoelinga, 2011). Furthermore, they must remain sensitive to their offers of feedback, doing so in a non-judgmental manner (Mangin & Stoelinga, 2011). This is crucial, as teachers will only confide in their teacher leaders once they understand how teacher leader will respond (Little, 1988). In a project so reliant on teacher-to-teacher leader communication, the ways in which teacher leaders set the standard for communication is crucial. Finally, teacher leaders communicate their support to fellow teachers is by accurately characterizing themselves as learners (Lieberman, Saxl, Miles, 1988). By viewing themselves as learners, teacher leaders further establish themselves as part of the teachers' community.

Teachers' Collaborative Learning

Collaborative learning practices are important facets of teachers' communities as they form the bases for trusting relationships, shared knowledge, and professional development. Two major forms of teacher communities involved in collaborative professional development in the literature include communities of practice and professional learning communities. While teachers experience considerable benefits from participating in teacher communities, the main purpose of the formation of these communities is to aid students reach their pedagogical and curricular objectives (Stoll et al., 2006). By modeling "critical thinking skills, lifelong learning, teamwork", teachers impart on their students the lessons they themselves learn through their communities (Lafee, 2003, p.5)

Communities of practice consist of groups of individuals with common expertise who share in a unifying vision that, through constant communication, aid them in navigating their daily experiences (Flogaitis, Nomikou, Naoum, Katsenou, 2012). Communities of practice increase the saliency of teacher learning, as teachers are more likely to implement teaching methods learned within a community of practice than elsewhere (Printy, 2008). Communities of practice play an important role in the make-up of the school organization, creating incomparable collegial networks and environments ripe with collaboration (Floigatis, Nomikou, Naoum, Katsenou, 2012). A community of practice's ability to reassess its shared vision and objectives (Wenger, 1998) allows the group to adopt new innovations, such as the integration of technology in curricula and pedagogy when traditional teaching methods no longer suffice. Furthermore, communities of practice can actually support new innovations through the "sharing of knowledge" (p.4), and promotion of collaboration,

access to more knowledge individuals, peer support, counsel, innovation and trust between colleagues (Hildreth & Kimble, 2004).

Communities of practice are comprised of 3 key components: group identity, interactional repertoire, and shared domain. Group identity encompasses participants and their relationships with one another and the ventures that sets the group apart as a distinct union of individuals; interactional repertoire is composed of major topics of discourse discussed as well as the various ways the participants communicate their views; and finally shared domain includes the vision and set of objectives the group works toward resolving (Admiraal, Lockhorst, & van der Pol, 2012).

While "communities of practice offer an underlying layer of stability" and are considered as rather stable structures (Wenger, McDermott, Snyder, 2002, p. 20), professional learning communities are social structures within communities of teachers that form temporarily for achievement of a goal or implementation of a change (Stoll et al., 2006). The educational system responded to the need for more comprehensive technological student education by investing in "a community of learners, and notion of collective learning", making community the key component in professional learning communities (Stoll et al., 2006, p.225). Professional learning communities not only involve teachers' active collaboration for creation of shared knowledge, but also the creation of a school environment in which teachers act as effective leaders in the pursuit of knowledge (Admiraal, Lockhorst, & van der Pol, 2012). They are identifiable among communities of practices through their main components of promotion of leadership qualities in teachers for collaborative learning and shared knowledge (DuFour, 2004).

When measuring factors of professional learning communities, researchers identify "core processes" of the group as measurable components including the group's ability to hold meaningful dialogue; elicit the commitment of its group members to the creation of meaningful knowledge; prompt a variety of contributions; link current initiatives with past endeavors; collaborate toward the attainment of share objectives; and management through democratic means (Huffman & Jacobson, 2003). These communities are very much in line with the constructivist approach (Muijs, Ainscow, Chapman, West, 2011). Teachers engage

in learning processes that have proven to be effective with students, such as "action learning, coaching, mentoring and peer-assisted learning" (Stoll et al., 2006, p. 233).

As implied above, communities of practice and professional learning communities are not mutually exclusive. Rather, communities of practice generally create the foundations for trust and collaboration (Admiraal, Lockhorst, & van der Pol, 2012) necessary for formation of professional learning communities when the need for a change arises (DuFour, 2004). While communities of practice set the change initiatives (Flogaitis, Nomikou, Naoum, & Katsenou, 2012), it is the professional learning communities that promote the learning needed to create such change (Wenger, McDermott, Snyder, 2002). Once the specific skills are learned, tasks are accomplished, and target changes are achieved within the professional learning community, the professional learning community discontinues and the community of practice endures. As active learners, teacher with leadership characteristics themselves often initiate their own professional learning communities (Toole & Louis, 2002).

Design Research

Design research in education comprises of 6 key components: extended commitment by researchers to the project in order to implement appropriate study refinements; cooperation between researchers and teaching staff; concentration on multifaceted issues, far-reaching in scope; re-evaluation of prior theoretical frameworks and practices; adaptation of current educational theory to modern contexts; and the use of technologies within research methodologies when dealing with complex challenges (Reeves, Herrington, & Oliver, 2005). Researchers utilizing the design research framework generally focus on dependent variables outcomes relating to the school system such as sustainability and availability of resources, learning factors such as technological knowledge, and factors relating to the classroom (Collins, Joseph, Bielaczyc, 2004) These adjustments cause design research projects to be conducted over extended periods of time, with a usual duration of "2 to 5 years" (Reeves, Herrington, & Oliver, 2005, p. 106). Furthermore, the research design framework allows researchers to manipulate variables to better meet the needs of real-life settings and experiences of teachers as major sources of information to the researchers (Heo & Breuleux, 2011). By reflecting over the studies' "cognitive, interpersonal, classroom, resource, institutional" components with researchers, teachers offer valuable and crucial insight into possible revisions (Collins, Joseph, Bielaczyc, 2004, p. 35), thereby allowing

future researchers to prepare for such issues in their own design research (Heo & Breuleux, 2011). As an example of a design research, Collins, Joseph, and Bielaczyc (2004) discuss the refinements made in a design research project aimed at teaching students biology topics. During the classroom lessons, the teachers noticed that students did not have a proper basis for understanding the topics at hand. Once communicated to the researchers, the researchers implemented more introductory material into the lessons.

Building Community through Tele-collaboration Network (BCTN) Project

The BCTN project is a design research with a focus on providing Quebec elementary school teachers with the opportunity to develop their networking skills amongst their colleagues as well as to enhance the practice of collaborative technology-based projects on different scales (Wall, et al., 2012). These projects can be collaborated upon between and within various school boards, schools, grades and classes (Breuleux et al., 2009) using ICT (e.g., WIKI, Blog, Listserv, Voice Thread, and Live Classroom), class tours and visits to other schools (Heo et al., 2011).

The researchers' main focus within the BCTN project is the teachers' technology integration within the context of the community of practice of elementary teachers in English school boards of Montreal (Breuleux et al., 2009), where teachers integrate technology into the curriculum with the support of other teachers who demonstrate leadership qualities (Heo et al., 2011) rather than with external sources of change such as research interventions or curricular technological integration as mandated by the schools principals or the ministry of education. As teachers are put into contact with other teachers and teacher leaders who share their same goals for pedagogical and curricular integration of technology, all involved become increasingly motivated to make consistent technological integration a reality (Breuleux et al., 2009).

Initiated by teacher leaders and in order to assure quality training and support, several meetings ensuring sufficiency of contact between teachers and teacher leaders either within the school (e.g., Techy Tuesdays), within school boards (Thursday visits to schools) and among school boards (Face-to-Face meetings and workshops) have been held (Heo & Breuleux, 2011). Personalized meetings have been supplemented by online communications through ICT tools such as Sakai Discussion Forum, the BCTN-Teachers Listserve, email, and

Skype (Wall, et al., 2012). Face-to-face meetings have been organized and tailored to the needs, interests, and perspectives of teachers, based on the feedback given by teachers to teacher leaders. They also serve as platforms to newly learned tools, and teacher leaders' modeling of new ICT tools while teachers follow teacher leaders' instructions in small groups at their computers (Heo & Breuleux, 2011).

The BCTN project also seek to determine how communication and collaboration in a professional learning network facilitate teacher professional practice and enhance student learning (Wall, et al., 2012) by using a design research framework, necessitating the collaboration and feedback of all participants and researchers (Heo et al., 2011).

In the case of the BCTN project, the responsibilities of teacher leaders are extensive. They promote the integration of technology in everyday use through creating an environment in which collaboration is key and knowledge is shared (Heo & Breuleux, 2011). They work directly with teachers to provide relevant training and support (Wall, et al., 2012). These relationships foster a sense of shared responsibility toward achieving the common goal of technological integration, creating group successes, and group opportunities to improve. The BCTN project highlights the collaborative aspect of the group dynamic by encouraging participants to discuss their experiences with their colleagues and find value in each other's experiences (Heo & Breuleux, 2011). By gaining expertise while on the job, teachers can engage in active learning by modifying their behaviors according to situational and teacher leader feedback, leading to more impactful learning (Schrum, 1999).

Methodology

Participants

We sought teacher leaders who demonstrated leadership qualities within their positions and who were committed to the integration of technology in the classroom. Teacher leaders interviewed represented various teaching experience. At the time of the interview, of the 6 interviewees (1 male and 5 female), 2 were working as teachers, 2 were working as principals and 2 were working as RECIT animators during the time of the BCTN project. Together, teacher leaders had a range of 6 to 16 years of teaching experience with an average of almost 10 years. They have managed positions at various levels within education, including the classroom, entire school and school boards. Table1 shows Teacher Leaders' Information. It was important to sample participants from the BCTN project who were involved in the project for several years and were familiar with the QEP agenda focused on integration of technology into pedagogy and curriculum, as one of the main objectives of this project was to seek information that come from the experience of teachers who lead other teachers in a community of practice. These teacher leaders showed leadership characteristics (5 years ago), they already were recognized among other teachers and known as competent and reliable professionals. That is why some of them were encouraged by the research team to take up leadership roles while some other volunteered because of their interests. Since their selection, they became members of the BCTN leadership team that also included the researchers. Teacher leaders and researchers started exchanging information through periodical meetings. Researchers intervened minimally in teaching other teachers and this role was taken by teacher leaders. They often came up with the ideas on what next steps to take, solving problems, planning for teacher education, etc. through exchanging ideas with other teacher leaders and sometimes asking for advice from the researchers.

Table 1. *Teacher Leaders' Information*

Pseudonyms	Years of teaching exp.	Years of Admin exp.	Detailed description
Teacher Leader 1	15	1	Working as a Recite Animator. Always in the same board and the same school. Taught from grade 2 to 6
Teacher Leader 2	9	3	Working for the 3rd year as a principle
Teacher Leader 3	6	-	Have taught all levels from k to grade 6
Teacher Leader 4	More than10	3	Working as a Recite Animator, worked for different school boards, and also in industry for a few years
Teacher Leader 5	16	-	Second year as a BCTN teach leader
Teacher Leader 6	12	5	Working for 5 years as a principle

Procedure

The BCTN network project employed a design research framework. Once teacher leaders consented to participating in the study, they were briefed by the researchers regarding the objectives of the study. Teacher leaders met with the researchers several times over the course of a few weeks in order to form a strong working relationship. The working relationship served an important purpose in the study, as researchers were in constant communication with teacher leaders. As part of the design research framework, it is crucial that researchers and participants be able to discuss the challenges that arise on a day-to-day basis in order to jointly develop strategies to resolve the issues, which teacher leaders then implemented. The design research framework, under the continual refinement provision, mandates this process.

In order to conduct the current research, which focused on teacher leaders' roles and experiences, we employed design research methodologies including researchers' observations of face-to face meetings and a few of the Techy-Tuesday sessions and eventually semi-structured interviews with teacher leaders and subsequently conducting thematic content analysis for the transcribed interviews. The qualitative analysis methodological framework allowed for insight into the mechanisms and processes that produced the outcomes for which quantitative methods would not account (Spencer, Ritchie, Lewis, & Dillion, 2003). Sampling consisted of 6 teachers leaders and their experiences within the project.

The researchers contacted the 6 teacher leaders separately, scheduling individual, face-to-face interview times. All teacher leaders consented to the audio recording of interviews. The interviews were held on separate days, within a span of 6 days. The interviews were held at teacher leaders' schools, all of which are in the Montreal, Quebec region. The researchers followed up with teacher leaders by email, two weeks after each interview, asking final questions in order to clarify or prompt elaboration on unclear responses, to which four of the participants responded.

Instrumentation

We developed a semi-structured interview protocol for the interviewers to follow during the interview. Although largely based on teacher leaders' responses, the interview questions

covered 3 general areas of inquiry: professional development experiences, the BCTN project experiences, and general perspectives on the use of technology in education and teacher learning. The interview questions worked directly to serve the research questions, while prompting elaboration into specific details of teacher leaders experiences that pre-formulated questions may have overlooked. The questions pertaining to teacher leaders professional experiences aided the researchers in understanding the tasks performed by teacher leaders as part of the BCTN project, both the responsibilities outlined by the project and those taken on under teacher leaders' own initiatives. The questions concerning the BCTN project experiences served to determine the ways in which teacher leaders experienced the program, where their focus laid and where the majority of their efforts were put. By asking the participants about the challenges and successes they experienced, we built the groundwork for which the project could be best amenable to implementation. Finally, the general topics concerning teacher leaders' views of ICT use in education and their perspectives on how teachers learned to use ICT tools were formulated to determine the viewpoints teacher leaders were conveying to the teachers and the learning processes implicated in technology use. Some supplementary vignettes were designed by researchers and proposed to teacher leaders in order to tackle some real scenarios in the BCTN project to gain a more comprehensive view on how teacher leaders perform their leadership roles in challenging situations within the professional learning community.

The semi-structured interview format allowed the researchers to obtain as much detail from participants' responses as possible. It was crucial to obtain as much data as possible as the literature concerning support network-based professional development programs is limited. This project serves as the basis for implementation of similar projects and as such must garner as much detail as possible about the project in order to best serve future educators and researchers. The interview questions along with the transcript of each interview are included in Appendix B of this thesis to ensure transparency.

Data Analysis

Data from the interviews were analyzed within a conventional "content analysis framework with categories that were relevant to the research purposes" (Tesch, 1989, p. 79) and analyzed following the steps for analyzing qualitative data (Gay, Airasian, 2000) starting with "managing or organizing the data, then reading it [which is the step of] becoming

familiar with the data and identifying main themes, then describing data which includes examining the data in depth to provide detailed description of setting, participants and activities, and then classifying that is categorizing and coding pieces of the data and physically grouping them into themes, and eventually interpreting and synthesizing the findings into general conclusions" (p. 341). Once the interviews were transcribed, the researchers read through each interview several times to understand each of teacher leaders' experiences as a whole. The researchers then re-read the interviews, highlighting key words relevant to the research questions and making notes of overall themes. As key words, sentences and themes were compiled, the researchers began to create coding schemes, as part of an emergent coding framework. An external researcher independently performed the same steps and then they compared their results. The researchers then compared their coding schemes to determine the congruency of the 2 outlines. Once the coding schemes attained 95% overlap, the researchers began to use the coding schemes. The codes were verified with the supervisor of the project. Interview data were coded and categorized into various categories, with the codes used to determine the critical attributes of each category. In total, almost 40 categories were compiled which were used for the presentation of results for answering the interview questions and also s emerging themes. Categories were defined and operationalized based on prior research within the areas of topic. Each researcher, within the context of the BCTN project and broader education theories, then interpreted the categorized themes. The external researcher performed the same steps and then compared their resulting categories. The researchers found the majority of the themes and categories they discovered to overlap with each other's work. The final categories were discussed and verified with the supervisor of the project. When novel themes emerged that had not yet been discussed in the literature, the researchers along with the supervisor worked together to name the new phenomenon.

The Standards

In order to adhere to qualitative research standards (Spencer, Ritchie, Lewis & Dillion, 2003), several procedures were followed. In order to assess the reliability of the results, the researchers analyzed their results' inter-rater reliability (Potter & Levine-Donnerstein, 1999), working under rigorous standards for coding data. They operationalized and defined each theme found within the data set, determining which words fit within the theme and which did not. During the comparisons of the researchers' results, the finalized themes were

those that had been determined by all the researchers. The researchers also examined their intra-rater reliability by re-evaluating the transcripts and comparing their prior results with the later results. The actual interview transcripts are presented in Appendix B for the readers to refer to, to ensure the rigour of the interpretation, and how they came to these conclusions in the results section.

In order to also achieve high validity ratings and reduce possibility of misinterpretation, the researchers used "member checking" (Cresswell, 1998, p. 203). Teacher leaders confirmed the researchers' findings in order to verify the accuracy of the interpretations. Also some triangulation (Cresswell, 1998) was implemented through researchers "prolonged engagement and persistent observation" (Cresswell, 1998, p. 201), when the researchers verified the compatibility of the results from the interviews with the information they gained through participation in face-to-face meetings and observations of Techy-Tuesday sessions. Also, the rich, thick description of the context (Cresswell, 1998, p. 203) provided by researchers as well as the insertion of direct quotes and excerpts of the interviews accompanied by the full version of interviews in Appendix B will allow the readers to make decisions regarding the rigor of the data analysis.

Presentation and Interpretations of Results

In this section, the results of the interview questions will be presented focusing on main themes extracted from the replies of teacher leaders, followed by some general themes that are considered by the researcher as the key characteristics of a successful professional learning community focused on integration of technology in teaching practice.

Teacher Leaders' Perceived Roles

While teacher leaders perceived themselves to fulfill several roles as consultant support [TL1, L11[1]], coaches [TL5, L1205], facilitator [TLs2, 5&6, Ls431, 1206&1648], extra hands for help [TL3, L565], models [TLs3&5, Ls701&1207], motivators [TL6, L1601] and presenters of new software, ideas and skills [TL3, L561, 695&699], their discussed roles surrounded several themes including support agents for integration of technology into pedagogy, facilitators of collaboration, models, mentors, collaborative knowledge builders, non-evaluative trusted knowledge sources.

Support agents

Teacher leaders discussed various ways to support teachers in "bring[ing] their concepts into reality" [TL4, L914], and it is clear that the BCTN project relies heavily on the support teacher leaders offer to their colleagues. Among the ways that teacher leaders offered their support was to meet with the teachers face-to-face to be present during the teachers' first use of technology in the classroom. By offering just-in-time support [TL4, L1178] teacher leaders elicited teachers' commitment to the project. Teacher leaders' ongoing support and follow-up feedback also served as an effective means to following and ensuring the progress of the teacher. Teacher leaders also acted as facilitators for collaborations by focusing on collaborative construction of knowledge with other teachers rather than direct instruction to them. Teacher leaders offered personalized support to teachers by aiding them in their objectives of integrating technology into their everyday curriculum through

[1] "TL" stands for teacher leader and "L" for the line number of the excerpt in the interview transcripts (Appendix B). "TLs" indicates that multiple teacher leaders mentioned the idea, and "Ls" refers to multiple lines that are indicative of the same idea.

mentorship, modelling with active involvement, and by embodying non-evaluative co-learners.

Teacher leaders held very firm objectives in their mandates as support agents in the integration of technology in pedagogy, namely by demonstrating "that technology is not an end by itself but rather part of the subject areas" (TL1, L12). While some teachers possessed the necessary abilities to properly integrate technology, the presence of teacher leaders' support aided these teachers' "expertise [to] kick in" (TL1, Ls21-2). Teacher leaders worked to change the ways teachers understood technology, to demonstrate "that based on what they are already doing in their class, the technology can complement it" (TL3, Ls570-1).

In order to do so, the teachers modeled lesson plans that were relevant to the pedagogical needs of their teachers (TLs3&6, Ls701&1806) and suggested certain alternative technological methods to better fit their needs of the teachers. For example, in the case of a teacher who used graphic novels in her lesson plan, teacher leader 3 demonstrated to the teacher suggested using computer programs rather than drawing the comics by hand. Teacher leaders also helped teachers realize their ideas by suggesting certain alternative technological methods to better fit their needs as teacher leader 4 puts it "They (teachers) might think of doing a project and not know what to use and sometime how to use it and I help them there" (L915).

Teacher leaders also felt it was important to be physically present when their teachers first began the integration of technology into the classrooms. In doing so, teacher leaders "support teachers when they are not sure about the glitches with the technology" [TL3, L566]. By being available to offer just-in-time support (TL4, L1178), teacher leaders re-affirmed to the teachers that they had their immediate support throughout the entire learning process.

Teacher leaders showed their support by going to the schools consistently. Teacher leaders 1,3, and 5 visited schools every Thursday (TL5, Ls1274-1283) with the support of their own schools and school boards. Importantly, teacher leaders saw the need for the visits because of the influx of new teachers to the project. Teacher leaders wanted to

ensure the teachers knew they had the support of their teacher leaders because when "they know the help is there, they tend to want to use it" (TL3, L599). The presence of teacher leaders is of utmost importance in reassuring the teachers that their needs will be supported. Teacher leaders also visited the schools where the teachers were not engaging in technology-based projects [TL2, L341], because teacher leaders felt their presence made a difference.

Teacher leaders feel that the personalized visits after face-to-face meetings can further motivate the teachers to commit to the project (TL6, Ls1640-3). This initial motivation can elicit further commitment in teachers because the motivation lights a "spark there, and they want to continue…to do the projects" (TL6, L1644).

Some of teacher leaders had multiple schools under their purview (TL4, L1180). In order to remain abreast of all issues under their responsibility, teacher leader corresponds with many of the teachers by email (T4, L920). Teacher leaders make it a point to respond to their emails "right away", understanding that "technology is scary to a lot of people" (TL5, L1211). Teacher leader mentioned that the challenge to maintaining an online community is that some teachers do not even use email and that is the reason why they started Techy Tuesday meetings to bring those teacher along (TL5, Ls1303-7).

As discussed above, different aspects of teacher leaders' support emerged from the data proved to effective in teaching learning. These aspects include tailored support, just in time support, ongoing support and post support follow up and feedback and are discussed in more details below.

a. Tailored support

Teacher leaders engaged in tailored support by finding the individual teacher's specific learning needs and varying "learning styles" (TL4, L497). Teacher leaders "chose tools [teachers] they could use"(TL1, L251) so that they could use the tools they learned in their classrooms with their students. Teacher leaders will try to pick tools that "will suit [a teacher] best" and "their students best" (TL4, L1008). Whether it be "a ELA project, a site project, or a math project" (TL4, L1004), teacher leader will try to teach the teacher tools that apply to the subject they teach. Based on the pedagogical and curricular needs of the

teachers, teacher leaders taught the teachers to "learn that one specific tool, and then […] experiment with [it]"(TL3, L689). Teacher leaders noted that it is necessary for the teachers to not "feel overwhelmed with all the tools", and to "pick one [IT tool] and work on that one for the first year"(TL3, L692). When teachers focus on one specific tool, teacher leaders find that the teachers are more productive and confortable with trying new IT tools.

Additionally, the leaders found that teachers showed interest in learning tools that were useful to them and "make the link to their activities"(TL1, L255). Another way the teacher leaders mentored the teachers using tailored support was by picking "two or three [tools] to show them" (TL1, L28) assuring that they fit the colleagues' needs. By focusing on a few tools at a time, teacher leaders are preventing the teachers from learning "a little bit of everything but nothing really well" (TL1, L257), which is usually the case when teachers become excited and try to learn too many tools at once especially because it was implied by teacher leaders that when some tools are taught that cannot be applied to the teachers' lessons immediately, it has been noted that the teachers will not retain how to use the tool.

b. Just in time support

Just in time assistance was another aspect of teacher leaders' support system, which was a predominant theme in the interviews. This specific aspect of support focused on responding to teacher requests in a timely manner, and was the main motivation for teacher leaders to visit schools. It is promising for teachers to "know [the leaders are] going to be there at least once a month" (TL4, L1180). Teacher leaders believe that "just in time [assistance] is important", because if "teachers have a question it has to be answered as quickly as possible"(TL4, L1178). When the leaders aid the teachers in schools, having direct contact is crucial if the teacher develops a problem. It is a crucial part in the learning process, for if the teacher is misusing the IT tool repetitively, it will be more difficult to correct the wrong actions in the future. Therefore, fixing or helping the issue quickly benefits the teacher in both the short and the long run (TL6, L1832).

Integrating technology into the school curriculum can be "scary" (TL5, L1212) at times, especially when the students are present. In a classroom setting, when both the teacher and teacher leader are present, the lesson execution seems to be smoother. Teacher leader

5 discussed the effectiveness of just in time support in which a teacher "sent [the teacher leader] the link and the first thing I did was do a video comment, so she could show her kids and be excited about it"(Ls1460-1). This fast response allowed for the teacher to teach her students in a timely and fluid manner.

c. On-going support

An important component of the relationship between teacher leaders and teachers is the duration of the alliance. The BCTN Project does not consist of a single training session but a long-term "learning process" (TL3, L618), allowing for teacher leaders to plan how to best meet teachers needs. As such, teacher leaders are able to invest their time and effort into ensuring the experience is successful and pleasant for teachers. Because of the longevity of the support, the teachers are able to build a rapport with their teachers and plan the ways in which they can best help them. In the case of teacher leader 1, the teacher leader was already planning the way she would aid one of the teachers the following year by offering a "little more support". Teacher leaders follow their teachers through every step of technology integration, ensuring they are always available to tend to their teachers' needs, whether by "emailing a lot back and forth with each other, to make sure [they] give them as much support as needed, and responding right away" or by remaining "visible" to ensure the teachers "know [they're] there" (TL5, L1210) and this happens throughout year(s). Teacher leaders also provide on-going support by helping the teachers to build a culture of sharing, that will sustainably continue the culture of support once the professional development program ends.

d. Post support follow up and feedback

The final means of support teacher leaders offered teachers was in the form of follow up feedback. Although teachers found teacher leaders' training sessions to be "one of the most valuable experiences"(TL6, L2036), teacher leaders found it necessary to follow up on the teachers after letting the lesson "sit" (TL6, L1908). Teacher leaders discovered that many of the teachers "forgot" (TL6, L2038) how to use the tools they learned once teacher leaders were not present to reinforce the lessons. In order to resolve this, teacher leaders would visit the teachers once or twice a month, or more if requested. The follow-ups would be face-to-face or by telephone, assessing the teachers' needs for direction or more training (TLs4&6, Ls946&1740). Following up is critical (TL 1, L63), as the success of the

professional development program is dependent on its sustainability. Teacher leaders found it useful to give "little refresher[s]" (TL6, L2040), to help the educators freshen their technological tool practice.

Facilitator of collaboration

Teacher leaders viewed themselves as important parts in managing different individuals' and groups' collaborations. Teacher leaders viewed the collaborations in doing projects as a "win-win situation for all, for the kids, for the teachers", and for teacher leaders themselves (TL2, L298). Within teacher leader group, teacher leaders themselves felt it was important to collaborate with each other in regards to planning and offering their support (TL5, Ls1274-9) Teacher leaders hope to "model collaboration" through their own work (TL5, L1207).

Teacher leaders saw value in having the teachers "reflect on what they have been doing and what they could do together" (TL6, L1583). Within the collaborative settings, teacher leaders felt the responsibility of setting the tone of the environments. Teacher leaders expressed wanting to see greater amounts of collaboration between various school boards and schools. Teacher leader 6 felt positive outcomes when various schools used online technology to communicate better. Teachers of different schools were witnessed to be "keen to talk to each other using the video-conference" (TL6, L1632).

The most important leverage of a teacher leader is that she is an informal leader already popular among teachers, who teach teachers how to use technology effectively. Teacher leaders are present to help "motivate [teachers] to […] want to continue […] want to do projects" (TL6, Ls1643-4).

Models for visual demonstration

A visual demonstration is a key component in aiding teachers to learn how to use technical tools. Teacher leaders demonstrate the use of diverse technology tools or diverse pedagogical uses of one technology tool and then "walk [the peer teachers] slowly through the steps and repeat the steps as needed"(TL1, L213). Teacher leaders have made it a point to show the teachers how to check the equipment […] and show them little techniques […] it could be in anything from movie maker to other […] software" (TL4, L938). This

technique is usually complemented by hands-on support and can either be "one-on-one […] or in a small group"(TL5, Ls1494-5) in weekly meetings, Techy Tuesdays (TL5, L1306), or in face-to-face meetings (TLs5&6, Ls1349&1640) that were helped 4 times per year. Teacher leaders found it most effective to "model how to use [technological tools]" (TL3, L701) by "going into a class and teach [technological tools] to the class"(TLs3&5, Ls701&1379) themselves. The leaders found that taking the "pressure […] off the teacher" was a good technique (TL5, L1379) that provides the environment for both the teacher and students to learn how to use the new tools. Using the modeling technique "encourages [teachers] to try [the new IT tools]" (TL1, L213). Just through the demonstration of "a few examples" teachers can see right away that using them "[would] be fun!" (TLs2&5, Ls366&1333)

It is alleged that having "someone in the front showing and having [teachers] on their own computers" is an extremely successful way of teaching, as teachers "struggle [and help] each other out, [a teacher leader] who is in the front shows [the teachers the IT tools] […] so [the teachers] have the model […] the auditory and […] the visual, and then they are doing it themselves" (TL2, Ls502-6). There are different possibilities when it comes to the combination of ICT tools with pedagogical purposes in the classrooms, knowing which ones will fit the context in the classroom best is something that teacher leaders are master in [TL1, Ls54-6&227] and presenting to teachers how to use the tools is extremely beneficial not only to the teacher, but to the student as well. Through the demonstration of these IT tools, teachers can enrich their way of teaching.

Mentors

Teacher leaders engage in one to one instruction, modeling of the usage of technology tools and providing feedback to other teachers, in other words serving as peer mentors. Through this mentoring strategy, teacher leaders can establish a trust relationship as they tailor information and support to the need of individual teachers as well as monitor their unique performance when using the new tools and provide feedback that matches their needs best. This practice is especially useful for the new teachers and also when a decision of usage of a new technology tool is being implemented in the school improvement system. Lieberman and Miller (1992) assert that these chances of monitoring peer's learning and modeling the desired practice from teacher leader's side and learning from a trusted

source and receiving feedback which best fit their performance from the other teachers side develop a culture of collaboration in the school that cannot be compared with any other model of school reform.

The relationship between teacher leaders and their teachers is an essential part of the BCTN Project. The relationship is based on support throughout different components of the integration of the ICT tools in the classroom. The one-on-one component of the mentorship allows teacher leaders to offer advice specific to the needs of the teacher, making a "huge impact" (TL5, L1545), and because of the depth of the relationship, teacher leaders are able to follow the progress of teacher leaders on a long-term basis. In the case of teacher leader 6, teacher leader was able to offer "a little more support" to a "timid" teacher the following year.

The teachers are also able to rely on their mentors for continuous support. Every effort is made on the part of teacher leaders to ensure the teachers know "[they're] there" for them through constant communication through email and being continuously present in the teacher's schools (TL5, L1210). In addition to supporting the teachers' needs, the mentors also aid the teachers in improving other aspects of their BCTN experiences. Teacher leaders teach the teachers "how to talk to each other" effectively (TL1, L27), "get [them] motivated" (TL6, L1581) and integrate their pedagogies effectively with ICT tools.

<u>Collaborative knowledge builder</u>

Teacher leaders view the teachers' time in the BCTN project as a "learning process" (TLs2&3, Ls346&618). As educators themselves, the teachers employ the teaching mechanisms they know to be effective. Teacher leaders hope to create self-sufficiency in teachers' abilities to integrate technology into the curriculum. Because every teacher's implementation of ICT tools is based on their own unique pedagogical needs, it is important for teacher leaders to ensure that all teachers are able to find their own relevant meaning and purpose within the training sessions. Teacher leaders found the constructivist approach to be effective in helping teachers create new knowledge. Teacher leaders would "see the lights go on" in the minds of the teachers, indicating that the teachers understood the role of technology in their own pedagogies (TL1, L253).

In order to ensure teachers learn in the best ways possible, teacher leaders focus on knowledge construction rather than direct instruction. Teacher leaders ensure that the teachers are given the time to reflect upon the program, helping the teachers to "realize that [the integration of technology into the curriculum] has a purpose", rather than expecting the teachers to absorb the information at face value (TL1, L57). Reflection is an important component of teacher leaders' means to having the teachers work effectively (TL1, Ls97, 245& 251). For teacher leaders, it is "not just a case of getting teachers to work together; it was really getting them to reflect on what they have been doing and what they could do together" (TL6, L1582).

Consistent with the constructivist approach, teacher leaders took into account the style of each teacher as a learner, as each learning process is "personal" (TL4, L1145). Rather than practicing direct instruction in which teachers would be passive recipients of the information, teacher leaders used teaching techniques based on teachers' involvement (TL4, L1071), with a willingness to "walk slowly through the steps and repeat the steps as needed" (TL1, L213). Teacher leaders implemented the modelling teaching technique and with many "hands-on" approaches (TLs2, 3&6, Ls507, 816&2034). In order to supplement teacher leaders' modelling technique, the educators also encouraged the teachers to reflect upon the lessons and to manipulate the materials themselves. Teacher leaders encouraged the teachers to "play around with the materials" and "experiment with" the tool (TL3, L836) because "they [needed] time to learn themselves" (TL5, Ls1496-7). Teacher leaders also asserted that it is "important [for teachers] to experiment before bringing it into the classroom, and to also be open to learn along with [their] students too" (TL3, L822). Furthermore, "very few people read manuals professionally" (TL4, L1147) and most individuals "generally work with the system [and engage in trial and error] a lot" (TL4, L1150).

Teacher leaders provide the teachers with the information they will need to construct knowledge with their peer teachers when teachers are afraid to share or develop projects together (TL6, L1651). Teacher leaders' approach is hands-on, instead of taking a direct instruction approach in which information can be easily forgotten and not necessarily adapted to each teacher's unique pedagogy, teacher leaders opted to focus on knowledge

construction whereby teachers learn from each other (TL1, L114) and self-sufficiency could be attained.

Non-evaluative trusted knowledge source

Although teacher leaders have the title of leaders, they do not have the role of supervisor or evaluator for other teachers. Teacher leaders cast themselves as co-learners rather than supervisors so that they gain the other teachers' trust. This nonsupervisory and co-learner role along with their higher knowledge of technology tools and their expertise in pedagogical use of technologies results in gaining the trust of their colleagues (Mangin & Stoelinga, 2011). Teacher leaders believe that going "into each school and [meeting] with the teachers to talk about their individual needs and [giving] them one to one training made a huge impact… in the development of the trust [between teacher leaders and teachers]" (TL5, L1544).

Teacher leaders become sources of help and information, allowing teachers to view them as individuals they can depend upon. "The fact that teacher leaders are living the same thing" [TL5, 1263] and by offering continuous support through "online support" and "actually physically [being] able to be there", the teachers view teacher leaders as proponents for their cause (TL5, Ls1264-5). Teacher leaders also accept that they are learners, just as the teachers, throughout the BCTN project as well. Teacher leaders relayed skills they have learned from their students to their colleagues, such as in the case of teacher leader 3, whose students "taught [her] things about [creating] Comic Life" (TL3, L826).

Teacher Leaders' View on the Main Features of the BCTN project as a Design Research on a Community of Practice of Teachers

According to teacher leaders, a climate of collaboration and a culture of sharing are two most essential resources to the teachers of the BCTN Project because it entails a form of support that only teachers can provide for each other. This support allows teachers to gain confidence in their technological expertise, as well as gain insight into the ways in which their colleagues handle the integration of technology in pedagogy. Teacher leaders offer support to their colleagues through pedagogical advising. The effects of the teachers' culture of sharing is transmitted to students whereby students receive much more

applicable educations. The students partake in student centered learning, where lesson plans reflect the world outside of the classroom and engage students. Furthermore, the use of ICT tools in the classroom engages students with special needs in ways that traditional pedagogy cannot. In addition, technological support for all teachers in school boards ensures that all students in the school board receive equal ICT engagement. The idea that technological integration into pedagogy remains a sustainable part of future education is also an important component to the program. The following themes including culture of sharing of knowledge, technological support, student-centered learning, equitable access and diffusion of change and sustainability of the project emerged as the main features of the BCTN project.

Culture of sharing of knowledge

The major theme relevant to all teacher leaders' responses was that of collaboration. The technological component of the project was seen as secondary to the culture of sharing as the teachers' "primary purpose is the collaboration and learning from each other, and the technology projects kind of stem from that " (TL1, Ls32-3). The collaborative aspect of the project assured that teachers learned more than simply new ways of implementing technology into their curriculum. By collaborating with their colleagues, the teachers learned "how to talk to each other and collaborate with each other", an aspect of their careers they "[took] for granted" (TL1, Ls27-8). Teacher leaders found that teachers who "are so outgoing in the classroom [with their students] … for some odd reason … they don't want to share it […] when they get with colleagues they are afraid of any kind of [even] constructive criticism" (TL6, Ls1590-2). The BCTN Project aided the teachers to realize that the culture of sharing, the ability to effectively communicate with each other "takes time to develop" (TL1, L30).

Teacher leaders also emphasized the scope of the culture of sharing, in which all members of the learning community were encouraged to participate. The BCTN project encouraged teachers to surmount geographical boundaries by working with "teachers, be they in the same school, be they in the same school board or be they in the same province maybe some day outside the province" (TL4, L927).

The BCTN project's focus on the collaborative efforts of the teachers allows the more technologically savvy teachers to "[network] with people who are just as crazy about technology as [they are] (TL2, L301). While networking allows the teachers share ideas with other technology-oriented people, the culture of sharing also encourages a culture of support amongst the educators. Teacher leaders ensure that all teachers feel that they "are not alone, and there is people there to support them" (TL5, L1217). This support helps to ease the teachers' fear as they are sometimes "scared of the technology not working in crucial moments" (TL4, L931). Teacher leaders teach the teachers coping skills because "you cannot run away from technology in our society but you have to cope with the effects of it.

Technological support

More specific to the technological aspects of the BCTN Project is the support given to teachers once they have begun the integration of the ICT tools into the pedagogy. As the BCTN Project aims to utilize ICT tools throughout the QEP pedagogy, teacher leaders "point out to [teachers] where [ICT tools] fits into the curriculum" (TL4, L937). The teachers leaders also ensure the teachers know how to operate the technologies and are present to offer assistance on the spot if a problem arises.

Teacher leaders ensure the teachers "feel comfortable with their technological devices of choice" before the teachers are given further independence (TL4, L929). Furthermore, teachers have unique insight into the experiences of their colleagues since they are "teachers supporting teachers" (TL5, L1123). The technological support of their colleagues' aids the teachers immeasurably, as the non-educator staff from the technology department may not fully understand what a teacher's needs are, as they "don't have the pedagogy" (TLs3&5, Ls645&1234) or "it is not a priority to them" (TL3, L649).

Student-centered learning

By creating a "community of teachers" (TL6), the BCTN project develops a stronger learning experience for students in which support for teachers translates into increase of students' involvement (TL3, Ls805&812). Teachers realize the importance of integrating technology into their pedagogy in order to "reach [their] students" (TL3, L606). In a time when students "know more technology than their teachers" (TL3, L607) teachers must

adapt their curricula in order to make lessons more relevant to the students' experiences (TL3, Ls798-800). By integrating ICT tools into "everyday teaching", the teachers ensure that they are "really enhancing what the students are learning" (TLs3&6, Ls622&1666), further engaging students to learn (TL2, 3&5, Ls373,894,&1467) to the level that sometimes students emerge as trainers for their teachers(TL1, L275). Teachers' collaboration on projects also increases their students' collaborative skills through field trips between schools (TL3, L861) or even online communications with students from other countries (TL3, L717).

Equitable access

The use of technological tools in pedagogy creates a more equitable environment for students of all backgrounds. ICT tools create opportunities for students with special needs that traditional pedagogy would not allow. For students with special needs, where "just writing their names without looking messy on a paper is a big thing", ICT tools such as computers can help to put the students "on the same page as other kids" (TL2, L337). The ITC tools allow for students with special needs to better demonstrate their capabilities; they are "changing the way students are learning" (TL3, L812). Students are "more focused and willing to work on their assignments when they use an ICT tool" (TL3, Ls892-3).

Because the BCTN project prompts teachers to collaborate also with colleagues outside of their school community, the program ensures a more equitable education to all of its participating students. The use of online communication tools allowed teachers from all schools, whether located in suburb areas or city regions to participate fully and equally. Teacher leaders of the project "plant the seeds" of support in the minds of all teachers to take that "first risk" and use the ICT technology "so that every child can benefit with equal opportunity" (TL5, Ls1217-8).

Diffusion of change and sustainability

Teacher leaders also saw the value in making sustainable change with the BCTN project. The teachers view the BCTN project as an "ongoing learning process" [TL3, L618], whereby acquiring technological expertise and learning to effectively implement them into curriculum has become a necessity for teachers. A crucial part of this sustainability is the

project's ability to diffuse change and promote adoption by teachers by creating curiosity in the project.

Teacher leader 4 measured their success through the sustainability of their work, stating, "I think I see success with teachers who may not be participate in the BCTN project this year but had been previous years and have been continuing incorporating technology into their curriculum (L956). Components of the project, such as the culture of sharing it creates, gives the initiative a self-sustaining quality. In some locations, the BCTN project began with only "2 or 3 teachers in the schools, but … those teachers have gone back to their buildings and talked about the projects [bringing] in a few more teachers into the training sessions" (TL1, L48) by creating interest in them (TL1, L50)

As an strategy for increasing the quality of recruitment of the new teachers to the project, teacher leader 3 suggests that " it would be important that if [a teacher] he wants to join [the project] next year he comes to their last meeting this year to see whet the project is about and to see what the end results are" [TL3, L760] and she also suggests that teacher leaders take the initiative to "maybe even invite a teacher who have plans on joining the project … to see what we've done through the summer" (TL3, L762).From this point, the BCTN participants mentor interested teachers who then "get involved" with the project, and the project "branches out more and more" (TL3, L635).

Challenges of Teachers' Integration of Technology in the BCTN Project

As with any project involved with technology, there were challenges to be overcome in the BCTN project. As teacher leader 4 explains, "sometimes there has been obstacles and there continue to be obstacles because technology is not perfect, nor are the people who put technology together, but nevertheless, … we teach them coping skills as you cannot run away from technology in our society but you have to cope with the effects of it"(Ls950-2). . The challenges faced by teacher leaders in implementing the BCTN project are institutional, social, and economical in nature. Teacher leaders experienced many challenges, from which 7 themes emerged: lack of time, lack of technological resources and accessibility, unreliability of technology and lack of IT team support, differences in teachers' levels of expertise, differences in teachers' level of commitment, and resistance to

sharing and establishment of a CoP. Many of the challenges acted in bidirectional manners, affecting each other in various ways.

The most pervasive theme to emerge amongst the teachers' experiences was the lack of technological resources and accessibility. Teachers became frustrated at the lack of technical support offered by IT personnel and their school boards and the lack of time preventing their learning. Furthermore, varying levels of expertise and commitment entailed that teacher leaders focus their efforts on teaching the teachers the basic skills needed for ICT integration and convincing the teachers the rewards to be reaped by committing to the program. Furthermore, teacher leaders were met with opposition when encouraging teachers to share their classroom experience with their colleagues. Establishing a community of practice was also found to be difficult amongst teachers. While similarities in challenges faced were found, teacher leaders demonstrated varying methods of rectifying their situations.

Lack of time

Many teachers considered a lack of time as a barrier in learning how to properly implement and planning for the implementation of technology in the curriculum (TL1, L60). Teacher leaders helped teachers to overcome this barrier modelling the ease with which this barrier could be overcome and the related rewards reaped by participating in the project. Furthermore, teacher leaders focused on classroom management skills to save more time when implementing technology (TL2, L418). Teacher leaders also mentioned that they need time to be able to provide teachers with support and the BCTN project is somehow providing them with the time and opportunity (TL5, L1216)

Lack of technological resources and accessibility

The lack of technological resources available stifled the teachers' ability to regularly integrate IT tools into their curricula. Several teacher leaders indicated that the tools they were supplied with did not adequately meet their needs, resulting in one of their "biggest challenges" (TLs3&5, Ls638&1295). As a result, the teachers' ability to accomplish certain tasks was diminished. In teacher leaders' experiences, the lack of Internet bandwidth often necessitated that the teacher find alternative means to complete classroom projects with students (TLs1, 3&4, Ls266, 639&1046). The lack of Internet bandwidth also resulted in

teachers being unable to successfully share files and ideas online (TL1, L66). This is of critical importance as the teachers' inability to share their work directly contradicts the BCTN's objective of using the project as a platform to share ICT lesson plans and reflections. More generally, the lack of Internet bandwidth demonstrates how a seemingly simple-to-provide service can be crucial to the everyday integration of IT tools and learning objectives in pedagogy.

Furthermore, teacher leaders discussed the problems of working with ageing technology. The schools' inability to remain up-to-date in certain technologies, such as updating device drivers (TL4, L971), impedes the teachers' ability to use the technologies effectively as well as teach their students' about the tools most relevant to their needs and experiences. Teacher leaders acknowledge the difficulty in providing these resources, citing cost and time as factors (TL4, L974). Teacher leaders also made suggestions for resolving the problem of the lack of technological resources in schools in general, stating that they believed that they would one day have to say to the student, "Part of the things you have to bring to school in late august is your laptop" to compensate for the school's shortfall (TL4, L991).

The lack of technological tools and sufficient equipment available to the teachers also created an organizational obstacle. Because of the limited number of technological units, "sign out" systems (TL3, L654) were used amongst teachers and teacher leaders necessitated demonstration on how to be cooperative in signing out the ICT tools. In the experience of teacher leader 3, many teachers would return the tools with "wires missing… or batteries [not] charged" and this affected the effectiveness of the ICT tools in teaching (L655).

Unreliability of technology and lack of IT team support

Teachers' lack of technological resources is exacerbated by unreliability of technology and the lack of support by those in positions of authority within the IT field. Teacher leaders assured the teachers that "technology is not always smooth, and reliable" (TL1, L167). Teacher leaders instruct the teachers "not to panic" should an ICT tool malfunction (TLs2&5, Ls480&1410). Rather, they tell the teachers to "remind [the students]…the computer is a machine and there are going to be problems with it" (TL3, L772). Because

teacher leaders themselves do not always "have confidence in [the] infrastructure", they also inform the teachers to always "have a Plan B" (TLs3&4, Ls740-2, 1106&1130).

A discrepancy exists between the teachers' understanding of their own technological needs and the understanding of those technological needs by the IT support teams. Teacher leader 3 attributes this discrepancy to the IT personnel not being pedagogues and therefore not understanding the need for certain technologies in the classroom. Moreover, teacher leaders felt that their needs were "not a priority to the IT personnel" nor were the IT personnel enthusiastic about resolving the teachers' obstacles (TL3, L648).

Some teacher leaders also felt a lack of support from school boards (TL3, L644). Teacher leader 5 mentioned technological support to be the "Achilles' Heel" (L1309) of their school board. While teacher leaders do feel that progress is being made concerning technological support within their schools, teacher leader 5 felt that the rate of progress does not adequately match the severity of the need.

Differences in teachers' levels of expertise

A great disparity exists in teachers' levels of TPACK expertise, creating barriers in the implementation of the BCTN initiative. While a few teachers are well informed on current technological advances, many were not as based on teacher leader 5 a great number of teachers still do not use the most basic levels of technology offered within schools, such as email service (L1305). The most prominent challenge that teachers faced included learning which tools to use for their target projects. To resolve this, teacher leaders "[exposed teachers] to different types of tools" and then "[asked] them to reflect on in what ways [they] could use them" (TL1, L244). As a result, schools provided teachers the opportunity to catch up with their colleagues' expertise, as was the case with 'Techy Tuesday' in teacher leader 5's school which are hand-on sessions when teacher leader demonstrate the use of tools in a step by step fashion for teaches who need to catch up.

On the other hand some of the BCTN teachers who are more "technologically savvy" want to know more and more technology tools to get various options for presenting the lesson content to the students (TL1, L218), although teacher leaders prioritized the philosophical discussion behind the tools [so that] when facing a new tool they will [be able to

independently] use this with their students in their class, [and become capable of] see[ing] other possibilities"(TL1, Ls252-3).

Differences in teachers' level of commitment

As with the great range of technological competencies demonstrated by teachers, educators also showed varying levels of commitment to the project. Some teachers' commitment to the project was not as strong as many teacher leaders would have hoped (TLs1&2, Ls62, 305&309). Specifically, while teachers seem enthused about the BCTN project during the training stages, most did not honour their commitments in the later stages of the project (TL1. L63). Moreover, teacher leader 2 expressed difficulty in accepting and managing the performance of increasingly uncommitted teachers expressing confusion about the motives of teachers who joined the project if they were not fully committed to the responsibilities entailed (Ls537-8).

Teacher leaders faced obstacles in trying to engage unenthusiastic teachers to the project and elicit commitment. Teachers who were uncommitted to the project cited relevancy of the tool and lack of time in their schedules as reasons for their unwillingness to commit to the project (TL2, 311).

Resistance to sharing and establishment of an active CoP

Teachers were reluctant to share their experiences using ICT tools in the classroom with their colleagues (TL5, L1457). Teacher leader experienced difficulty communicating to the teachers the value of sharing their experiences with their colleagues (TL6, L1651). Oftentimes, teachers cited inadequate practices as their reasons for not wanting to share their experiences, although teacher leader 6 feels their decision not to share can be attributed to their lack of self-confidence, as teacher leader 1 states that "teachers are often shy, they haven't really developed that community feeling with the other teachers in the project" (L147) and teacher leader 6 also believing that "They're so confident in the classroom but not when you get them together… They are shy and it's not because the teachers don't want to share"(Ls1590-1).

Teachers' unwillingness to share their experiences with their colleagues presented challenges to the creation of a more active community of practice. By means of building a

stronger community of practice (TL6, L1770), teacher leader 6 hoped to produce solid results such as a resource bank that would be "open for other boards" (L1772).

The Successes that BCTN Project Experienced from Teacher Leaders' Point of View

It is important to acknowledge the components of the BCTN Project that teacher leaders deemed successful and the resulting outcomes. Teacher leaders' responses when asked about the 'successes' of the initiative are congruent with the overall objectives of the project itself. Seven themes emerged from teacher leaders' experiences, all of which were deemed to be successful outcomes of the project: increase in collaboration and peer support, combination of modelling with active involvement, improved teacher leader's support, increase in teachers' risk-taking, emergence of leaders, and increase of top-down support. The most pervasive theme to arise from teacher leaders' experiences is the collaboration of teachers' in the construction of ICT knowledge. From the most introductory of ICT skills to the most in-depth use of technology within day-to-day curriculum, teachers worked together in order to fulfil technology-based projects within the context of the BCTN project.

Another aspect of the success of the project included improved style of support that teacher leaders provide to other teachers. Teacher leaders came to realize that support is necessary to teachers' success. Teacher leaders created environments whereby teachers felt supported and invested in the project by both modelling the ways in which the IT tools were to be used and encouraging the teachers to practice their skills with the technologies. Teacher leaders learned to model their expertise with the use of technology while putting emphasis pedagogy, using technology as the final step (TLs1&3, Ls137&576). Further positive changes in teacher leaders were the result of he teachers' active involvement with the project and providing feedback to their leaders that allowed teacher leaders to discern different teachers' specific needs and weaknesses when working with the technologies. As a result, teacher leaders were able to adapt their teaching foci to the various needs of the teachers. Teachers who began the initiative with increased knowledge of the technologies in the classroom demonstrated leadership qualities by taking the initiative to aid their colleagues attain higher levels of proficiency. These leadership qualities extended to the classroom when the teachers became the ambassadors for the effectiveness of technology in the classroom, incurring support from both students and their teacher colleagues.

Furthermore, the curiosity initially triggered by teacher leaders was propagated by the teachers' own excitement at the possible pedagogical opportunities brought about by the use of classroom technology. Finally, the teachers experienced an increase in structural support when principals provided greater amounts of technological resources. The themes of collaboration and peer support, combination of modeling with active involvement, improved teacher leader support, increase in risk taking, emergence of leaders and the increase of top-down support are further explained below.

Increase of collaboration and peer-support

One of the purposes of the BCTN project is that whilst being able to use and understand technology, teachers step up as technology leaders and help other teachers who find using IT tools difficult (TL6, L1846). Teachers are self-initiating to help support other teachers with integrating technology in their curriculum (TL4&6, Ls948&2042). Teachers unite and help one another out to help solve the IT tool discrepancy and to help one another integrate the tools in their lectures (TL2, L539).

Alongside the collaboration of teacher knowledge, teacher leaders discovered that teachers who would normally not work together are uniting to aid each other (TLs1,2 & 5, Ls42,610&1583). Not only are teachers collaborating across subjects, but they are also collaborating between grades. For example, teachers who teach grade 1 help collaborate and do projects with teachers who teach grade 5 (TL1, L43). Teachers, regardless of location and speciality, often have common goals. With these common goals, teachers live the same problems and can connect over problems they face (TLs1&5, Ls98&1264). By sharing ideas, they are able to increasingly help teachers use IT tools (TLs5&6, Ls1325-6&1822). Teachers come together during break time or Techy Tuesday sessions and share ideas and new tips on what they have learned themselves, and will support one another with their endeavours. Teacher leaders also have been learning and have become more professional in exchanging information, projects, rubrics, and teacher materials (TL2, L540). They share ideas through emails or face-to-face (TL1&6, L274&1710). Among what they learned through time and experience is that emailing, Skype sessions [TL6, L1710] and other forms of online support are used for quick mode of getting new information; however, when teachers engage in face-to-face sessions, it allows for better means of support (TL1, L275).

Combination of modeling with active involvement

Among the successes was learning the lesson that teachers' learning processes were most effective when both active involvement and modeling off how to use the technology combined (TL5, L1509). By actively involving the teachers, teacher leaders created interest in the technology that the teachers learn (TL1, L258). After teacher leaders modeling of the technology tools and their pedagogical applications, teachers took initiatives in doing projects with their students using those tools. Sometimes they would do "simple little projects like Google searches" and sometimes they participated in "mass projects" among classrooms or within school board (TL4, L961).

Improved teacher leader's support

Part of the success of the project was achieving a better support system through experience. Teacher leaders believed that learning is an ongoing process "even for teacher leaders" [TL3, L618]. They learned through time to focus on support tailored to "the teacher's individual needs" (TL5, L1544). Teacher leaders find it effective to go into a classroom, model the technology use, and discuss the teacher's individual needs after the class. They adapt their teaching to fit the teacher's wants, while giving them "one-on-one training" (TLs3&5, Ls678&1544). They also learned that that following up with teachers after the mentoring is necessary. They noted that they "assumed that teachers [learned the IT tools] naturally, and after the first year of the project [teacher leaders] noticed that that's not what happened" (TL1, L28).

Teacher leaders found that the ongoing communication with teachers is a very good technique to help the teachers be acquainted with the changes that constantly happens in technology (TL5, L1550). Teacher leaders also began to focus more on supporting technology integration by considering the pedagogy as the core versus using technology for random tasks (TL3, L569-571&576).

Increase in teachers' risk-taking

One lesson for teacher leaders' success in helping teachers was that teacher leaders found it effective for teachers to take what they learned and try it by themselves on their own time, or in their own classroom setting. They go and "take risks and embark on small

projects with their students" to try something new (TL1, Ls272-3). New teachers also take a leap (TL5, L1547). They try doing projects with other classes in the same school within and between grades and sometimes they do it "across school or across school boards" (TL3, Ls611&619). Teachers take the risk of new adventures like travelling with their students to another school to collaborate in projects and this is a great learning opportunity for students (TL3, Ls860-2). The supportive, non-supervisory approach taken by teacher leaders ensures that "many teachers take risks" because they know they have they continuous support of their teacher leaders, and as a result, trust is created (TL5, L1546).

Emergence of leaders

Teacher leaders would encourage teachers who are more confident with technology " to start to become the mentor" (TLs1&2, Ls112&390). By taking the initiative to " [step] out and [take] up the role of training other teachers" (TL1, L46), "teachers who would have never ever considered themselves as leaders" (TL1, L45) nevertheless, showed leadership characteristics from themselves in the teaching community. They integrated the ICT tools into their lessons and emerge as leaders and help others to adopt and acquire the knowledge as well. At the same time, students are increasingly becoming more technology savvy than before as well, allowing for them to emerge as leaders. Students are willing to take more risks, and therefore learn the technology as it changes. Additionally, children do not forget what they do, and learn (TL6, L1731), so it makes it easier for them to adapt with technological changes. With their knowledge they are able to help their teachers in using tools and sometimes even "emerge as the trainers" (TL1, L275). Teachers found that the students were supportive and consoling to the teachers when glitches or problems arose when using the technology (TL3, Ls772-6).

Furthermore, it is evident that students' propensity to become leaders is directly related to their teachers' abilities to act as leaders. Teachers who "[started the BCTN project] with email" were able to elicit "enthusiasm from the kids" regardless of whether they participated in "big or small projects" (TL2, Ls343-346). Such a "huge success" in the integration of technology into the curriculum is considered to play a major role in "students' success, a number one priority" of teachers (TL2, Ls343-346). The ability of these teachers to "flourish like that…in a couple of year" (TL2, 346) is based on the format

of the BCTN project, whereby teachers are supported fully by their colleagues and teacher leaders.

Increase of top-down support

Through teacher leaders follow up (TL6, Ls1903-7), principals who have been observing the outcome of the BCTN project (TL4, L1064) become more supportive of integrating technology into the teachers' curriculum by providing facilities, technology tools and software to the BCTN teachers (TL6, Ls1962&1915-17).

Teacher Leaders' View on the Role of ICT Tools in Education

All teacher leaders interviewed believed that ICT tools play an important role in pedagogy. Teacher leaders felt strongly about the role ICT tools play in making pedagogy relevant to the lives of students, both in educational and personal contexts. Teacher leaders felt that it was the responsibility of the educational system to teach students about modern day technology, as it is an important part of every day life that will only become increasingly important in the future. Teacher leaders also recognized the generational gap between students and their parents concerning technological expertise. As such, teacher leaders felt a heightened responsibility to educate students about the tools, as some may have not have had the opportunity to learn about safe and effective practices. The relevance of the technology to the students encouraged increased engagement in classroom activities. The ICT tools also allowed students to demonstrate their skills more effectively than through the use of traditional means. Finally, teacher leaders viewed ICT tools as avenues for better pedagogy and more effect curricula. The ICT tools allow teacher to better present their lesson plans, producing more effective learning practices and increased student engagement. These themes emerged surrounded two main themes: technology as an avenue for curricular learning and increased relevance of education to students' experiences.

Technology as an avenue for curricular learning

Teacher leaders recognize the importance of technology serving as an avenue for stronger pedagogy and curriculum in the classroom. While the technology programs teach students the expertise necessary to use the systems, the teachers believe that if the "content is not there, [then] that's useless"[TL1, L198].

Technology is also flexible in its use. Teachers can adapt their use of the technology to their needs. Consequently, the material that students are learning is not compromised but simply supplemented. As such, teachers take into account the "purpose [of the lesson plan] and the audience" when planning to use technology (TL1, Ls199-200). This is exceptionally relevant in the cases of younger students who "really need the basics" and teachers use technology as "kind of the enhancer" (TL5, Ls1481-2). Teacher leaders feel that the ICT tools reinforce the skills already being learned in the classroom, such as "communication, collaboration, the reading, and the writing". Furthermore, when working on projects in groups that include technology, students engage in problem solving, successful communication and compromise, "a very important lesson" (TL1, L192).

Increased relevance to students' experiences

Teacher leaders view ICT tools in education as a means to making pedagogy more relevant to the experiences of their 21st century students. Teacher leaders were of the mindset that without integration of technology into the curriculum, the students would "not succeed in the outside world" because "whether we like it or not, [technology] is here to stay" (TL6, L1987). However, another teacher leader cautioned that the technological integration must be done without "losing the reality of pen and paper, using books and stuff and doing old school research" (TL3, L802). Another part of the need for this engagement of students is the high drop out rate in high schools (TL2, L488). Teacher leaders feel that the integration of technology into the curriculum results in "student engagement" [TL3, L491] and "may just be another factor that keeps them [in school]" (TL2, L491) as "students are changing over time and this is part of their world" and that pedagogy must adapt as a result (TL3, L798). The teachers realize it is their responsibility to "unlock their full, true potential" (TL5, L1470) as they often notice that technology in class provokes students' curiosity ("How can I use that?") and interest ("I wanna use that") (TL5, L1482).

Teacher leaders also recognize that the technological expertise they are teaching their students may interfere with a generation gap between students and their parents. The teachers realize that their students are using technology that "defies their parents" because parents were not "led through the process of using the Internet" (TL6, L1996). Teachers are teaching students the building blocks of ICT tools in cases where the students

may have had no other technological education. This was substantiated by teacher leader 6's personal story in which a student agreed to meet a man online not knowing he was a child molester (Ls2004-18).

Teacher Learning and Adoption of the Change

According to teacher leaders, teachers' efficient and sustainable learning is heavily dependant on reception of guidance that support-based. Some teachers shared their view and reflected upon the role of technology in pedagogy and the ways in which they could integrate technology more effectively. These teachers were reportedly the ones that mostly favoured and benefited from collaboration. Other teachers needed greater amount of encouragement from teacher leaders' and peer teachers' sides. The encouragement elicited by the teachers created feelings of warm-heartedness, developing a basis for teachers to take 'baby steps'. Teacher leaders ensured that teachers felt comfortable, repeating themselves when their lessons were not clear. The main themes discussed below based on teacher leaders' responses in the interviews related to teachers' learning include: baby steps, need for encouragement, needs for reassurance of presence of support, need for resources, learning through collaboration, and aspects of teacher's knowledge for meaningful technology integration.

<u>Baby steps</u>

One of the most important theme that all teacher leaders agreed on was that "baby steps" (TLs1,2,4&6, Ls95,528,533,1122&1615) that is it was beneficial for the teacher s who were learning the new tool to "play with it", and take the time to "learn themselves" and learn in a small step by step manner while being under support of teacher leaders (TLs4&5, Ls1146, 1496). These "baby-steps" are thought to be advantageous as it was perceived that "when [the educators] have the basics they feel more comfortable to go and experiment with it at home"(TL3, L836). While "some teachers are really into it and their participation is amazing and overwhelming right from the start" (TL2, L534), with the help of baby-steps, those teachers who feel less comfortable with taking risk or learning new tools can get the chance to slowly "progress and get more and more into the project" (TL2, L533).

Teacher leaders encourage the teachers to "start small"(TL6, L1615), and in addition "with something very simple" (TL1, L95) and with something that is "easy to use" and they are more familiar with (TL4, Ls1009-11) and take time in mastering those tools for a long time rather than jumping from one tool to another. Observations have concluded, however, "initially there is a lot of fear [TL1, L211]; […] often teachers would say […] 'no I know I am stupid'"(TL1, 215). Certain teacher leaders believe that "baby steps [are important]" to encourage teachers to "take a look at what [the teacher] has been doing in [his or] her classroom"(TL1, L96) and talk to "[teacher leaders] about how they use technology" (TL6, L1619). Baby steps can be supported by the leaders either face-to-face or by providing "step-by-step reassurance via email" (TL5, L1450). These baby-steps allow for teachers to adopt new technological tools, at their own pace. When integrating them slowly, it allows for teachers to adapt to the changes with less effort. Furthermore, as teachers try the tools on their own, it allows for them to learn in their preferred manner, and in a less stressful environment. Teacher leader then slowly backs away, allowing for the teacher to spread their wings with the hopes that the teacher will use the IT tools in the classroom to teach their students

Need for encouragement

The encouragement of teachers by their teacher leaders plays an important part in the ways teachers responded to the lessons. Teacher leaders view themselves as "cheerleaders" for the teachers, supporting them through bouts of low self-esteem (TL1, L217). Teacher leaders encourage the teachers by telling them "they can do it" (TL1, L218), that they are indeed "fabulous teachers" (TL1, L216) and they should not question their pedagogical skills as teachers. Encouragement of the teachers has a large effect on teachers who experience "a lot of fear", which has been "the case for all the classrooms that [TL1 has] been in so far this year" (TL1, L211).

The teachers also need environments where their experiences are met with "no judgment" (TL6, Ls1593-4). To provide that environment, when teachers are involved in the use of trial and error as a learning strategy, teacher leader took the sting out of error by telling teachers, "What is fun about the computer is that if you did something and you don't like it, there is an 'undo' button" (TL3, L821). The teachers also accept that they are learners, just as the teachers, throughout the BCTN project as well. Teacher leaders relayed skills they

have learned from their students to their colleagues, such as in the case of teacher leader 3, whose students "taught [her] things about [creating] comics" (TL3, L826).

Needs for reassurance of presence of support

An important part of the BCTN project is the continuous presence and support of teacher leaders to participating teachers. Teacher leaders believe their "major work is to help and support teachers" (TL1, L9). Beyond teaching the technical aspects of ICT tools, teacher leaders see themselves as support systems for their teachers, believing support to be the "starting point" of the project (TL6, Ls1283-6). In providing support, teacher leaders felt it important to ensure the teachers knew they could be reached at any point for help [TL5, Ls1446-7]. The teachers would "meet often [with teachers, they would] go into other schools, even sometimes when they're not doing projects at that time" in order to remain visible, [they] want them to know that [they're] there" (TL5, Ls1210-1). This makes teachers warm-hearted because they know they will not be left alone in case they need help and support if glitches in technology use happen. Teacher leaders are able to connect with their colleagues' experiences, understanding that "technology is scary to a lot of people" (TL5, L1212).

Need for resources

In order for teachers to learn properly, they need to be provided with the necessary resources and materials. When sent on professional development workshops, teacher leaders asked the teachers to buy, on behalf of the school, books related to the seminar they attended so that the community of teachers can benefit from the seminars too (TL2, L526). BCTN teachers also keep the resources that the teacher leaders give them like compiling "binders with the information that the teacher leaders' gave them in the beginning of the year" (TL2, L841). The "set up and the management of the equipment" is usually taken care of by the administration; however, teachers need to get education on how to share resources, set up and manage the technological equipment to ensure most efficient use of the resources (TL3, L844). Teacher leaders also provide supplemental resource materials such as instructional videos and posters to aid teachers (TLs3,4&5, Ls657, 850-2, 1074&1460).

Learning through collaboration

Within the same vein as constructivist approach, the teachers would get motivated to change through collaboration and shared learning. Every teacher's learning experience is unique. As such some teachers do not feel "comfortable" learning about technology independently and would prefer to "team up with someone who does know the software and …learn from them (TL3, L831). The confidence and experience gained from such shared learning experiences prompt the teacher to "experiment with the materials at home" (TL3, L836). Furthermore, collaborations allow less experienced teachers to join the project and be mentored by a more experienced teacher, making them "a little more comfortable to start" (TL3, L867).

Aspects of teacher's knowledge for meaningful technology integration

Finally, one of the major metacognitive skills that determines teachers' learning of integration of technology in their teaching practice is their knowledge and understanding of the role of technology in education and the relationship between technology knowledge with their knowledge of pedagogy and content. Most prominent in the themes discussed, is the notion that successful integration of the tool involves deep knowledge of the subject matter, pedagogical methods and finally ICT tools that serve teachers' selected content and pedagogical method in the best way. While teachers showed great enthusiasm for the project, many teachers demonstrated fear in using the ICT tools. Teacher leaders used technological knowledge to quell these fears and build the technological confidence of the teachers. Furthermore, it was found that ICT tools enhanced students' learning and better served their pedagogical needs.

Teachers acquired technical knowledge through examining "the structure and features of [the] tool, looking at the purpose of using that tool" (TL1, L131). Technological knowledge played an important role in integrating technology, as teacher leaders' "biggest problem was [addressing] staying with the teacher until they feel comfortable with their technological device of choice" (TL4, L930). Once teacher leaders instruct and model the instructions of the ICT tool, teacher leaders "assist them [in] how to check the equipment beforehand and … show them little techniques like appointing a student expert" (TL4, L936).

In addition, teacher leaders also managed the needs of teachers who no longer felt challenged by the technological tools presented, as they had "done every single tool there" (TL5, L1346). Teacher leaders discussed having these teachers mentor other teachers (TL1, L113); however, they also pointed out that because "there is always something new in multimedia coming out", the teachers will continue to learn about technological advances (TLs1&6, Ls119&1856).

As educators, teacher leaders prioritized pedagogical knowledge above all other knowledge. The appeal of the BCTN Project consisted mainly of the integration of technology's ability to better attain pedagogical goals. Indicative of their priorities, teacher leaders advised the teachers to not "do a project based on technology" but rather to incorporate technology "that could complement what you are doing" (TLs2&3, Ls362&689).

Teacher leaders teach teachers ICT-inspired projects "fit into [the] curriculum because there is a significant part of the QEP that deals with the technology integration" (TL4, L937). When deciding upon which ICT tool to use, teachers determine a balance between "what will suit [their] needs best and what will suit [their] students' needs best" (TL4, L1008).

In order for technological integration in education to be consistently and effectively used by teachers, teachers must have the subject knowledge to decipher which tools will best fit their needs. The teachers view the technological aspect of the curriculum as "useless…[if]… the content is not there" (TL1, L198). Both the content and the technological aspect of the curriculum must be "appropriate" for the students as audiences in order for it to be beneficial (TL1, Ls200-1). In the views of the teachers, it is the "basics" that are necessary to reach students' academic goals (TLs1&5, Ls133&1481). ICT projects generally remain in one academic domain, although teachers can also work in a "cross-curricular" fashion (TL6, L1587).

Teacher leaders showed great metacognitive abilities in understanding the purpose of TPACK in education. Teacher leaders viewed themselves as "much more than [just] technology people" (TL5, L1237), but rather experts in all components of technological, pedagogical content knowledge and the ways in which these three fit together for everyday use. Teacher leaders understand that "technology is not an end in itself but rather part of the

subject areas" (TL1, L12). TPCK parallels the goals of student-centered learning, whereby teachers adapt their teaching methods to the ever-changing student reality. The teachers view the practice of TCPK as a means to better "reach our students because we are in the 21st century and this is what students are" (TL3, L606).

Teacher leaders play an important role in putting teachers' understanding of TPCK into practice. Teacher leaders help to bring the teachers' "concepts into reality" (TL4, Ll914). Teacher leaders acknowledge that the integration of technology into the curriculum takes additional effort on the part of the teachers, and therefore give them the time to plan their projects" (TL6, L1653). However, the teachers feel the effort is well worth the outcome, as use of technology tools and software such as Microsoft Word in projects "really [enhances] what the students are learning" (TL6, L1666).

Along with understanding the ways in which content, pedagogy and technology can combine to create a comprehensive curriculum, the teachers also contend with classroom management in contexts of technological integration (TL3, L674). The teachers found it difficult to deal with students who "tend to think…they know all about technology" (TL3, L675). When teaching the students the "proper etiquette for how to use technology", the teachers were at a loss regarding "where to start, how to teach that" and how to "[set] up the classroom" (TL3, Ls676-7), creating a starting point in teacher leaders' lessons.

Discussion

The BCTN project was established to promote the integration of technology in QEP-based curriculum and pedagogy through teachers' peer-based support networks and constructivist teaching methods. Research analyzing the school dynamics for creation of optimal climates of learning has provided a strong basis for the BCTN network project. In line with our project objectives, we determined that by creating environments in which, through teacher leaders, collaboration, support, constructivist learning and leadership could thrive, teachers gained the capabilities to put into practice their newly acquired knowledge of technology. Our results both reinforce prior knowledge and add new insight into the teachers' professional development literature. These results and their discussions are organized along our research questions and outlined below.

RQ1. What are the Major Features and Central Aspects of Teacher Leader Role in Teachers' Integration of ICT in their Teaching Practice?

The role of teacher leaders as teacher community builders is also highlighted in Lieberman, Saxl and Miles (2000). In the BCTN project, teacher leaders played a critical role in serving as teachers' supporters through developing sustainable systems of support amongst teachers. Reflecting current researchers' call for and focus on collaborative and constructive teaching methods (Nanjappa & Grant, 2003; Applefield, Huber, Moallem, 2001), teacher leaders facilitated meaningful learning through evidence-based methods. Our findings match those of Becker and Riel (2000), who demonstrated that teacher leaders who were more professionally engaged in activities including support for other teachers were more likely to utilize constructivist-based teaching practices and use technologies in "exemplary ways" (p.27).

In line with prior research (Little, 1988), the BCTN teacher leaders played an important role in redefining the role of technology in education to teachers. The BCTN framework allowed teachers to develop their TPACK in a meaningful manner. Although many of the problems experienced in various other professional development programs based on the integration of TPACK were not found to be challenges in this project, such as passive implementation, (McGrath, Karabas, &Willis, 2011), and lack of IT training (Pelgrum, 2001) and feedback (Park & Ertmer, 2008), the teachers did experience similar benefits, such as teachers'

learning of how to actively participate in group settings and a general cognitive reframing of the role of technology in education (Koehler & Mishra, 2005). Our findings parallel those of other studies, demonstrating that professional development programs based on support serve as effective avenues for practice of TPACK knowledge , which aid to shift teachers' notions of technological use as an independent goal to viewing technology as an important tool in achieving pedagogical and curricula goals (Koehler & Mishra, 2005). This finding demonstrates that knowledge alone is not enough to prompt teachers to practice their expertise, but rather that support plays a vital role in effective integrated use of technology that is meaningful to pedagogical goals.

Another aspect of teacher leaders' roles emphasized in our data was mentoring. Through mentoring, teacher leaders built trusting relationships with teachers that formed the basis of TPACK construction and development, feedback, and ongoing support. Research into the role of teacher leaders as mentors finds the mentorship role to be effective in reaching professional development goals (Stoll et al., 2006). As mentors, teacher leaders provided individualized support for teachers, providing feedback specific to their needs. These mentorship relationships fostered the professional learning community dynamics, as expertise was shared by all. Specific to the BCTN Project, the mentor relationships between teacher leaders and teachers also laid groundwork for teachers to learn the communication skills and support skills needed to aid each other in the eventual absence of teacher leaders.

BCTN leader teachers' focus on learner-centered learning is in line with the literatures' call for teachers' facilitation of meaningful learning (John & Sutherland, 2004). The results of this study support prior research that teachers must shift their traditional roles of knowledge-transmitters to those of facilitators of knowledge creation in order for meaningful learning to occur. In line with this framework, teacher leaders allowed teachers to progress at their own pace, supplemented by tailored support. While prior research cites experimentation with ICT tools as crucial in teachers' adoption decisions (Fullan, 2001), our study shows that it is crucial that teachers also be afforded the necessary time to familiarize themselves with the technology. It is also imperative that teachers be given sufficient time to learn integration methods, as teachers in the literature and also BCTN teachers cited a lack of time as a cause for a lack of integration (Sicilia, 2005). The importance of experimentation with technologies in the adoption process has been documented in various other lines of

research (Rogers, 1995; Hall, 1979). However, our research gives further insight into the ways in which experimentation serves to meet teachers' needs. The way in which learning occurs over time proved to be an important factor for teachers. Our teacher leaders placed great emphasis on taking "baby steps" in introducing the teachers to the technologies, presenting another component of learner-centered teaching practices that must be emphasized. Although student-centered learning is an established concept in the professional development literature,(Heo & Breuleux, 2011), our project is novel in its effort to outline and discuss the various ways in which student-centered learning is supported. Our data supports Stoll, Bolam, and Collarbone (2002)'s framework for teachers' adoption of teacher leadership system, with additional evidence for effectiveness teacher leaders as support agents. Furthermore, our findings reflect prior research concerning the importance of collaboration of knowledge (Becker and Riel, 2000), the effectiveness of TPACK-based programs (Koehler & Mishra, 2005), the value of TPACK-based programs, the effectiveness of mentoring and importance of learning-centered learning. We add to the literature, however, evidence for the means by which experimentation aids teacher learning, the ways in which challenges in TPACK-based programs can be overcome and how mentorship serves as an avenue for feedback.

RQ2. What are the Major Challenges of the Initiatives like the BCTN Project that Focus on Teachers' Integration of ICT in Practice within a Professional Learning Community?

The results of this research shared some commonalities with the multitude of studies (Ertmer, 1999; Bingimlas, 2009; Hadley & Sheingold, 1993; Keengwa, Onchwari, Wachira, 2008) demonstrating various barriers hindering successful integration of technology in classrooms. As per the literature (Ertmer, 1999), teachers and teacher leaders in the BCTN experienced various first and second order barriers, such as the teachers' lack of time, self-efficacy, and insufficient technological knowledge (Sicilia, 2005; Binglimas, 2009; BECTA, 2003). Our data confirms the literature's findings (Ely, 1990) for lack of technology resources and accessibility as barriers to successful technology integration. Because of our project's focus on collaboration, however, our results highlight how a lack of technology resources can impede teachers' success. We found that a lack of certain IT resources, such as Internet bandwidth limits teachers' abilities to facilitate each other's learning and sharing capabilities, ultimately hindering the growth of the professional learning community.

In line with prior research (Keengwa, Onchwari, Wachira, 2008; BECTA, 2003), our data proves lack of support to be a barrier in teachers' integration of technology. Teacher leaders cited support by school administrations and IT personnel to be out of touch with teachers' needs. Teacher leaders believed the discrepancies between the teachers and IT personnel's views of technology to stem from their professional backgrounds, where IT personnel's strictly technology-based aid could not adequately serve the needs of pedagogues trying to integrate technology into a greater framework of pedagogy. This supports the argument for teacher leaders, who understand the needs of teachers in their technological development and who can play much more supportive roles throughout the learning process. Moreover, our data support teachers' varying levels of commitment (Rogers, 2000) and expertise (BECTA, 2003) to the professional development project. This diverse set of skills and commitment demonstrated by teachers as grounds for which teacher leaders could use their various learner-centered teaching methods to meet the diverse needs of teachers.

Because the BCTN project is based on the premise that collaboration produces meaningful learning (Heo & Breuleux, 2011), it was particularly evident when resistance to sharing was found to be an obstacle. Such resistance can be attributed to teachers' traditional views of teaching as an "individual enterprise" (Little, 1988, p. 81) and by the convergence of various other barriers found within our data such as teachers' varying levels of commitment, time constraints and feelings of inadequate self-efficacy. By redefining teacher professional development as a joint enterprise, the BCTN project tackled a barrier that has not been emphasized by researchers working within the traditional education framework. Interestingly, collaboration and peer support were found to mitigate some of the other barriers found to be prevalent in this and other lines of research. For example, in cases where they lacked sufficient IT training, many BCTN teachers relied on each other for support.

RQ3. What are the Elements of Success of a Professional Learning Community in Facilitating Teachers' Professional Learning in Integration of ICT Tools in their Practice?

Based on teacher leaders, one of the major achievements of the BCTN professional leaning community was that by engaging in peer support, several teachers emerged from the project

as leaders. These teachers share their experiences with their colleagues and model proactivity in one's own learning to their students, which in turn can positively influence students' own empowerment (Marks & Louis, 1997). While many studies discuss the development of the advanced technological skills of students (Prensky, 2001) only a few, like the BCTN project, focus on development of their leadership skills through empowering their teachers (Becker & Riel, 2000).

Another perceived success of the community was that teacher leaders demonstrated great improvement in their roles over time. As one of the improvements, teacher leaders learned that their follow up meetings with teachers and weekly school visitations are important factors in teacher leaders development of teachers' support needs and trust. Our data demonstrates that teacher leaders honed their skills as support systems for teacher, ultimately demonstrating more effective communication and support skills over time as a result of teacher feedback. Our data parallels that of Lieberman, Saxl, and Miles (2000), in which teacher leaders acquire the necessary professional skills to serve their roles by doing. The teachers discussed in the project by Lieberman and her research group learned to become better leaders and supporters of their teachers by carefully balancing their roles of leaders and peers, eliciting their principals' support, employing collaborative activities to encourage all teachers' participation. As with the BCTN teacher leaders, teacher leaders in Leiberman's project fed off the needs of the teachers to inform them of the factors they needed to incorporate into their professional development programs. Teacher leaders' abilities to improve their support behaviors will allow for the promotion of teachers to take on these responsibilities, rather than the placement of external individuals unfamiliar with school dynamics.

The next favorable outcome of the BCTN community is that teachers succeeded in gaining an increase in top-down support when principals allocated more technological resources for teacher use. As emphasized in the literature of teachers' professional development, this is important, as professional development project outcomes and teacher experiences are largely dependent on the support they receive from school administrators (Berrett, Murphy, Sullivan, 2012).

Another considerable by-product of the initiative of the BCTN project was the equitable access to learning environments. Teachers found the value of using the ICT tools in classrooms in helping students with disabilities achieve the same pedagogical goals as their peers (TL2). This is consistent with the research analyzing the role of assistive technologies (Duhaney & Duhaney, 2000; Hasselbring & Glaser, 2000). More relevant to the objectives of this study, however, are the project's ability to connect teachers across geographical boundaries. The project encouraged teachers to connect with teachers outside of their schools and school boards, in order to add more diverse contributions to the community's culture of sharing. The use of ICT tools allows schools separated by great distances, which otherwise may not have had such collaboration opportunities, to connect. Although networks created to share information are not new to the education world (Lieberman, 1995), networks built with the goal of support in professional development are not as prevalent.

Finally as one of the main objectives of the BCTN project, creating a framework within which technological integration could be sustained for as long as possible (Wall et al., 2012) was successfully established. While this endeavor is not unique to the BCTN project (e.g., Hall & George, 2000), the means by which the BCTN project sought to achieve this goal are novel. A unique way in which teacher leaders ensured the sustainability of the new teaching practices on an individual basis, was by offering post-teaching feedback, in addition to support during the teachers' teaching experiences. By meeting with teachers after their teaching sessions and reflecting on the experiences while involving simultaneous performance, teacher leader can better deal with any delayed or unexpected concerns that threaten the teachers' continuation of the integration of technology. Many other professional development programs frame professional development as ongoing in order to encourage teachers to continue their efforts once the programs are over (Greeno, 1997; Liu, 2013). While the BCTN framework uses this tactic as well, the practice does not ensure that future generations of teachers adopt technological integration as those of their predecessors. The culture of sharing in the BCTN opened the lines of communication for participating teachers to discuss their adoption of the new practices with teachers not yet part of the program. This leads to creation of curiosity and which in turn advances diffusion of the practices of the BCTN projects among other teachers, which can be explained by Rogers' (1995) framework in which channels of communication, social systems and time are

needed for diffusion of change to occur. The diffusion of change propagates, sustains, and allows for adaptations to be made to integration of technology practices.

RQ4. What are Teacher Leaders' Views of ICT Integration in Education and how Teachers Learn to Integrate a New ICT Tool in their Practice?

The BCTN teacher leaders' views support the current literature citing leadership, encouragement of participation (Ely, 1990) and facilitated collaboration (Liu, 2013) as effective methods in teachers' adoption of technology. Our results specifies the exact types of support effective in fostering teachers' adoption of regular technology use and demonstrate the ways in which these tools can be implemented in professional development programs. Several factors work to overcome the barriers preventing teachers' implementation of technology, such as teacher leaders' modelling of ICT tools' as alleviating teachers' fears concerning insufficient knowledge of technology use, a fear pervasive in the literature of teacher learning (BECTA, 2003; Balanskat, Blamire, & Kefala, 2006) and also in the BCTN teachers' experiences. In teacher leaders' view, the combination of active learning through the facilitation of modelling and encouragement occurring within professional learning communities and its prevalent culture of sharing proves to be an effective and feasible model for teachers' professional development.

Teacher leaders asserted that teachers learn best only if they have access to sufficient modeling of the use of the ICT tools or collaborative behaviors. Our data is in line with prior research that demonstrates modeling the use of ICT tools to be effective at quelling teacher's anxieties over the use of technology by teaching teachers how to operate the tools (Franklin, Duran, Kariuki, 2001). A key component to the BCTN project however, is the combination of modeling techniques with teachers' active involvement. By focusing on learner-centered learning through hands-on involvement, teacher leaders better served the individualized needs of the teachers, as finding in line with other constructivist-based research (Lieberman, Saxl, Miles, 2000). By allowing the teachers to actually see the step-by-step process needed to integrate technology, from the turning on of the tool to the actual integration of the tool in projects, teacher leaders also demonstrate the ease with which the practices can take place, thereby motivating the teachers to adopt the practices themselves. While these constructivist teaching practices have been discussed in the literature

previously, the BCTN project brings forth new knowledge into the ways in which these practices interact to affect learning.

Teacher leaders recognized the creation of a culture of sharing as the main key for teachers' professional development. While various other programs highlight the need of support (Little, 1988; Guhlin, 1996; Schrum, 1999), the acquisition of knowledge is often placed at a higher priority than the development of support networks. Although the development of teacher networks goes against traditional understandings of educational practices (Little, 1988), in the constructivist view, teachers learn best through benefiting from sharing with colleagues within a community of practice or even more efficiently through forming and active participation in a professional learning community with fellow teachers. As collaboration forms the bases of these communities (Floigatis, Nomikou, Naoum & Katsenou, 2012; Stoll et al., 2006), their development is dependent on the development of a culture of sharing. While the relationship between collaboration and teacher communities has been extensively researched (Admiraal, Lockhorst, & van der Pol, 2012; Muijs, Ainscow, Chapman, West, 2011); the BCTN project is novel in its approach, as it demonstrates the role teacher leaders play in the development of the organizations. Although these groups can occur naturally (Wenger, 1998), our data indicates that discourse, trust and learning that develop within the community contexts are much more meaningful when facilitated by a teacher from the group.

It can be conceived that the main factor in the BCTN project's transition from a community of practice of elementary teachers into a more organized professional learning community was the leadership of teacher leaders. Teacher leaders created the platform for optimal teacher learning and support, and guided the teachers in reconstructing their shared vision to include the integration of technology as part of a comprehensive pedagogy. The development of a professional learning community is an important goal as collaborative learning is a venture that is very feasible and can be fostered internally within every school. By focusing on the development of meaningful learning through collaboration, the BCTN have created a model in which collaboration promotes and elicits virtually most other tools necessary for successful implementation.

Another key feature in teacher's learning based on the BCTN teacher leaders and Ely (1990) is the simple but important practice of encouragement by the BCTN teacher leader throughout teachers' learning curves. Heo and Breuleux (2011) have promoted the use of non-evaluative settings and practices as promoting trust, collaboration and persistence within professional development programs. While prior research demonstrates a lack of support to be a barrier in the successful integration of technology (BECTA, 2003), our research highlights encouragement as an integral component of support. This is an important finding for both researchers and practitioners, as teachers are unlikely to communicate to their peers their need for encouragement. Furthermore, this finding aids in operationalizing teacher support, for both future lines of research and professional development initiators.

Finally, peer support, often self-initiated by teachers, was also mentioned by teacher leaders to be a core feature of the BCTN project, contributing to teachers' integration of technology in their practice. The focus of the BCTN project on collaboration could be seen in the actions of the teachers as they collaborated with other teachers across subjects and grades, offering assistance for development of TPACK, even utilizing ICT tools to communicate their experiences. Communities of practices' beneficial effects on peer support have been documented in prior research (Hildreth & Kimble, 2004). Conversely, peer support has also been shown to positively effect teachers' teaching practices (Garet et al., 2001). Our data reinforces the bidirectional relationship between collaborative practices and communities of practice as both sustain and strengthen the other.

Other Discussions

Teacher leaders' claims regarding teacher's adoption of technology parallel the various theoretical frameworks concerning adoption of change processes. Firstly, our data supports Ely (1990)'s 10 conditions for the successful integration of technology, as the BCTN project framework tended the outlined conditions, consisting of: "dissatisfaction with the status quo; knowledge and skills exist; resources are available; time is available; rewards or incentives exist for participants; participation is expected and encouraged; commitment by those who are involved; leadership is evident" (Ely, 1990, p. 299). Teachers were discouraged by their administrations' previous handling of technology integration, which comprised of a lack of IT and institutional support. The BCTN project tended to the

dissatisfaction by creating a new framework within which to integrate technology, that allowed provided them with the necessary resources such as support, and IT training, encouragement for participation, teaching about the rewards of integration, effective and distributed leadership, and sufficient time to progress through the program. Secondly, there are some support for the Hall (1979)'s Concerns-Based Adoption Model (CBAM) theoretical framework in the BCTN teacher leaders perception of the teachers' processes of adoption of technology. Although our research did not focus on the validation of the theory, many of the teachers demonstrated behaviours and needs consistent with the framework. For example, teachers appreciated and sought the feedback of teachers once they began to incorporate technology into their lessons. This is in line with CBAM's refinement level of use, in which teachers adapt their integration of technology to fit their own unique classroom needs. Finally, many of the BCTN teachers' adoption experiences also fit with Venkatesh and colleagues' (2003) framework. The framework's performance expectancy and facilitating conditions' were particularly salient to the teachers' as many were hesitant to integrate technology into their classroom as a result of negative self-efficacious beliefs and low perceived confidence in the institutions' support for the new framework. The successful outcome of the BCTN project and the project's consistency with these theoretical frameworks indicate that it is necessary for barriers to adoption to be overcome and for processes of integration of technology to be supported if teachers are to be successful in their endeavours.

A final discussion point is that the comparison of the professional development framework utilized by the BCTN project with other competing teacher professional programs, demonstrated multiple advantages for the BCTN project. Conclusions can be drawn from teacher leaders' interviews regarding teachers' needs for optimal learning that the self-teaching, group teaching, and top-down approach methods cannot be successful in removing many of the barriers in teachers' adoption of technological integration, such as administrative support (BECTA, 2003), insufficient IT training (Pelgrum, 2001), and feedback (Park & Ertmer, 2008). Problems associated with the self-teaching method, were not present within the BCTN project because of teacher leaders' and peers' support. Furthermore, based on the observation of teacher leaders' the trust that teachers have in teacher leaders cannot be easily gained by administrators in top-down approaches. Top-down approaches could not have elicited the professional learning community initiated and

supported by teachers themselves as within our project, because the top-down framework does not require administrators to fully participate within the program as peers, co-learners and leaders. Finally, although collaborative in nature, the group teaching method does not create optimal contexts for teacher learning either. By removing teaches' learning sessions from the classrooms, and decontextualizing the barriers that teachers face while trying integration of ICT tools in their daily practice , the group teaching method inhibits resource administrators from offering teachers constructive and meaningful feedback, a factor that proved to be effective in the BCTN project. These professional development frameworks are also unsustainable, as they do not engage teachers in meaningful learning. It is not surprising then, that professional development programs to date have been deemed unsuccessful in truly changing the way integration of technology is practiced (Becker 2001; Mann, Shakeshaft, Becker, & Kottkamp, 1999; Reeves 1998; Schacter 1999). The major difference between the BCTN project and various other competing methods is the BCTN project's focus on teacher support and collaboration as all BCTN teacher leaders highlighted the key role teacher support plays in professional development.

Limitations

As a result of the research design of this project, our findings are limited in their generalizability to other lines of research and professional development programs. As design research generally delves into complex, multifaceted issues (Reeves, Herrington, & Oliver, 2005), the outcomes of this study cannot be expected to be reproduced in other programs unless all of the factors present in this study and their dynamic, interrelated mechanisms are present as well. Also the fact that the data from interviews provide information on only the participants' perceived reality limits the generalizability of the results and calls for deeper investigation of the results by stronger triangulation methods. What is lost in generalizability, however, is counteracted by a large gain in detailed information of the interaction, sharing methods, relationships, and teaching methods of teachers and teacher leaders. Such insight promotes evidence-based implementation, practice that has been proven effective in research. The continuous refinement processes mandated by the design research approach will aid future researchers and practitioners inform their expectations and inspire possible methods of overcoming their own professional development obstacles.

Finally, although the results throws a different light on support for teacher professional development, because of the small number of the participants, it is difficult to draw definitive conclusions from the findings and they can be used as results for a plot study for future research on larger scale researches.

Implications

While many of the individual findings of this research are significant, it is the connections between these findings that create the most powerful implications for researchers and practitioners in the field of teacher professional development. The ways in which the various components of the BCTN Project combined to facilitate meaningful learning amongst its participants introduces a new way of approaching teacher professional development. By making support networks the focus of the BCTN professional development program, the developers created an avenue in which many other objectives could be achieved with comfort and efficiency. Using the discussed methods, this study demonstrates that the actual translation of knowledge to practice necessitates supportive environments.

Implications for practitioners

The overarching goal of the BCTN Project is to aid teachers in learning how to effectively integrate technology into the classroom in order to ultimately prepare students for changing realities. In doing so, teachers must be able to use ICT tools as a means to achieving pedagogical and curricular objectives. The Quebec Education Program (2011) outlines "intellectual, methodological, personal and social competencies and communication-related competencies" as cross-curricular competencies necessary for the formation of worldviews, as part of holistic, meaningful education (p. 6). The BCTN Project aims to afford teachers, as ongoing learners, the same form of holistic teaching experience as their students, utilizing methods of student-centered learning and constructivist approach to teaching and learning.

The findings of this research indicate that educational administrators must focus their efforts on teacher education, just as highly as they do their students' education. As reviewed in the literature and also found in our results, teacher practices have powerful effects on student outcomes and therefore investing in teacher professional development is an investment in students' education (Lieberman & Mace, 2008). . Specifically, support networks as manifested through professional learning communities and communities of

practice are effective in fostering learning and practice for teachers. This research creates both a theoretical and practical framework calling for schools to foster teacher communities that promote collaboration, a culture of sharing and support. Furthermore, it calls for principals to support their teachers' leadership roles and for school administrators to focus further resources and efforts into teacher development as the ultimate investment in students' futures.

Implications for researchers

As for researchers in the field of teacher professional development, this research creates a new framework for which meaningful professional development can occur. It shifts researchers' focus from the singular components of teacher collaboration, constructivist learning, culture of sharing within teacher professional development to the dynamic interrelations between all of these components within the programs under a more direct focus of meaningful learning. This work demonstrates a shift into the next phase of research in the ultimate pursuit of evidence-based practice. As educational research is rarely amenable to immediate practice (Young & Rorrer, 2012), this project is significant because it has the propensity to affect both the research community and the community of practitioners. While previous research has demonstrated the importance of support within teacher communities (Miles, Saxl, Lieberman, 1988), our group took the necessary further steps determining the mechanisms that make support effective. Our line of research will aid future researchers to experiment and manipulate professional development and learning factors to further optimize student outcomes. Specifically, our findings also further elucidate teaching and learning processes more generally by delving into teacher-teacher support behaviours and collaborative knowledge acquisition, independent of the integration of technology context. Our study outlines the challenges to be expected in future experimental professional development programs concerning technological integration and the ways in which these obstacles can be overcome. It is crucial that researchers continue to investigate the operationalization of theoretical frameworks such as TPACK in order for teachers to be assisted in development of their technological knowledge within their pedagogical practice of the content they already teach to eventually achieve their goal of better engagement of the new generation of the learners. Within the educational psychology of technology integration by teachers, this entails further analysis of the role of support and collaboration in professional development and the effect these factors have in student outcome.

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Appendices

Appendix A. BCTN Interview questions for Leader Teachers

Q1. Brief factual questions

Q1.1. How long have you been teaching in the school board, in your current position?

Q1.2. Describe what you do as a RECIT animator/BCTN Teacher Leader.

Q2. Questions on BCTN Project

Q2.1. Please describe the BCTN project in your own words.

Q2.2. What are the main features and characteristics?

Q2.3. What are the success

Q.2.4. What are the challenges or problems?

Q3. Questions with scenarios of common issues and challenges in teacher education

Q3.1. Scenario1. Kate is a teacher new to BCTN and she wants to do a project with ICT in her class. She has been teaching for over ten years, but has barely used computers in her class. She wants to learn about ICT tools she can start using with her students, but there are some issues inhibiting her. First, she is a bit nervous about all the tools available and all the new learning. Second, she is worried about the little time she has to learn them. Finally, she feels that the methods of teaching she has been using so far are still efficient in terms of students' learning, class control and time management. What are the challenges in this context? Describe your approach to getting Kate to participate in the BCTN Network.

Q3.2. Scenario2. Maureen is a cycle-3 teacher who has been in the BCTN Network since the beginning. Last couple of years she has had her class involved in collaborative projects using digital story telling, voice threads, etc. She is quick to learn new tools, and is confident in using them with her class. What challenges do you see in this situation? What could be her next steps in the BCTN network? What would be your suggestions to her?

Q3.3. Scenario3. Jane, a cycle-2 teacher, wants to do a collaborative project with Blabberize in her class. She is not experienced enough to facilitate student group activities with ICT. What issues/challenges should be considered as she designs and implements her project? (e.g., grouping, responsibilities, classroom management, assessment).

Q3.4.Scenario4. David is the new principal at an elementary school. After hearing you talk about the BCTN Network, he contacts you to get his school involved. He wants to start with one teacher, just to see how the network operates. He says that other teachers may get involved later if things work out well. He asks your advice on how to proceed. What are the challenges in this context? What would be your suggestions to David?

Q3.5.Scenario 5. What would be your response to these situations? (to avoid/solve these problems)

Q.3.5.1.Suzanne has prepared her content in digital format, to be presented to class on the smart board. The computer freezes; she does not know what the problem is. After a few minutes of trying to restart the computer, etc. she gives up, and decides to present the material without the smart board.

Q.3.5.2 Michael has started using voice thread in is classroom. Students take turn in recording their voice but at the end when he listens to the voices he notices that due to the Internet failure, some of the sound has not been recorded, or there are cut offs. He feels helpless, as the technical support for a better connectivity in school is not available.

Q.4. Questions on ICT tools and teacher learning

Q.4.1. What is your view of ICT use in education?

Q.4.2. Describe how a teacher learns a new ICT tool (i.e., selection of a tool; learning resources (e.g., guidebooks, online tutorials, friends/colleagues); learning process; trouble shooting).

Appendix B. Interview Transcripts

Interview with Teacher Leader 1

Interviewer: How long have you been teaching/working, in the school board, in your current position?

Teacher leader 1: Ok, I've been teaching for 15 years and this is my first year as the RECIT Animator. Always in the same board and the same school.

Interviewer: And grades?

Teacher Leader 1: Anywhere from 2 to 6

Interviewer: Describe what you do as a BCTN Lead Teacher.

Teacher Leader 1: My major work is to help and support teachers to implement any technology project in their classrooms also I've seen and learned that ....my role is also to support the consultants that we have here and how they try to integrate technology into subject areas. We're trying to see that technology is not an end by itself but rather part of the subject areas.

Interviewer: and you learned that you learned that your mandate is also to teach the consultants? You didn't know that to start with?

Teacher Leader 1: It was not clear. I thought it was more with the teachers to the students but what we realized is that the fact that training days and pet days are so few and far in between that to devote the whole pet day to just learning technology and one of the things that I strongly believe technology has to be integrated into the curriculum why would not be integrated into subject area and what we realized is that consultants'…some are understanding of technology, basic levels but as I start showing them different possibilities their expertise kicks in

Interviewer: and you learned from them also?

Teacher Leader 1: Absolutely

Interviewer: Please describe the BCTN project in your own words.

Teacher Leader 1: I think the BCTN project is really about building capacity in teachers to learn first of all how to talk to each other and collaborate with each other which is something that we take for granted, we assume that teachers did it naturally and after the first year of the project we noticed that that's not what happened and so through 5 years of working at it we realized that it just takes time to develop. So I think that is one of the primary gains of the BCTN project and that's how I see the project. It's a project that encourages the collaboration and the technology is there but our primary purpose is the collaboration, talking and learning from each other and the technology projects kind of come from that.

Interviewer: So what would you say of the main features of the BCTN project as you experienced it?

Teacher Leader 1: so I think that is one of the primary gains of the BCTN project and that's how I see the project. It's a project that encourages the collaboration and the technology is there but our primary purpose is the collaboration and learning from each other and the technology projects kind of come from that.

Interviewer: What are the successes?

Teacher Leader 1: I think the major success in different schools, first of all if I take St. John's, cause it has been involved for 5 years, I've seen teachers who come together that maybe wouldn't normally have worked together. Basically from grade 1 up to grade 6 teachers are collaborating together, the other thing is that I've seen teachers who have really become leaders who would have never ever consider themselves as leaders. I think there are some great examples of teachers who have stepped out and taking up the role of training other teachers. One of the other advantages I see especially with some of the new schools this year is that we started with 2 or 3 teachers in the new schools but as we've gone out, those teachers have gone back to their buildings and talked about the projects we have actually brought in a few more

teachers into the training sessions that we've had so it's creating of interest, so even though they are not technically involved in that release time they're very interested in to sit with us and talk to us.

Interviewer: Other successes?

Teacher Leader 1: I think the idea of starting discussions about pedagogy in technology at the school board level; I think that's huge, where we've gone. We still have major challenges in terms of trying to bring together pedagogy and technology. That's a mountain that we need time and a lot of patience but I think just helping people to realize that it has a purpose, I think it's been the key thing, especially in this level.

Interviewer: What are the challenges/problems?

Teacher Leader 1: Major challenges is time with a lot of teachers, you know they are often very interested in doing something but then time becomes a factor for them. Other challenges are perhaps not the same level of commitment I think, they hear better projects they have the training on the tools, but then the follow-through is not there. Technological challenges are huge. When you think of this as, I mean I would have liked to see this goes further with online-sharing this year. Unfortunately we have a lot of problem with the Internet speed, our bandwidth is an issue, and some of those uses were not live, which we had thought about using were just not possible, so I think we've worked out some of those issues by now but still, and also in some schools I think access to the technology has been a huge issue. It's not set up. And I think that's another thing we learned at St Jean's, is that you had to get the technology into the hands of teachers couldn't be locked up in a lab in a cupboard whereas that's the way it is in some of our newer schools and we are starting to go and say that look these are the lessons we learned and if you put them into the hands of teachers to share, they'll use it more.

Questions with Scenarios/vignette

Interviewer: Scenario 1. Kate is a teacher new to BCTN and she wants to do a project with ICT in her class. She has been teaching for over ten years, but has barely used computers in her class. She wants to learn about ICT tools she can start using with her students, but there are some issues inhibiting her. First, she is a bit nervous about all the tools available and all the learning it involves. Second, she is worried about the little time she has to learn them. Finally, she feels that the methods of teaching she has been using so far are still efficient in terms of students' learning, class control and time management. What are the challenges in this context? Describe your approach to getting Kate to participate in the BCTN Network.

Teacher Leader 1: Well I think first of all there is that idea, the fear and the anxiety on the teacher's part, not knowing where to start, how to fit it in, seeing it as something else added on to an already busy schedule, probably an isolation, not having any other teachers there to be mentor to be a guide her, to walk her through, so what she can do she will probably be comparing herself to other teachers who are doing great big fantastic projects and that's what she is thinking would be her goal to do; feeling that the support is there and also not knowing about what tools to use to fit her purpose, I think oftentimes teachers are who are unclear on how to integrate them, they just not know what they could do, or taking that step that becomes part of the whole lesson planning process.

Interviewer: What would be your approach to encourage Kate to participate in the BCTN Network?

Teacher Leader 1: I think first of all talking to her and encouraging her that even starting with something very simple, you know that whole concept of baby steps is really important, I would encourage her to take a look at what she has already been doing in her classroom and then reflect on can you pick one area that you could see adding an element of technology into, and then also reminding her that there are other teachers out there that are in the same position as she is, that she is not the only one that's feeling that she's new and, encouraging her to not to not compare herself to others, and also encouraging her that the support structure is there and

if she gets involved there are people there. Also we would start conversation with the administration to look in to how at how we could make the technology available and facilitate that process.

Interviewer: Scenario 2. **Maureen is a cycle-3 teacher who has been in the BCTN Network since the beginning. In the last couple of years she has had her class involved in collaborative projects using digital story telling, voice threads, etc. She is quick to learn new tools, and is confident in using them with her class. What challenges do you see in this situation? What could be her next steps in the BCTN network? What would be your suggestions to her?**

Teacher Leader 1: If we were to keep the same structure as the BCTN that we have now, I think the challenges would be allowing that teacher to see that there's potential for growth, potential to learn new things from others, and I would be encouraging her to start to become the mentor, looking at "maybe you can buddy up with a new teacher and share some of your experiences". That whole idea of sharing experiences is very important because we learn from each other and I think would be very important.

Interviewer: Other next steps that you see for her?

Teacher Leader 1: In terms of the experience? I think encouraging the teacher to look at what they are doing, are there other tools that the teacher can kind of examine, there are always different kind of technology coming out, encouraging them to perhaps if they have made one voice thread, one digital storytelling, think of how they can extend that project and to connect to others.

Interviewer: Scenario 3. Jane, a cycle-2 teacher, wants to do a collaborative project with Blabberize in her class. She is not experienced enough to facilitate student group projects with ICT. What issues/challenges should be considered as she designs plans and implements her project? (For example: grouping, responsibilities, classroom management, and assessment).

Teacher Leader 1: Well I think one of the first thing she would want to do be to talk to somebody who has already done they type of project before, perhaps have that teacher come in and model the lesson or use the RECIT in the board who would come in and also model a lesson, looking at examples with the students, Encouraging her to talk about what the structure and features are of that tool, looking at the purpose of using that tool, basically not trying to do it in isolation and also not trying to become the expert in it but showing the kids the basics, learning the basics and allowing kids the time to explore the tool and test it on their own.

Interviewer: Other issues that you see?

Teacher Leader 1: Well I think also with that particular teacher, it would be important to have her aware of what the tools would be that she would need to do this type of project, I think the process also during the project is really important, understanding that the technology is that final step, having to do all of the reading, writing with the students, before they get the time in front of a computer, that's key with any technology.

Interviewer: Scenario 4. **David is the new principal at an elementary school. After hearing you talk about the BCTN Network, he contacts you to get his school involved. He wants to start with one teacher, just to see how the network operates. He says that other teachers may get involved later if things work out well. He asks your advice on how to proceed. What are the challenges in this context? What would be your suggestions to David?**

Teacher Leader 1: I would definitely discourage just one teacher, I think it's key that you have at least 2 to 3 teachers from each school because at the beginning the teachers are often shy, they haven't really developed that community feeling with the other teachers in the project, so at least if there are 2-3 teachers in their own school they can reach out to them for support and talk about, you know, talk about issues and frustrations. So that would be really the key.

Interviewer: Other suggestions to David?

Teacher Leader 1: perhaps encouraging certain incentives for these teachers whether it's through common spares, scheduling in terms of allowing them that community time in their building, whether by saying that if you do this project we will provide you with the support in terms of the technology tools, basically as administrative setting up the conditions for successes for these teachers.

Short Scenarios.

Interviewer: What would be your response to these situations? (To avoid/solve these problems) (a) Suzanne has prepared her content in digital format, to be presented to class on the smart board. The computer freezes; she does not know what the problem is. After a few minutes of trying to restart the computer, etc. she gives up, and decides to present the material without the smart board. What would be your response to this situation to avoid or solve the problem?

Teacher Leader 1: Well I think first of all I encourage the teachers to always have a back up plan, always be prepared and also be willing to say to the kids "Oh well it's not working today, we will try again another day", one of the things I always say to the teachers is that technology is not always smooth, and reliable and that's one thing that's 100% guarantee, but you always have to be prepared to go with that...and I think that's what's the important lesson in technology and that's what the kids need to learn about technology too, learning how to be flexible.

Interviewer: (b) Michael has started using voice thread in is classroom. Students take turn in recording their voice but at the end when he listens to the voices he notices that due to the Internet failure, some of the sound has not been recorded, or there are cut offs. He feels helpless, as the technical support for a better connectivity in school is not available. What's your response to this situation?

Teacher Leader 1: What would I encourage him to do, or?

Interviewer: What would you suggest to avoid or solve the problem?

Teacher Leader 1: Well, again I would suggest that he'd try it again another day, perhaps trying another computer, that become the issue in our board with our experience trying another time of the day, certain time of the day the Internet is stronger than others, so it might have just been a glitch, try to see and encouraging him that it doesn't have to be perfect the first time, that's the first try, ask the students to re-record, they won't mind doing it.

General topics

Interviewer: What is your view of ICT use in education?

Teacher Leader 1: My view in general?

Interviewer: Yeah.

Teacher Leader 1: I really see it as an integrated part of learning, it's just another type of tool, It has to have a purpose, you can have as much technology as you want in a classroom, if it is not used for a purposeful activity then it's a waste of time .I think also it has to be motivating for the students, I think the technology really is the end product, learning is a process, and what happens is that you still have all the skills that go into creating and using as ICT tools; you still have that communication, collaboration, the reading, the writing. When kids work in groups using technology, sure one of them may have a problem but that they still have to talk together, to try to problem solve together, they also have to communicate clearly what they like to see, to compromise, being a very important lesson. I really see that technology is that it can't be that you know flash, you really have to look into what the product is, you can have a really fancy, I'll give you an example, PowerPoint, a very fancy PowerPoint, it's got all kind of colors and animations, but if the content is not there that's useless. And so that to me the major part of technology is that it really comes down to the key aspects of your purpose and your audience also. You know you can prepare something for a

grade 1 student but if it is not appropriate for him, then you've missed your mark. So to me that's the essential element.

Interviewer: Ok now I think you've become a specialist in helping others who learn about ICT, as a RECIT animator.

Teacher Leader 1: Yes, that's the role

Interviewer: Describe how a teacher learns a new ICT tool (i.e., selection of a tool; learning resources (e.g., guidebooks, online tutorials, friends/colleagues); learning process; trouble shooting) What do you see as key ingredients in to that process? What happens process- wise and tool-wise,[and there might be different cases as not everybody learns the same way] but what happens when a teacher learns a new ICT tool?

Teacher Leader 1: Well, I think it's very exciting and motivating for them but initially there is a lot of fear and that has been the case for all the classrooms that I have been in so far this year. The fact that I'm willing to go there and either model something for them and their students really encourages them to try it, the fact that I take my time and walk slowly through the steps and repeat the steps as needed. Often they'd say, the teachers would say no, no I know I am stupid, I know I just don't know this, and it's really encouraging them to say no you're not, it's just that you are learning a new tool. So you're fabulous teachers, you got all of that, it's just really...you almost become the cheerleader for them, that just encouraging them that they can do it. And you've got teachers who are technologically savvy also but are missing the other parts

Interviewer: You see them?

Teacher Leader 1: Absolutely, very much so. It's almost like a little bit of attitude they give you, at first, Oh it's ok, I can do this but then they all say to you that well when I bring the computer in the classroom it's chaos with the kids and that I'm running all over and then you ask them did you have them practice, did you show them what the tool was for, did you talk about purpose and audience and all of that, and often the answer is no, so they hear the latest tool or the latest internet site say and then they want to try it because it's cool but there's no pedagogical value to it or the other option is that oh it's neat look what we've created but they don't know how to evaluate that, so tying elements together, well they created they know they finished their podcast, they finished their Blabberize, it's done and it looks complete but how do I say that one is better than the other. So it's very interesting, you see the people who are very nervous and then you see people who are confident but are missing that structure underneath.

Interviewer: Now because you are a RECIT Animator, I'm getting into a bit more details, because I am curious about how you see the dialogue that you are having with the teachers, we were talking about Kate doesn't know much about the tools, you're presenting the perspective that she needs to focus on what she wants to achieve, purpose first and then to choose the tool that would be appropriate, I guess you're the person to help make that connection, but isn't it true also that teachers who don't know about the tools needs to see what the tools are? So there is a kind of dilemma here. It's easy for you to say, give me a purpose and I'll show you what tools are appropriate but someone who doesn't know the tools need to know a bit more about the tools so it's kind of chicken and egg situation, I'm sure you deal with daily.

Teacher Leader 1: Absolutely. And I think probably one of the best ways is, that we've looked at especially in BCTN project, is really by exposing them to a few different types of tools and then really ask them to reflect on what ways could I use this. I as a RECIT here started a technology community where I have one representative from each school and my first session with them was a half-day which was very much based on philosophical discussion behind what we should use and most of the feedback was this is great but we'd like to see some tools, so we can go back with them so my second session was again looking at technology and we watched some videos then what I did was that I took them through a series of tools, I specifically chose

tools that they could use and then I reflected with them as we were going through and using the different tools well how could you use this with your students in your class, could you see other possibilities and it's almost like that you see that lights go on, they say. "oh, Audacity! You mean I can record my instruction and then send it to the students?". That was really powerful, so they do have to see what's possible in order to make the link to their activities and it is a fine line, because you don't want to just become a well here's this tool, this tool, this tool, because then they learn a little bit of everything but nothing really well, so what I've tried to do is pick two or three to show them and then I've actually done this with kindergarten class where they wanted to have the kids create a podcast for Valentine's day. So I went there with two teachers and I sat down and showed them you know garage band, how to record and then we talked about how you can bring in a picture of that and they said ok that's good, that's for me for next year. I'm going to keep it basic. So they were able to verbalize, so I tried to show them different possibilities with different tools that they also have available to them. I tried not to bring in too many tools that they don't have access to or software that they don't have access to. Like we've encountered a few issues with Blabberize and some of the voice thread because of the bandwidth so I tried to show them other ways that they can do it, you know. If this doesn't work for you, then try this tool.

The follow up of interviews through email

Describe situations that represent one of the biggest challenges/successes you have faced as a BCTN leader.

Teacher Leader 1: Some of the biggest successes have included: Seeing teachers become excited about technology in their classroom, Watching teachers take risks and embarking on small projects with their students, Starting to see teachers sharing ideas with each other and supporting each other through email Engaging face-to-face sessions where teachers are not afraid to share with each other, the emergence of students as the trainers .

Challenges: Technology not working properly, not enough time, technology not easily accessible, getting responses from people.

Give us an example of ICT use by a teacher that you find particularly good or exemplary from your perspective.

Teacher Leader 1: A new teacher this year wanted to have her students interview local hockey stars. She asked the kids to prepare questions, practice and then interview the person. She taught them how to record using audacity and then had them record the interviews. The students then used the iPad to create music to go along with their interviews. After completing the process, they then listened to each other's work and reflected on the quality of the work. A great example of integrated technology through the process and for a real purpose

Interview with Teacher Leader 2

Brief factual questions

Interviewer: You are now a principle at school?

Teacher leader 2: yes this is the third year I am the principal.

Interviewer: Prior to that?

Teacher Leader 2: I was a teacher principal in Orland and then before that...I started at school board since 1999 started off as a substitute teacher while I was getting my degree and I worked for 8 or 9 years as a teacher.

Interviewer: Describe what you do as a BCTN Lead Teacher.

Teacher Leader 2: Facilitating different people from different schools to do projects together using technology which was a very important subject for me cause I love technology and so I thought it's a win-win situation for all, for the kids, for the teachers, for myself, cause it is easy to say, you know, let's do this project.

Interviewer: Please describe the BCTN project in your own words.

Teacher Leader 2: Networking, with people who are just as crazy about technology as me.

Interviewer: And what were the main successes and challenges that you saw in the process?

Teacher Leader 2: As a leader, one of the major challenges that I saw was different levels of commitments, that I had to learn that not everybody does it mean that everybody in the group, they all going to participate to the same extent, so I had hard time dealing with that because I was crazy about the project, so how could everybody else wasn't? And why it takes you three weeks to answer my email? So as a leader I had a hard time with that. You have to understand that not everybody is going to commit the same way and I had a hard time with that.

Interviewer: Do you have any idea why that was the case?

Teacher Leader 2: yes, definitely time factors, teachers are busy, the cycle three ...end of year exams, so yeah people are busy and some people when they join projects like that, or networks, they join for various reason. They do not join always join gung-ho like me, they have the lurkers and some that are there on paper, so that was a good learning experience for me.

Interviewer: So you learned something from that?

Teacher Leader 2: for sure, you know here when I have staff meeting, they do not have a choice, they show up, I have 25 teachers and they are all there and when there are some projects, well they raise their hands I send them regular emails so they have to send me back, it's part of their jobs and if they don't I can even go through the route of insubordination. This is not the same approach, it's not the same mandate for sure, so that I found hard, you know? Yeah definitely I learned from that.

Interviewer: So what would you say of the main features of the BCTN project as you experienced it?

Teacher Leader 2: Networking, for sure networking, professional development, students' success. When I was a teacher in BCTN, one of the main problems I found, I would set my rubrics and I would show the kids, you have to do this to get this point, you know how rubrics go and the when it was time for me to evaluate the project, up and above and beyond what I had asked, I asked them for ten things and woops they would give me 25. And so everybody got A or A+ in effort or A or A+ in enthusiasm and the quality of the work, like even special needs didn't stand out. Maybe they did not give me in-depth work like other students but still they were there.

Interviewer: They achieved something; you mentioned engagement motivation and also academically more serious work?

Teacher Leader 2: well because some of the special needs kids have problem with the printing or their writing, you know for some of the kids, just writing their names without looking messy on a paper is a big thing, and then they get on the computer and they are on the same page as other kids, so they are not on the same level.

Interviewer: and what were the successes that you saw in BCTN?

Teacher Leader 2: The projects, Just to see the kids' faces when they were doing various projects even there is one time when I visited [Proper name] School. I visited one class and her other classes were across the hall and they would say "are you going to see us, we can show you our projects, just the enthusiasms from the kids, you know that's number one, Students' success. Whether it is a small or bigger project. And even to see like for example [Proper name]? I was working with her and I was in BCTN as a teacher, she was starting with email and to see her a couple of year flourish like that, that's a huge success. The learning process of the teacher was good.

Questions with Scenarios/vignette

Interviewer: Scenario 1. Kate is a teacher new to BCTN and she wants to do a project with ICT in her class. She has been teaching for over ten years, but has barely used computers in her class. She wants to learn about ICT tools she can start using with her

students, but there are some issues inhibiting her. First, she is a bit nervous about all the tools available and all the new learning. Second, she is worried about the little time she has to learn them. Finally, she feels that the methods of teaching she has been using so far are still efficient in terms of students' learning, class control and time management. What are the challenges in this context? Describe your approach to getting Kate to participate in the BCTN Network.

Teacher Leader 2: She is a bit nervous about all the tools available and all the new learning, I would say "Minute, Ponpon" take a deep breath, you're not going to loose them all, and it's not just ICT. I would talk to her and see what cycle she is in, and what she is teaching, is she doing a novel, poetry, and then incorporates the project into what she is already doing. Don't reinvent the wheel and don't do a project based on technology but what are you doing now that you can do differently. That's what I would do.

Interviewer: So your approach will be to reassure her and to center it on what she is doing pedagogically?

Teacher Leader 2: yes, well then once we know that she is doing poetry, offer her a few examples, show her some examples and maybe buddy her up with somebody who's doing the same project or who has done the same project.

Interviewer: What about views or feeling that the way she is teaching now is good enough?

Teacher Leader 2: Well there is nothing wrong with her teaching, I wouldn't make her feel that she is not a good teacher but this would show her you know, lets' just do it, a new project and get your kids engaged and focus on the kid's learning and not her teaching. I will make sure that I will be there for her and not leave her alone, that's why I joined originally BCTN because I was the only technology person in my school back then, and I used to keep computer cards in my classroom because nobody wanted to use computers like the laptops, so I needed somebody to be like that... The feeling that you are not alone

Interviewer: Scenario 2. Maureen is a cycle-3 teacher who has been in the BCTN Network since the beginning. Last couple of years she has had her class involved in collaborative projects using digital story telling, voice threads, etc. She is quick to learn new tools, and is confident in using them with her class. What challenges do you see in this situation? What could be her next steps in the BCTN network? What would be your suggestions to her?

Teacher Leader 2: Well you do not want her to be stuck there, right? You want her to go ahead, to go forward maybe have her not necessarily as a lead teacher but definitely use her expertise and have her branch out throughout her school or give her Kate who she could help her out, you know, use their expertise. Not everybody could lead the group but definitely everybody can mentor

Interviewer: yes, so put her in mentoring situation?

Teacher Leader 2: to take some responsibility for teaching and mentoring other teachers . And give her maybe a challenge, you can say, "you're quick to learn new tools, I've heard about whatever this tool, could you find more about it". So use her expertise for sure. Well I see, you're used to something continue redo similar things you know, so you know voice thread, let's continue using voice thread, digital story, you will continue that. Not branching out to use different tools. Maybe also the feeling of not getting...Not that we would give the support but worry that oh they think I can do everything even herself, she'll do technology one day and not thinking about the glitches and whatever as she is so used to using it. That could be a challenge.

Interviewer: Scenario 3. Jane, a cycle-2 teacher, wants to do a collaborative project with Blabberize in her class. She is not experienced enough to facilitate student group activities with ICT. What issues/challenges should be considered as she designs and

implements her project? (e.g., grouping, responsibilities, classroom management, assessment).
Teacher Leader 2:Yeah, that's a big one, not experience enough, depends on how her classroom management is. You know, you don't have to all be on the computer at the same time. She could pull out kids. I did this with [Proper name], because she needed help, I was reading stories to her class, she was pulling the kids out and doing a voice thread, just to show her how to do that and then she got a student teacher. So I could be away, I didn't need to hold her hand and that's how we started it off, but definitely that could be one as a lead teacher, as a BCTN leader go there and show her the possibilities, and suggest that she can maybe select one or two kids at a time at recess, it does not have to be during the class time, and again show it and model it to the keys and chances are that they'll be quiet and want to listen, they are curious so they're like "what did you do, what did you do?" So after a while with [Proper name] the kids were quiet, somebody was recording in the class and everybody else were ...and it shows the kids to respect and listen to others
Interviewer: It's an opportunity to learn.
Teacher Leader 2: Absolutely, in more than one way. Yeah I guess it would be to sit down and see where her, like where is to facilitate, is it classroom management like I said before, Is it cause you have only one computer, is it her schedule, does she meet that group for an hour a day based on 8 days rather than 5. But it's do-able; everything is doable.
Interviewer: Do you see anything about assessment that might be…. ?
Teacher Leader 2: I don't assess the final project but the process, or the written work behind it and maybe the first time you don't have to assess, you know get the kids on board and comfortable and then try assessing, you don't have to assess everything .
Interviewer: Scenario 4. David is the new principal at an elementary school. After hearing you talk about the BCTN Network, he contacts you to get his school involved. He wants to start with one teacher, just to see how the network operates. He says that other teachers may get involved later if things work out well. He asks your advice on how to proceed. What are the challenges in this context? What would be your suggestions to David?
Teacher Leader 2: I'd congratulate him; for sure that's a good thing. I would facilitate the connection of the teacher with the group for sure and talk to David a lot about the support that you have to give as a principal, because if you are not for the technology, don't even send your teacher, if you are not going to supply the computer or the smart board or whatever the teacher wants to do, *"tu vas mettre les batons dans les roues"* if you are not going to be cooperative and supportive then don't even bother. You have to be supportive, not push it but if you're there and you're open to getting new software or release time or...that's going to be really important for him to implement if he wants to have success for her teacher. For a teacher to want to do that, take it, take it and run. We have a lot of teachers that stagnate, that are stuck there, have been doing this the same way for five years or ten years or thirty years, they are not really curious, they go to professional development because they have to. If you have a teacher that comes to you take it and run.
Interviewer: What else do you think of in terms of principals' roles?
Teacher Leader 2: Use that opportunity to show your teachers that somebody is doing something, the sharing amongst each other, that's a good networking opportunity within the whole school, so that's a good thing too. But again you have to have support; it's nice to see a teacher wants to join but if you not going to be behind then and give your support then...
Interviewer: Short Scenarios. What would be your response to these situations? (To avoid/solve these problems) (a) Suzanne has prepared her content in digital format, to be presented to class on the smart board. The computer freezes; she does not know what the problem is. After a few minutes of trying to restart the computer, etc. she gives up, and decides to present the material without the smart board.

Teacher Leader 2: Laugh about it because it is going to happen. So don't get too upset. Do your lesson there because you don't want your kids to be waiting but the figure out why the computer was freezing. You know if it is everyday then get it fixed. If it's once then don't start crying, I've seen that teachers are very upset because the technology is not working and it's gonna happen. So do what you have to do, but don't let it control you and don't let it get you down, because it is going to happen. I went to [Proper name] for a presentation and I was supposed to do Internet, Web.20 and the room they put me there were no connection so it's going to happen. It's going to be a question of attitude, if she freaks out and says, "Oh that's it, I'm not doing it again" you know... You have to expect it with a with a grain of salt and try it tomorrow

Interviewer: (b) Michael has started using voice thread in is classroom. Students take turn in recording their voice but at the end when he listens to the voices he notices that due to the Internet failure, some of the sound has not been recorded, or there are cut offs. He feels helpless, as the technical support for a better connectivity in school is not available.

Teacher Leader 2: The internet failure...well if he is doing it on wireless I would say get on to the plug right away and voice thread is fine for that, because once you pictures are downloaded you can record over and over again until you're satisfied just keep doing it. Michael I assume is a teacher, so he is recording the kids so the kids enjoy that and let the kids be the judge if they are satisfied or not. You know you can't be perfect, you can't expect that you going to do like your first project be perfect. Don't set your bar too high, be realistic and let the kids decide if it is good enough or not, they'll laugh about it and definitely talk to the principal to see where he can get a better connection but if it's the internet problem it's because of the wireless I assume get them plugged directly.

Interviewer: Sometimes it has to do with the traffic.

Teacher Leader 2: but there is always a way around it. You know take your Mac record the voices using the garage band and go home and do the transfer. Again it's a question of attitude, don't panic, that's why you have a BCTN, call your colleague and say, "Well, what would you do?".

General topics

Interviewer: What is your view of ICT use in education?

Teacher Leader 2: It's there it's not going away. It's very important. If you look at smart board and the Internet and what's there for the kids, more and more they will be accessible, it's definitely a good learning tool.

Interviewer: And in what ways you see it as good learning tools?

Teacher Leader 2: well just to get the kids engaged. We keep talking about the drop off rates right? Because the kids are not happy in the school. If they are doing something like that and they like it, not saying that because of ICT they are going to stick longer but it could be just another factor that keeps them there. So definitely yeah, the student engagement for sure, If I was still a teacher, definitely I will keep on my toes what else I can do, what else I can show them and they can show me, so that's a very positive...

Interviewer: Describe how a teacher learns a new ICT tool (i.e., selection of a tool; learning resources (e.g., guidebooks, online tutorials, friends/colleagues); learning process; trouble shooting) .

Teacher Leader 2: It depends on their learning style. For me if you give me a guidebook, I wouldn't read it, if you take 10 minutes to show me then I have an idea, I'll play with it. Hands-on .

Interviewer: If you were back to BCTN leadership role would you take a diverse approach? Teacher Leader 2: Well we did a lot of little workshops to show them voice thread, Blabberize, all of that ... to have someone in the front showing and having everybody on their own computers, I think that was the best way, and from there you saw that this one went way

ahead, that you are still on page 2 and they are on page 9 and then the other ones are struggling and helping each other out, so I thought that was the best...someone in the front is showing so you have the model you have the auditory and you have the visual and then they are doing it themselves, the hands on , I thought that was the best way, cause if you just send them the link and say just check it out, most won't, like I said, if you give me a guide, I won't read it .

Interviewer: What are your views on online sharing, because this is remaining a challenge for BCTN project for example a kind of mentoring or sharing of the problems and solutions online ?

Teacher Leader 2: you know what? It's no different than in the school, in school too a lot of teachers work in their classroom with the doors closed and they don't share. I remember going to one school one year and asking can I have some ideas of where you are going with that group, cause I am teaching the same thing to another group and I was told "No, *arrange toi"*, so I was like Ok. So there is no difference online or face-to-face, it's in a different location but the ones who share, will share and those who don't want to share, they will never get there. The same phenomenon.

Interviewer: What do you do now as a principal to move out of that situation when there are not enough sharing solutions?

Teacher Leader 2: I'm not finished my first year here, but when my teachers go on workshops, when we have our staff meetings, I ask them to report back. They don't think it's very funny, some of them enjoy it some of them don't, so when we have one male teacher, one female teacher we went here we learned about this and that, you know two minute presentation, but at least it shows the others that they went to a workshop. So for professional development they got the extra resources and when my teachers go out to workshops I tell them get a resource book and I will pay for it and we will put it in a resource library, cause some of them are arts, some of them are special needs, etc.... that's how I try, baby steps!

The follow up of interviews through email

Describe situations that represent one of the biggest challenges/successes you have faced as a BCTN leader.

Teacher Leader 2: There are many. The biggest challenge and success is the level of commitment. Many participants are new and proceed with baby steps. They progress and get more and more into the project. Some are really into it and their participation is amazing and overwhelming right from the start. I found it difficult to deal with those who couldn't commit. That in itself is a challenge. I had a hard time dealing with people who joined the project but were not as committed as I would have hoped they would be. Why did they join (and stayed) if they didn't want to commit? They are at different levels of competencies and another success is to see them learning from each other and to see them going through their process and make huge progress. Other successes are the exchanging of information, projects, rubrics and teaching materials. Another big success is the creation of a network and building friendships.

Give us an example of ICT use by a teacher that you find particularly good or exemplary from your perspective.

Teacher Leader 2: They are all good! What is amazing is we show each other our projects and from there others create a similar project s but with a twist of their own. All projects on the Web 2.0 sites are amazing. It's a wonderful way to add technology within the classroom and use the QEP. Voice thread, Blabberize, iMovie, Moviemaker, animations, Smart board activities etc. projects are mind blowing.

Interview with Teacher Leader 3

Brief factual questions

Interviewer: How long have you been teaching/working, in the school board, in your current position?

Teacher leader 3: So my name is [Proper Name] and I have been teaching in Riverside fulltime this is my 6th year as a teacher and I taught all levels from k to grade 6, it's my second year full time at [Proper Name] and that's where my permanent position is, and before that I had taught for two years as a substitute teacher with part time contracts.

Interviewer: Describe what you do as a BCTN Lead Teacher.

Teacher leader 3: well this is my first year as lead teacher and I know the format is a little bit different than it has been in the past years , so basically when the project started in September we were there kind of just to help teachers, what the project is about and our role to present them with different software and the projects that they could do with their classes and then from there we went with interest groups to actually train them with the software and the projects and then what we started doing is that we go into schools and we act as being a set of extra hands to help teachers in the classroom, because it's always good to have...especially when you've just start off and you are not sure about the glitches with the technology so we just go to schools, we are extra bodies to support them when they are working with their class

Interviewer: You said, " affinity group or interest group?" The interest is about what?

Teacher leader 3: What we tried to promote in teachers about technology is that we do not ask them just to use it , we are trying to show them that based on what they are already doing in their class, the technology can complement it. So if there are teachers who are looking at the graphic novels and they want to do comics stuff, they would always have to do it by hand, so we train them to do use Comic Life. Or teachers with just simple Audacity, we told teachers when you are doing presentations with your kids it's just nice for them to hear themselves talk, so we train them quickly about this and they're recording as they're presenting. So by interest, it went with what they are teaching, their pedagogy and then integrating the technology as the final step

Interviewer: And when you go to schools alone, or the three of you, or the two of you?

Teacher leader 3: We try to go the three of us but obviously Teacher Leader 1 has to a lot to do in the school board so it's definitely Teacher leader 5 and I and then Teacher leader 1: is coming to most of schools with us. The ones that cannot come with us, when we went to [Proper Name] but Teacher leader 1: goes to all schools and school boards and on her time as well.

Interviewer: And are you released by the school, as a teacher, to go to these other schools?

Teacher leader 3: yeah cause on Thursdays we are released from school for the day

Interviewer: And it is always on Thursdays?

Teacher leader 3: yeah every Thursday, so we're not going to school, we meet on Skype, sometimes we meet with [Proper Name] and sometimes we meet as a group. A few times we've taken the entire day and I have gone to ...house and had actually paper planning going on.

Interviewer: Do you remember how the idea developed of making these visits, getting into the classrooms of teachers?

Teacher leader 3: Well basically, at our first meeting we noticed that a lot of the teachers were new, and we have a great support system at St. Jeans so whenever something doesn't work there is always someone, you can go down the hall and ask someone to come and help or you could go downstairs and we on our spares we help once in a while and in the other schools there were less people on the project and some of them, it being their first year and stuff and if they know the help is there, they tend to want to use it. Like when we want to go to St Laurence, one of the teachers wanted to introduce to the portal and she had been wanting to

introduce it for a while and just having that extra person to maybe answer the question that may be I cannot answer is kind of nice to have so that's where it emerged from.

Interviewer: Could you describe the BCTN project in your own words? Like what is it?

Teacher leader 3: Well to me the main idea is to try to help teachers integrate technology into their teaching so as I mentioned before not use the technology because it is there so for the sake of using it, but really to integrate it with what they are already teaching and to try to reach our students because we are in the 21st century and this is what students are, they know more technology than we know and basically we are trying to open teachers' eyes to that now and trying to connect with our students. It's a project to get teacher's together to collaborate which is starting more and more now I find at the board which is kind of nice so to get teachers work together across board, across schools would be nice eventually to again to do projects but really to focus on students and what their interests are.

Interviewer: Right. What would you say of the main features of the BCTN project and don't worry about repeating yourself.

Teacher leader 3: Like the main things that we do?

Interviewer: Yes, the main characteristics also to be more general .

Teacher leader 3: well learning about different software and projects that you can do, so it's an ongoing learning process even being a lead teacher, I'm learning new things that I can do with my students this year, working together in small groups within the school, groups within school boards also, providing support, getting kids involved in the learning process, and getting them to use technology, trying to get more schools to use the technology and integrate it in the everyday teaching.

Interviewer: you mentioned a number of successes of BCTN project so far, you know going to the classrooms, helping novice teachers to integrate technology in their teaching... What are the other successes that you see in BCTN project?

Teacher leader 3: Well, it's kind of nice to see that new teachers embarking on it and trying to become more confident with the technology, another great success that I found this year is that I'm having a lot of teacher from school not on BCTN project starting to ask questions, "oh, what kind of technology activities can I do with my kids and how can we become involved? I have several teacher friends from schools some actually on maternity leave this year and she is going back to work in September, she has already asked me does she know the numerous programs that I am using with my students,

Interviewer: So there is a rumor, there is a buzz.

Teacher leader 3: Yes, there is a buzz, people are hearing about it and they want to know how they can become involved, I think it is branching out more and more .

Interviewer: Now, what are the challenges that you see?

Teacher leader 3: Well one of the biggest challenges that we have is with the support that we have for the technology at our board well basically with the technology too, we plan to do a project one day and if our Internet speed isn't fast enough that day, it bugs and the students can't do their activity, it's just what I had a couple of weeks ago we were about to doing Blabberize and they were trying to record, but when the internet is not working, they can't directly record on Blabberize. We found a solution to that though, we uploaded on Audicity and then it was easier to attach the file. So yeah we don't have the support cause we talk to school board and Teacher leader 1 's great for that. She trying to talk to the head of technology, and them, because they are just not pedagogues they do not understand what we need in the classrooms and what we need. They don't seem to be eager. For example, we have smart board coming in but our laptops won't be in until June. So we've got the projector, we've got the board but have no laptops to … you know because well it comes in when it comes. It's not a priority to them.

Interviewer: IT support?

Teacher leader 3: Yeah.

Interviewer: Are there other challenges?

Teacher leader 3: yeah we noticed at a few schools what we helped them with is just organizing system on how to sign out the technology, cause that tended to be a problem that would come up like when people go get the materials and there will be wires missing or the batteries wouldn't be charged, signing out the materials like how do you agree along the school that ok I'm using them now, so one of the things we did was to made a video "Life at [Proper Name]" and that kind of help teachers, oh well yeah the sign out system would be good, Community, Filing cabinet where you can put out all the technologies and everyone goes there for it. So yeah, signing out was another issue. I think some schools they did not have as many laptops or as much equipment as others so that became a challenge for them to begin with. Those are the main challenges.

Questions with Scenarios/vignette

Interviewer: Scenario 1. Kate is a teacher new to BCTN and she wants to do a project with ICT in her class. She has been teaching for over ten years, but has barely used computers in her class. She wants to learn about ICT tools she can start using with her students, but there are some issues inhibiting her. First, she is a bit nervous about all the tools available and all the new learning. Second, she is worried about the little time she has to learn them. Finally, she feels that the methods of teaching she has been using so far are still efficient in terms of students' learning, class control and time management. What are the challenges in this context? Describe your approach to getting Kate to participate in the BCTN Network.

Teacher leader 3: [The main challenge will be] to figure out how to bring the technology into the class, you always have classroom management and bringing in the technology with students they tend to think you know they know all about technology just go, go, go so you have to teach them etiquette proper etiquette for how to use technology, so it's obviously a challenge of where to start, how to teach that, setting up the classroom. Do I set it up as a whole class, do I set it up as small groups, one on one. You know, what is she going to do when the problems arise, because obviously if she is starting off, she's going to encounter problems, how do you deal with that, Because you could have a sense of incompetence, you as a teacher you are supposed to know; because if something happens you cannot help the kids. So management.

Interviewer: etiquette of being prepared for when things don't work. She is nervous about all the tools, what will be your response to that?

Teacher leader 3:My response would be to choose one, always start off small; when you haven't ever used it, I don't think the goal is ever to be able to use all the tools by the end of the year. I think it is important that you start off with one that would complement your teaching, so don't go and build something around the tool, build your unit, build your activity and then choose a tool that could complement what you are doing, and learn that one specific tool, and then if she gets to March she's done that and she wants to experiment with something else then focus on another tool. And that's one of the things we spoke about in one of our BCTN ...Don't feel overwhelmed with all the tools, pick one and work on that one for the first year.

Interviewer: So that will be your approach for getting Kate to participate in BCTN?

Teacher leader 3: And I think that would be important too to present her with different ways to use the technology in the class, because some teachers in our school they'll do ...whole class and some works really well in the center with the students or even grouping the students when they are doing 3 by 3 or 4 by 4 with the computer, there's proper etiquette to teach them because they cannot all be touching this computer at the same time, so present them with different options and that's great about how the team meters is you can go in that day and set up with her and model how to use it in the class.

Interviewer: Scenario 2. Maureen is a cycle-3 teacher who has been in the BCTN Network since the beginning. Last couple of years she has had her class involved in collaborative projects using digital story telling, voice threads, etc. She is quick to learn new tools, and is confident in using them with her class. What challenges do you see in this situation? What could be her next steps in the BCTN network? What would be your suggestions to her?

Teacher leader 3: Well I think, if there was the opportunity at least within her school to become more of a leader in her school and not necessarily a BCTN teacher but maybe branching out to other teachers at their school and maybe trying to do a project because you are already in the school with another teacher who may not be on BCTN but maybe willing to learn, maybe even giving her just a little bit of encouragement of "Oh look what we could do together", so maybe not necessarily a leader for the entire project but within her own school.

Interviewer: Anything else that you can think of that you would suggest to her?

Teacher leader 3: She's doing collaborative projects already but it might be nice to branch it a little bit further, if her collaborative project is within her school board it may be nice to branch out to a different board or to have the, for example we have a teacher who is blogging with students in Australia so maybe that's the next to go.

Scenario 3. Jane, a cycle-2 teacher, wants to do a collaborative project with Blabberize in her class. She is not experienced enough to facilitate student group activities with ICT. What issues/challenges should be considered as she designs and implements her project? (e.g., grouping, responsibilities, classroom management, assessment).

Teacher leader 3: So definitely the first challenge will be classroom management and set up, so presenting her with different scenarios again of the best process, Blabberize is for recording so it is important to realize that when you are ready to record you have to know what the other students are doing because they cannot all be recording at the same time so that is a challenge, depending on the type of class you have and depending on how well they have rehearsed in it so my first suggestion will be probably to like a mini activity on Audacity, where the kids to do, even if they are just reading and recording themselves reading to get used to the recording system and set up plan in class. For example the red card that you put on the door "we're recording" so if it's up you can't come in, if they are at the washroom or something. The count down tends to work, five four three two one and the class is quiet. I wouldn't suggest everybody doing Blabberize at the same time, I think my suggestion will be smaller groups, so maybe 5 or 6 laptops working on Blabberize and then when they are ready to record, count down. Have something that other groups are doing at the same time, that's quiet, so no group work, to go along with that.

Interviewer: Anything else?

Teacher leader 3: Well challenges when using Blabberize to me is a lot of classroom management, and to be prepared for difficulties with the Internet, because that's something that seems to arise whenever teachers use. Be prepared to… Blabberize...

Interviewer: alternative, plan B?

Teacher leader 3: Alternative, plan B, yeah.

Interviewer: Scenario 4. David is the new principal at an elementary school. After hearing you talk about the BCTN Network, he contacts you to get his school involved. He wants to start with one teacher, just to see how the network operates. He says that other teachers may get involved later if things work out well. He asks your advice on how to proceed. What are the challenges in this context? What would be your suggestions to David?

Teacher leader 3: I think one big challenge would be having one teacher to start. The important thing is that even if there is a lead teacher that can come to school and then Teacher leader 1 who can help out as the RECIT, I think that's important to have that support within the school, so that there is someone you can go to who understands what you are going

through, understands the project as well, and someone that you can work with even in building projects who's there everyday to talk to about it.

Interviewer: So what would be your suggestion?

Teacher leader 3: My suggestion would be at least two teachers, depending on the size of the school, if not more, but at least two, so they are in the journey together, it is kind of nice to have maybe one more experienced if you have one less experienced with it cause I think it is not a good idea to just throw someone into it, you know, who is really starting off, and being all alone by themselves. I think it would be important that if he wants to join next year that he comes to our last meeting this year to see whet the project is about and to see what the end results are and maybe even invite a teacher who have plans on joining the project, invite that teacher to see what we've done through the summer so she can start planning ahead.

Short Scenarios.

Interviewer: What would be your response to these situations? (To avoid/solve these problems) (a) Suzanne has prepared her content in digital format, to be presented to class on the smart board. The computer freezes; she does not know what the problem is. After a few minutes of trying to restart the computer, etc. she gives up, and decides to present the material without the smart board.

Teacher Leader 3: Well obviously sometimes that does happen and you cannot fix the problem in the moment when your students are there ready to learn, but I think the first thing to do is to talk to your students about it and remind them that the technology is a computer it is a machine and there going to be problems with it. That actually happened to me this year and it was my student who turned around because I think I looked really discouraged. And it was my students who said, "Miss, we taught this last year, technology doesn't always work so it's fine and we will do it tomorrow", which was actually very nice of them to say. But that's where it's nice to have a team at the school to kind of help you. You can always go to them after work, or depending if you're in a big school, it's easy to send a kid and try to work on it together with another teacher, obviously if you are in a smaller school you have to always be ready to accept, always have the alternative ready in case, and always be ready to accept it. It's ok and the next time it will work better.

Interviewer: (b) Michael has started using voice thread in his classroom. Students take turn in recording their voice but at the end when he listens to the voices he notices that due to the Internet failure, some of the sound has not been recorded, or there are cut offs. He feels helpless, as the technical support for a better connectivity in school is not available.

Teacher Leader 3: So obviously we learn from all the experiences, so it is very important, I always tell my students, that when you record one part to listen to it to see to make sure that it is done properly kind of just typing in word save it on a regular bases cause if your computer shuts down or whatever, but even then use it as a learning experience. And play it back to the students cause sometimes I record and they realize they are not talking loud enough, or they are mumbling or they are talking too fast, and then when you play it back, we'll talk about it, what could you have done differently, what are you going to do next time, why is it important to speak clearly. So use it as a learning experience and just to understand that sometimes these things happen and don't give up, try it again.

General topics

Interviewer: What is your view of ICT use in education?

Teacher leader 3: I think it is excellent, it is important to realize that students are changing over time and this is part of their world and if we want to get students involved and interested in learning, we need to teach to them we need to accept the fact that those are the kind of learners that they are, and we know that they are interested in it, so it is important to integrate it without losing the reality of using paper and pens, using books and stuff and doing old school research and stuff. But I think it is coming from a class where I have lots of students

with special needs in it, it really helps, having an smart board for math has changed the way I teach math, the students are much more involved in the process, it's a lot easier than pulling out different colors of chalk, you have the colors, it's bright, it's engaging, there is noise that goes along with it, it's stimulating for the students which is important, and it is kind of fun to see how much they can learn from it too. And how much they're not afraid to experiment with it. I notice that sometimes what they do on computer is sometimes even better than what they do on the paper. We do discussion forum? In the class, it's nice to see how much they're going to write on a computer than they would write with a paper and a pencil, so I find it, it's important cause it changes the way students are learning and it engages them a lot more.

Interviewer: Now, how teachers learn about ICT tools, you've had experience this year and last year, how do teachers learn about ICT tools, describe your thought about this learning process.

Teacher leader 3: Well I know at first teachers can be very nervous about it, I think the hands-on are one of the important things, like last year when I started at [Proper Name], I started to learn about these different programs, garage band, Audacity, Blabberize, and my favorite way is to just go on and do mini projects on my own and I like trial and error and that's what I told the students too , which is fun about the computer is that if you did something and you don't like it there is an "undo" button. It's not set in stone, it does not stay there, like when you draw or mark something on paper, you don't have to restart, so I think it is important to experiment before bringing it into the classroom, and to also be open to learn along with your students too, we've done power point and every year that my student teach me something that I did not know about power point, the same thing with Comic Life. We did Comic Life this year and I had experimented with it and they taught me things about Comic Life that I didn't know.

Interviewer: In some of the thing you described in your answer, it seems that you are an independent, autonomous learner; do you think that it is usual?

Teacher leader 3: It's not the case for everyone and I think, like there are teachers at our school are open to joining another teacher on project to learn about something. You know, you don't feel comfortable, you team up with someone who does know the software and the program and you learn from them, again emphasizing, I think it is important to have a support group like that, and that's one of the fun things about the BCTN project that the teachers who are not as autonomous, will take the initiative to say that ok I am going to learn this, or when they get together in the face to face meeting with the group, they are learning it there and then when they have the basics they feel more comfortable to go and experiment with it at home.

Interviewer: In the work that you are doing with Teacher leader 1 and Teacher leader 5, I think you've started encouraging team of BCTN teachers to collect resources that they can share. Is that working?

Teacher leader 3: It is, actually when we'd gone to the schools they actually have their little binders with the information that we gave them in the beginning of the year, they seem to know where it is.

Interviewer: And they use it?

Teacher leader 3: Yeah, well even just the set up and the management of the equipment, they started asking a lot of questions like we went to [Proper Name] on that day they set up a binder and helped us set up the sign-out sheet and sheet to go on the cabinet for the laptops and stuff?

Interviewer: Video that you produced to help, is that used?

Teacher leader 3: yeah, well we showed it to them once and they haven't looked, I don't think they have seen it again, but they often ask us questions about it, they'll say oh in your video I kind of saw you know kids are working in the center, so they ask the question about how to manage the centers, what you do to teach the kids how to function in centers, again on the video we had showed footage of pictures on our sign-out system, so they ask more questions

about, so may they don't go back to watch it but they definitely ask questions and they ask us when we go and visit schools .

Interviewer: Any other thoughts on teachers' learning?

Teacher leader 3: I think it is kind of fun to see new teachers asking about it and like what I said, teachers who aren't even working this year to ask about "oh how can we join it, even if I'm not on the project, could you teach me this" being so eager to learn about it before even coming back to school in September, it's kind of nice. I like that more collaboration is starting to happen this year with [Proper Name] and [Proper Name], they are in two different school and they actually had their students go on a field trip, so they actually have visited each schools we were there this morning and I think that's a wonderful idea so now with [Proper Name] going to a new school next year, we want to bring that school in. And there's a teacher in mind there to do something with my class next year.

Interviewer: So they are starting to expand the collaborative projects .

Teacher leader 3: Yes, and I think that's what was fun this year. It was fun to be with different schools last year, but because we are now closer and we know each other a little more it makes it comfortable to start, but I think, like someone like [Proper Name] now, she is done with different schools so let's expand it. ,

Interviewer: It's nice to hear it .

Teacher leader 3: It's really nice.

The follow up of interviews through email

Describe situations that represent one of the biggest challenges/successes you have faced as a BCTN leader.

Teacher leader 3: One of my biggest challenges this year was when I tried using Blabberize and the Internet connection was so slow, it was not allowing the students to record their voices. All the other steps were completed. All they had left to do was record. However, with the help of my colleague, who also experienced a similar problem (here comes a success story) she suggested that we record on audacity and then upload the file. This worked and I was finally able to complete my project! It was great to see how the students were so understanding. Having been working with a lot of technology for the past few years, they were able to tell me not to worry, that happen with technology. My success story would be that it is a great feeling to look back on my experience in the BCTN project. To think that I started last year knowing very little about the various ICT tools (having only used video- conferencing, PowerPoint, Word, IMovie before) and now being able to complete several projects with my students in one year is incredible. It goes to show what a great team we are and how wonderful it is to have such support in this project.

Give us an example of ICT use by a teacher that you find particularly good or exemplary from your perspective.

Teacher leader 3: Any teacher who has used ICT tools with special needs students would be able to say that it works wonders with them. Being in a class with several students who have special needs, it's amazing to see how focused they are and how much more they are willing to work on assignments when they have the use of an ICT tool. For example, the simple use of the Smart board for math lessons keeps my students extremely engaged in the lesson. Also, when working with audacity, my students who have difficulty producing written work love to record themselves responding to literature. Their answers are much more detailed and thorough, thus giving them a sense of accomplishment and pride. Comic life is an excellent tool which allows students to be creative, all the while learning how to write a form of narrative text. Having a computer in front of them helps them to correct both their grammar and spelling. Finally, it also helps with teamwork and it encourages students to work together and learn from one another.

Interview with Teacher Leader 4

Brief factual questions

Interviewer: How long have you been teaching/working, in the school board, in your current position?

Teacher leader 4: Ok, I started with [Proper Name] school board as the RECIT animator, which preceded RECIT in April 5th, 1993. Prior to that I worked for Montreal Catholic school board which no longer exists, is now English Montreal, but I taught with them for 9 years, almost 10 and in between those incarnations I worked in Industry for 13 years, so that brings me to my age today.

Interviewer: Describe what you do as a BCTN Lead Teacher.

Teacher Leader 4: Basically what I do is that I help teachers facilitate the integration of technology and put simply, what I do is help them bring their concepts into reality. They might think of doing a project and not know what to use and sometimes how to use it and I help them there. Now that can happen in workshops, it can happen in small groups, and it can happen one to one.

Interviewer: And you mentioned before we started the interview that you do travel to all 36 schools, and you do some of that online?

Teacher Leader 4: Only by email so far, next year we want to set up a Edmodo to do some of that, however, I understand that there going to be new rules with that but I'm not sure about the Edmodo anymore, in any case we can probably set up the same thing on the [Proper Name] website.

Interviewer: Can you describe BCTN project in your own words?

Teacher Leader 4: Basically the BCTN project, wants to assist teachers in integrating technology in the classrooms and furthering collaboration amongst those teachers be they in the same school, be they in the same school board or be they in the same province and maybe some day be they outside the province, ok... but we're just working slowly towards that. The biggest problem we address is staying with the teacher until they feel comfortable with their technological device of choice, that is the best thing. Teachers are scared of technology as much as they are scared of the technology not working at critical moments or they reach a point they don't understand in front of the class, and what we do is simply alleviate those fears.

Interviewer: and how do you do that?

Teacher Leader 4: well one thing is that if they understand the entire piece of software they are working with, and we assist them how to check the equipment beforehand and we show them little techniques like appointing student expert that takes a lot stress from them, we also point out to them where it fits into curriculum because there is a significant part in QEP that deals with the technology integration of various things, it could be anything from movie maker to other exotic pieces of software but you have to work with software at some point in a child's life.. You have to work with computer software or iPads or iPods or whatever that you have at the moment.

Interviewer: So what would you say of the main features of the BCTN project as you experienced it.

Teacher Leader 4: I think the main feature of BCTN project is the ability to bring participants together and have them cohese as a group. So that they feel comfortable forming or communicating by some way whether it be VC or VC live or telephone call or email with other participants, and that's really where we want them to go, because there is only one of me but there is many of them. So basically they can offer assistance to each other. That's exactly where we want them to be. You want them to collaborate from a distance. Now sometimes there have been obstacles and there continue to be obstacles because technology is not perfect, nor are the people who put technology together, but nevertheless, what we would like to say is that we teach them coping skills. You cannot run away from technology in our society but you have to cope with the effects of it.

Interviewer: and what were the successes that you saw in BCTN?

Teacher Leader 4: I think I see success with teachers who may not be participate in BCTN project this year but had been previous years and have been continuing incorporating technology into their curriculum. That's what really success is. Once they leave us, I don't expect them to be always part of the BCTN because we just do not have enough funds to cover everybody each year, but the ones who drop by the way side , stay in touch and continue doing projects. Sometimes it's not projects you'd want to see; sometimes it's simple little projects like Google searches, research using computers. That's still very valid. Sometimes it's mass projects like you're filming a war year 1812, which is pretty spectacular for our school. But sometimes, over at [Proper Name], a teacher made a featured film of his class and it's very well documented, very well put together, in terms of he touched just every subject with the film, so that was very good. I call it a great success. I found that teachers continue doing things and they don't tell anybody and they send you things "oh my class did this, oh we did this". The fact that they continue incorporating technology in to their day-to-day curriculum is wonderful. That's the whole purpose of my being here.

Interviewer: You talked about obstacles, what are the successes and challenges?

Teacher Leader 4: challenges...I don't think it is only just our board, but equipment aging. The aging of hardware creates serious problem, the need to upgrade device drivers, it sounds almost when you say you have your own computer, my computer at home so you want to upgrade flash, it's just a button. When you have 6250 computers it's not just ...it means you have to assign those technicians to just do that and that is a long job, it's a costly job just to upgrade flash. Software versions, something you want to do in your own, running under Microsoft, office 2003 and you see something cool and 2007 and the 2010, it won't work, it will just not work. So hardware is a basic challenge, and bandwidth is another huge challenge, there is no such thing as enough bandwidth, ok? When teachers telling me it's a quarter to 9 in the morning we all sign on and then no one can go anywhere. We got 2 kids on Google and the rest of them are dead in the water. Well that's because at the same time. And we share what we call, Highway 15 backbone and on that backbone we share with all the French boards a lot. The French boards are a lot bigger than we are and they turn on their computers and we're just engulfed. .

Interviewer: And in this case [Proper Name] is at the end of the backbone.

Teacher Leader 4: No, we are not alone at the backbone here, and given the fact that there are only 86 kids, we fare pretty well.

Interviewer: Other aspects of success and challenges that you didn't mention?

Teacher Leader 4: Basically I think the biggest challenge is that. You can't keep up purchasing you try your best but still it's going to be difficult and I think there will come a day when we will be able to say to the child part of the things that you have to bring to school in late august is your laptop, the laptop will only cost 75 bucks so you can buy one, at that point we're home free but until then we are not. And we have to continue this struggle.

Questions with Scenarios/vignette

Interviewer: Scenario 1. Kate is a teacher new to BCTN and she wants to do a project with ICT in her class. She has been teaching for over ten years, but has barely used computers in her class. She wants to learn about ICT tools she can start using with her students, but there are some issues inhibiting her. First, she is a bit nervous about all the tools available and all the new learning. Second, she is worried about the little time she has to learn them. Finally, she feels that the methods of teaching she has been using so far are still efficient in terms of students' learning, class control and time management. What are the challenges in this context? Describe your approach to getting Kate to participate in the BCTN Network.

Teacher Leader 4: First of all ask her what does she envision as a project. I would say I would try to limit the domains, ok? Is it a ELA project, a science project, or a math project. Let's say it's an ELA or FSL project, then we have to say what software devices do we have or know

about that would help her, for instance if she was going to have students create a presentation, we have a number of devices, you have PowerPoint you have Prezi, you have movie maker, you have garage band, a number of them. Now what will suit her best and what will suit students best. Basically if the computer she has access to all have PowerPoint, we may start with PowerPoint. PowerPoint is almost universal in our school board, more than that it's a technology that has been around for more than 25 years. Its easy to use, no matter whether you have been exposed to or not, it follows a Microsoft protocol which means all the interfaces work the same way, so if you can use Word, you can use PowerPoint. We might start with that, if she really likes that, you might introduce her to Voicethread and Prezi, simply because, they have a bit of more pizazz, for the kids, more moving things running around but I would start with something simple like PowerPoint and after discussing it with her.

Interviewer: So that's your approach ?

Teacher Leader 4:That would be my approach.

Interviewer: Scenario 2. Maureen is a cycle-3 teacher who has been in the BCTN Network since the beginning. Last couple of years she has had her class involved in collaborative projects using digital story telling, voice threads, etc. She is quick to learn new tools, and is confident in using them with her class. What challenges do you see in this situation? What could be her next steps in the BCTN network? What would be your suggestions to her?

Teacher Leader 4: I would say if she is confident with wide variety of software and project and if she is comfortable with teaching classroom, I would seriously consider soliciting Maureen to be a lead teacher and to bring her to find some money and send her out to help other teachers, because I tell you number of years, it will never be as good as a teacher, so basically I will send her out. She goes to X Y Z school and guess what. And also seriously think of a number of project in school board that require teacher input but because I cannot do everything through the website . So we can solicit Maureen to do creative class plans for us and for us BCTN and other teachers

Interviewer: Ok, so bring her to contribute more of her level of expertise.

Teacher Leader 4: Definitely, you have to look for those guys who can pick you to the next step

By four teachers who are extraordinary, not because of their knowledge of technology, but because they can incorporate it into a teacher class plan which is so that's the type of teacher you want to send out that you want to send out in front of other teachers that's really important, and to replace me because retirement is coming.

Interviewer: Scenario 3. Jane, a cycle-2 teacher, wants to do a collaborative project with Blabberize in her class. She is not experienced enough to facilitate student group activities with ICT. What issues/challenges should be considered as she designs and implements her project? (e.g., grouping, responsibilities, classroom management, assessment).

Teacher Leader 4: First I will tell her not to use Blabberize. I love Web 2.0 but we have one big challenge with it one big that is bandwidth. Bandwidth will sneak up behind you and hurt you and that's why Jane.... Let's look at something even more simple, let's look at Moviemaker, which almost can do everything Blabberize can do, but you can have children create media, artifacts of good quality and perhaps better quality than Blabberize A; So but it's not using bandwidth. It's not because its inside the computer. So we are not going to worry about bandwidth there, more than that is what I've seen in Blabberize is that it's good but it… you know, I'd rather use Voice-thread if I had to choose a product, even voice-thread is almost impossible to take voice-thread off the computer for a beginner. Let's say they want to create a CD of all their children's efforts, which they all do,, voice-thread, and Blabberize you can kiss it goodbye while with moviemaker

you'll get a nice CD.

Interviewer: Scenario 4. David is the new principal at an elementary school. After hearing you talk about the BCTN Network, he contacts you to get his school involved. He wants to start with one teacher, just to see how the network operates. He says that other teachers may get involved later if things work out well. He asks your advice on how to proceed. What are the challenges in this context? What would be your suggestions to David?

Teacher Leader 4: First of all, the teacher who volunteers has to be a volunteer not assigned, that's a big problem, a principal gets very impressed that they sort of tell teachers, and sometimes they don't tell teachers you have to do it but they lean on them you know and that's awkward, they should come their own time, their own way. The first thing I'd say if you really wants to sell staff on it, he himself has to incorporate it, he has to use technology in staff meaning, he has to talk technology, he has to send out technological articles, he has to send out technological URLs, every moment he can think of with the staff, everything he has to do has technological bend and also say to him, we have to have technological project for the school that doesn't necessarily need to be technological, but it will involve all the teachers they might not have to even touch a computer but we are going to do technology and whether it's with one teacher, or more teachers, because there are other ..we can talk about technology without actually using computers. We can still put a poster; we can still do a lot of ELA things that involve technology and if you continue to see poster after poster after poster in the school all praising technology it will influence teachers .

Interviewer: When you say using technology without using the computer, what do you mean?

Teacher Leader 4: A pencil is a piece of technology, and that's how I'd start the project, is by telling the teachers we're going to use technology, perhaps though history, perhaps through the ages, but we are going through, and besides it's part of the grade 5 program, so basically we are going to talk about inventions, the inventions become technological, we're going to talk about computers, we're going to have a computer project and suck them in eventually.

Short Scenarios.

Interviewer: What would be your response to these situations? (To avoid/solve these problems) (a) Suzanne has prepared her content in digital format, to be presented to class on the smart board. The computer freezes; she does not know what the problem is. After a few minutes of trying to restart the computer, etc. she gives up, and decides to present the material without the smart board.

Teacher Leader 4: Does she have a phone in the classroom?

Interviewer: No, but she tells you later.

Teacher Leader 4: Ok, I will tell you that we have little repeating issue and one of the repeating issue has to do with what to do with smart board multiple crashes, because it is not that uncommon and nine times out of ten time it's because they didn't turn it on in a proper sequence, so basically what I will tell her is that all the thing she has to do is to make sure all the plugs are in, the USB is plugged in, also your video cable and you turn it on and it will start. It is possible that it is a damaged computer, there is something wrong with the drivers, if that's so, I don't know if you know how it is with our school board, but you have to get a technician, I am not even allowed to touch them, ok and it gets lots of years of experience but the whole point is that these things will happen, these things will happen and you have to be prepared and sometimes the computers will crash and you have to go to paper and you should always have a paper class plan ready.

Interviewer: Plan B .

Teacher Leader 4: Plan B. When I came back to education, I didn't come back to adult education , and I always had a plan B, what happens if they all die at the same time, and they did sometimes and I had a plan B, you have to have a plan B.

Interviewer: (b) Michael has started using voice thread in is classroom. Students take turn in recording their voice but at the end when he listens to the voices he notices that due to the Internet failure, some of the sound has not been recorded, or there are cut offs. He feels helpless, as the technical support for a better connectivity in school is not available.

Teacher Leader 4: well two things, one of the reasons I don't recommend voice-thread is that is problematic with voice thread, that they needs a lot of bandwidth for their recording, I would say Michael, we are going to do Movie Making, even if you are not using the camera you still can record and you have a quality recording or if you put Audacity you will get a really nice sound, and that's what you going to do because you cannot trust bandwidth.

Interviewer: At this time.

Teacher Leader 4:No, not for now.

General topics

Interviewer: Ok zooming out, or stepping back. What is your view of ICT use in Education?

Teacher Leader 4: I think we are still just taking baby steps and that's not just here, in Quebec, or in the south shore school board but across the world, I think we are only going to realize true ICT in 10-15 years from now. I will not be here anymore, not that I wont be alive but I will not be here because the products are still too expensive to buy but in 10 or 15 years they will be cheaper than a calculator, and not a graphing calculator, they will be cheaper than a calculator, I can see that. That's when true ICT comes in into play. I think to truly incorporate ICT, right now, the trick is to give teachers confidence; they simply don't have confidence in infrastructure. To be honest with you, from time to time I do not have confidence in infrastructure. You always have to have a plan B, which may not necessarily mean, "let's take out the papers and pencils kids", it might be "let's go to movie maker or the voice- thread", which maybe older technology, it is, but it's centered on the computer. And that's important, you can still keep going without bandwidth. ICT in general, ICT in terms of true integration in education is happening, we have a lot of problems, we have huge budget cuts, look at the United States, I mean it's terrible in States right now and that's why it has to be on devices which children can supply.

Interviewer: Inexpensive.

Teacher Leader 4: Inexpensive devices bring your own devices but even iPads, which are $600 are not the solution.

Interviewer: Can you describe how a teacher learns a new ICT tools in your experience? How do you describe the process that teachers go through? What do you see as key ingredients in to that process? What happens process- wise and tool-wise, [and there might be different cases as not everybody learns the same way] when a teacher learns a new ICT tool?

Teacher Leader 4: I think the process is their own personal, I mean, just like anyone else in the world, when you see a new ICT tool, I think people have found most successful...people who work with computer day after day, in and out do not perceive software.... very few people read manuals professionally, it's a hit or miss, it's a play you're trying this you're trying that, it doesn't work you try it again, and then oh it works, oh good, I know what to do now. But I think people who generally work with the system do that a lot. If you ever notice the way they produce manuals for any software, it's something you can look up and not read like a novel, let's say I cannot figure out how to do this one operation, I look up in the Internet, one piece of software, type it in the Google, ah there it is, I don't have to read a 470 pages manual, that's what I need now, teachers who have trouble want to learn they learned in school and the people my age, it's regurgitate that you're supposed to memorize, no, that's not going to work. You'll play with it; you'll get it. Let's face it, Software isn't written for PhD candidates. Software is written, and I'll tell you I've been in it,, software is written for some one with

grade 5 or grade 6 reading ability and probably has never gone passed first year college. That's the mark they use so I'm saying there is no piece of software, piece of commercial software that, there is AutoCAD X little thing, but normal human software isn't complicated, it's the perception they have a bout the software, so people play with it, you'll be fine. And then if they play with it enough, and they start to get the concept of how I can bring this into the class and teach this particular competency standard competency, ok so basically I think that's how they learn.

Interviewer: Do you think teachers are actually going online to get answers to their questions?

Teacher Leader 4: Oh I do, I know a fair amount, but I don't know everything. I need to know something I go online and I get the answer. And yes I do think that teachers do the same thing. I think there is a difference between digital native. it is there. I'll give you a quick example ok? I've got a 37-year-old daughter and a 29-year-old son. My son is a digital native; he has never lived in a house without computer in his life. My daughter isn't exactly. She missed it by 7 years. There is a generation gap between the two of them, she hesitates, and he never hesitates. It's not that he is a computer scientist, no he is not, he is in finance and it's numbers that mean something to him but you can tell the differences between the two children just between 8 years differences in their age.

Interviewer: All right, these were my questions; do you have questions?

Teacher Leader 4: No, I think basically we are going to strike out the way we struck out last year, and that's basically providing the teachers with just in time assistance. Just in time is important. If teachers have a question it has to be answered as quickly as possible, that's why I do these school visits. They know I'm going to be there at least once a month, maybe twice, if we are lucky. But now with more schools this year...

Interviewer: oh yeah? You are growing.

Teacher Leader 4: Yeah, we are going to four junior high because...

Interviewer: population is growing?

Teacher Leader 4:No, we are expanding the program; we are expanding BCTN

Interviewer: I thought you were talking about opening new schools, so it will be 37 next year.

Teacher Leader 4: we are expanding BCTN, we are bringing more schools in . I think there is a question, a tipping point. Once we get 25 percent of the school population using technology all the time.

Interviewer: What proportion did you say?

Teacher Leader 4: At least 25 percent, my mind was not prepared to talk about this economic theory So basically I believe if we can get 25-30 percent constant technological use we are over the top, you'll have an avalanche after that.

Interviewer: All right, good. Thank you very much.

Interview with Teacher Leader 5

Brief factual questions

Interviewer: How long have you been teaching/working, in the school board, in your current position?

Teacher leader 5: Ok so I've been in teaching with the school board for 16 years. I started subbing in '97 and got a contract right away when I came out of school, so since I'm 21, I've been teaching, and it's my second year as a lead teacher for the BCTN.

Interviewer: Describe what you do as a BCTN Lead Teacher?

Teacher Leader 5: I think my role, or what I do, is to coach and to support other teachers, to facilitate. That's how I always describe, people ask me "What do you do on Thursdays?" I say, "I'm there to support the use of technology and to model collaboration". So I'm there to kind of, yeah, to be a visionnaire in a sense, and with Teacher leader 3 and Teacher leader 1 we

meet often, we go into other schools to, even, sometimes they're not doing projects at that time, but we still want to be visible, we want them to know that we're there. The emailing a lot back and forth with each other, to make sure we give them support as needed, and responding right away, because technology is scary to a lot of people...it was to me, still is a bit.
Interviewer: Could you describe the BCTN project in your own words? Like what is it?
Teacher Leader 5: Well that kind of goes back to what I was saying, for me it's providing, it's giving us a chance to provide an equal opportunity to all the students within our board. I feel that my job, in this project, that this project what it's enabling us to do, is to give us the time, especially the time to go and give every teacher, kind of plant the seeds, that you're not alone and there is people there to support you, and that to take that first step, or that first risk. So I think the project is to encourage collaboration amongst our school board in using technology so that every child can benefit with equal opportunity.
Interviewer: So what would you say of the main features of the BCTN project as you experienced it?
Teacher Leader 5: I think, what's unique about it is that it's teachers supporting teachers. We have the RECIT on board, which is key, because Teacher leader 1 does have much more of the technology apprenticeship. She's also getting training by doing this job, she's getting full (leader) trainings, I know full well of what's new, oh try this, and it's teachers supporting teachers, therefore I know full well what they're going through. I know it's exam time, I know it's not an ideal time, I know they're going to need this before they need this, I know they're going to struggle with not having enough support, or not enough computers or whatnot. So I think that, and I lost track of...what was the question?
Interviewer: Main features.
Teacher Leader 5: That's it! So the main features would be that: teachers supporting teachers, having the RECIT involved, with having Teacher leader 1 there I think it helps with opening up the doors of communication with people higher above who don't necessarily have the pedagogy, they just deal with the software, so that's helping us slowly get that. So I see it that it's more teachers who are already moving at a slow pace, but are really there for the right reasons. Not just to showcase. And they're people, much more than technology people. Yep.
Interviewer: And what were the successes that you saw in BCTN?
Teacher Leader 5: Over the 5 years? This year? 2 years?
Interviewer: You decide.
Teacher Leader 5: I decide.
Interviewer: You can tell me about 5 years, and then 2 years, and then this year.
Teacher Leader 5: Ok. Well the success 5 years ago was that it really created a good--I'm going to talk school-wise, because I don't see the success broader than that 5 years ago. It created a kind of a nucleus within [Proper Name]. We had to r-, we had committed to this project, and the fact that our principal gave us 2 Macbooks each, we needed to continue with this project, whether we liked the way it was run or not, so we developed kind of a nucleus, and I remember full well being in the Palais des Congres really not well-established but nobody was doing anything, so Teacher leader 1 and I got down on the floor with our post- its and started webbing like we usually do when we teach our lessons. So it kind of gave us ownership of that project because we felt, all right, we've got the technology, now we need to do something with this. So it created a nucleus and it gave us that kind of a diving board to start using technology more in our classrooms. It also created some links with certain teachers, certain, like Teacher Leader 2 maybe, right away took, always wanted to, she's very into that, making connections with people abroad, so for her it was really fun to work with people from abroad, so that, it was kind of the diving board. I think the turn, rather than the project, started, well maybe it's because I saw it in a different way, because I was part of the lead team, but I learned a lot in working with you guys too, and the way things are run. It shifted to technology being at the forefront, to more the students and the pedagogy aspect of it.

Interviewer: When you started 2 years ago?

Teacher Leader 5: Yeah 2 years ago, I think there was a big switch in that. I think a lot of successes were, the collaborative projects, yes. The connections...I think we really developed that community feeling even though there were people we saw twice in our lives. Just the fact that we were living the same thing, and that we were able to give them online support. This year, what I really am excited about, is that we're actually physically able to be there. So that I find is kind of, another step. Yes we email back and forth, but it has shifted a lot from--like I found last year when we used the (SAKA) it was a lot of the same people, which was fantastic, for like people like [Proper Name], and that were really keen, and it was natural for them. But the other, we just saw them like twice a year; you know what I mean? They fell through the cracks, because, yes there were many reasons, maybe they weren't going to be teachers that would be the best participants, if you will. But maybe they would have been had we have been there more...do you know what I'm saying? Present physically.

Interviewer: How did the idea come up?

Teacher Leader 5: Ok well Teacher leader 1 was always on Thursdays that we would meet. Teacher leader 1 was always busy...RECIT, going to the school, and her being overwhelmed with "Oh my gosh, I'd really like to talk to you guys more than 2 hours but I'm sorry, I've going to go." So Teacher leader 3 at one point, and I said, "Well, at the beginning, can we help you? What can we do?" So ok, well, I know that, I just went to Sorel and they w--they're fine, but let's try, and vis--, I don't remember who, maybe it was Teacher leader 1's idea, let's try and visit...I'm going there, let's go. So then we thought "OK, well you're busy that Thursday, well Teacher leader 3 and I are going to go anyway, that's cool, we don't need you. I think it's nice to be two, three's even better, but two really make an impact. I think that's how it came about, with us trying to say, "How can we better support the teachers?" And instead of us sitting there and setting up all these things online that are, our teachers aren't really ready to use. And two, you think, you know? It's a collaborative project, online collaboration, ultimately, I think there is a.... a scale, a starting point, yeah.

Interviewer: Now, what are the challenges that you see?

Teacher Leader 5: And then, I think, what I've seen a change in the last 5 years, that the first ear I started, it was a lot of people who were tech-savvy. They knew what blogs and wikis were 5 years ago. There weren't very many people like me who were taking a risk and thinking, "OK, I'm going to try this, because if I don't get on board, I'm lost forever, right?" I find this year; we have a few techies, but mostly people who can see the need in their students and the difference it makes when technology is included. Oh I think they remain the same. The challenges are, there are some people that are in this project and you, they're lurkers. You hope that eventually they will rise up to the occasion but I think that's a challenge to...the biggest challenge I think it's the fact that it's a technology project, which means that with technology comes a lot of criticism of the actual tool, of the people running it, so. Sometimes we go into schools and we have to sit through half an hour of complaining.

Interviewer: Bashing?

Teacher Leader 5: Bashing. Ok! I get that! And the fact that I am a teacher, I can say "Yeah, I get you. I really understand. Now what are we going to do about it?" You know what I mean? So definitely that's a challenge. Um...I think another challenge, definitely, if our ultimate, well not THE ultimate goal, but one of our ultimate goals, is to set up, *comme*, some kind of online community. I think that's definitely a challenge because a lot of these teachers, I mean [Proper Name] saw, some of the teachers, they don't even use their portal email, they don't know how to...so some teachers are VERY far behind, and that's why we do techy Tuesday at our school, to try to bring everybody along. Umm... yep, I'd say that's a challenge. Definitely not working with Teacher leader 1 and Teacher leader 3, because that's always very easy. Technology is a challenge, with our board. It remains, I think, our Achilles' heel.

Interviewer: The lack of alignment between the IT?

Teacher Leader 5: Yep, yep. I know that Teacher leader 1 keeps on telling me "It's moving along", but it's slow.

Interviewer: I think it's the same in all school boards.

Questions with Scenarios/vignette

Interviewer: Scenario 1. Kate is a teacher new to BCTN and she wants to do a project with ICT in her class. She has been teaching for over ten years, but has barely used computers in her class. She wants to learn about ICT tools she can start using with her students, but there are some issues inhibiting her. First, she is a bit nervous about all the tools available and all the new learning. Second, she is worried about the little time she has to learn them. Finally, she feels that the methods of teaching she has been using so far are still efficient in terms of students' learning, class control and time management. What are the challenges in this context? Describe your approach to getting Kate to participate in the BCTN Network.

Teacher Leader 5: OK well, first of all, she could be me, a couple of years ago; exactly the same profile. So I can relate to that. So of course sharing my experience would be my first gut feeling. Where, ok I understand where you're coming from and exactly how I felt, but technology isn't something that's going to go away. 21st century learners are born with cell phones basically, right? So, um, I think if this teacher is um, took the risk to join the BCTN project, it's obvious that there's somewhere inside her with that understanding, or that need for kids to learn using technology. And again, it's just going to be to remind that teacher that, yeah it's curriculum first, I'm 100% sure with that. I think with this teacher it would be important to share one tool, simple tool, which she could feel excited about, and that's what we've done. I could take [Proper Name] for example, very same kind of person. I showed her a few examples of voice threads and she saw right away how "Oh yeah, that'd be fun!" I'm telling them it's not only *des bebelles la*, it's not a game online, it's going to be a way to connect with your parents, people abroad, to make learning more exciting for your students...so that's how I go about it. I teach a simple tool, offer online support, and uh, make sure I head up to that school at least once.

Interviewer: Scenario 2. Maureen is a cycle-3 teacher who has been in the BCTN Network since the beginning. Last couple of years she has had her class involved in collaborative projects using digital story telling, voice threads, etc. She is quick to learn new tools, and is confident in using them with her class. What challenges do you see in this situation? What could be her next steps in the BCTN network? What would be your suggestions to her?

Teacher Leader 5: I think a lot of those teachers are the teachers at [Proper Name], where they've been in the project so many years, they've done every single tool there, and [Proper Name] and Teacher leader 1 and I had a Skype call, and we were talking about just that. Where it was always a challenge but now I think it's time to, not let go, but perhaps offer a different role to those teachers, because I don't see myself trying to plan another first year face-to-face for these teachers. They've done it all, and at one point, I have to, even though I like to lead and be in that role of supporting and fostering, encouraging, it's not everyone's bag. Some of these teachers might be great with students but just don't have that in front of adults. I'm not going to throw them necessarily and say "OK, you're in BCTN project, you're all training teachers and"...*ca se fait pas comme ca la*. So my challenge in that is exactly, where do you take those teachers now, you don't want to say "OK thank you for five years" and "Bye" and "You're not needed anymore". I think, encouraging them to do a, like [Proper Name] and [Proper Name] are doing now, fabulous collaborative school project where they physically, again, have switched back and forth. Again, we supported them in that, we were there both days, and uh...other than that, the teachers that have been in the project, or that are so tech savvy, and have been doing this for a long time, I believe that maybe offering them to be go-to

teachers, those that are interested, again, because I understand...but continuing to support them in their classrooms when they do take on another challenge, I think, is key.

Interviewer: Scenario 3. Jane, a cycle-2 teacher, wants to do a collaborative project with Blabberize in her class. She is not experienced enough to facilitate student group activities with ICT. What issues/challenges should be considered as she designs and implements her project? (For example: grouping, responsibilities, classroom management, and assessment).

Teacher Leader 5: Ok, well again all of the key repeater, the written part, should be done first. Once she has immersed the kids, going through that whole process, making sure that, because I know you were surprised to hear that not all teachers teach with projects, but this needs to be taught right so if she understands that it's not just a one-shot deal, it's not the tool and then the project, it's really the whole process, so once that's done I think that would be step number one, that would be my first fear, that this teacher has no clue how to go about creating the project, so the challenge would be helping this teacher understand the whole process. And next would be, if you're going to use a tool like Blabberize, um, perhaps you need someone in there, to at least teach her once, how to do it.

Interviewer: To model?

Teacher Leader 5: To model it, yeah definitely. A good way that we've done sometimes is to go into a class and teach it to the class, so the pressure is taken off of the teacher, where all her students are supposed to learn, right? Supposed to be listening. Um...a tool like Blabberize, what's great about it, is that when you do use technology, students are very keen, and they love to hear what others are doing, so her challenge would be maybe to teach her students how to be quiet..."OK, you're putting up your hand, we're recording now". So I see that as being...yet every time it's taught, students really respect that because they're interested, they want to hear and see. So I would recommend to that teacher to hook up her one computer, because technology might be a problem, but limiting the amount of computers in your class...because I know, we've all done Blabberize with four or five computers in a class and, but then that's "Miss, Miss" and if you want to avoid that, I'd say plug in one computer to the overhead so that you can see the mouth move and they can see the voice going. Another challenge for us, with Blabberize especially, is technology. It's not Blabberize that's not working; it's something with our board. The...

Interviewer: Connectivity?

Teacher Leader 5: I don't know what you call it...the processing speed isn't fast enough or they're blocking this, or they're...so yeah, that would be a challenge, but unfortunately I have to accept that these are things that you try another day then. Try it in the morning; it's always better in the morning.

Interviewer: Scenario 4. David is the new principal at an elementary school. After hearing you talk about the BCTN Network, he contacts you to get his school involved. He wants to start with one teacher, just to see how the network operates. He says that other teachers may get involved later if things work out well. He asks your advice on how to proceed. What are the challenges in this context? What would be your suggestions to David?

Teacher Leader 5: Well I'd say, I'd go against that, because I think one teacher, as much as it's easy for every teacher to find one teacher. There's always one that stands out, you know? In every school; but I think it's unfair to ask that one teacher to go into a collaborative project on her own, so I definitely recommend at least two, and we had said to the teachers three or four from...to the principals three or four from each school. I think that's what saved [Proper Name] and that's what made us so strong in this project...that we're a lot. Even though Teacher leader 1 's not here, she was more our go-to techy person, but now it's wonderful to see because we're like "We have a computer problem so OK, kids, everybody, don't panic...Ms. [Proper Name], or Miss [Proper Name] or Miss [Proper Name], whoever's here, we go to..." (And it's really go

to), and we'll find somebody in the school that knows what to do with it. So I would perhaps encourage him to release more than one teacher, definitely. And uh, then I could explain that these teachers, if they're comfortable, can bring, he could ask that because they're being released for that, encourage them sometimes at staff meetings or cycle meetings to then present what they're learning or what they're working on. I think just having one or two teachers who do a project, every school we've been to we've been talking to teachers who weren't in the project that "Can you show me how that works? Can you show me how that works?" so that's really exciting when they're seeing what's going on and they want to learn...even though they don't want to necessarily be released to do it, which is good for our wallets I guess, but...

Short Scenarios.

Interviewer: What would be your response to these situations? (To avoid/solve these problems) (a) Suzanne has prepared her content in digital format, to be presented to class on the smart board. The computer freezes; she does not know what the problem is. After a few minutes of trying to restart the computer, etc. she gives up, and decides to present the material without the smart board.

Teacher Leader 5: I'd say "Honey, that happens to me every day"...often, really, seriously. And like I said before, I'd say "You know, put it aside, try it the next day", because we can troubleshoot, I mean email me, did you try this? Did you try that? But it could be so many things...sometimes it's the Smart board that's not connected well. And what we do at our school physically is we go into each others' classrooms, "OK, watch my class, I'll go into your class", so we do that kind of stuff internally, so it's, it would be kind of nice to see that every school would develop that mini network.

Interviewer: So you go to the other teachers' class?

Teacher Leader 5: Yeah! With Mrs. [Proper Name] it happens all the time, she starts, whenever technology doesn't work, Teacher Leader 2, ohh! Like, that's just the type of person that she is, we need to meet the needs now! So I say "OK, come into my class, they're doing so-and-so, just watch them and I'll try and go fiddle with it". If it doesn't work I say, "Hold on 'til recess, and we'll ask [Proper Name], or we'll ask, um, yeah".

Interviewer: (b) Michael has started using voice thread in is classroom. Students take turn in recording their voice but at the end when he listens to the voices he notices that due to the Internet failure, some of the sound has not been recorded, or there are cut offs. He feels helpless, as the technical support for a better connectivity in school is not available.

Teacher Leader 5: Well I think one of the things that's clear with our project is that we're there. I mean, I dunno how many times I've said "I'm there, I'm there" I could show you massive emails back and forth, for example, with [Proper Name] with Voice thread so, "OK, I think I did it. Now how do I do half a chart?" I basically, even though she went to the training session, she took in all she could, we had the handouts, but she needed that step-by-step reassurance via email. That was fine with me. And every time there was a little word of encouragement..."I'm so proud of you, keep going!" So it would be the same, I think I'd make sure that that teacher would have that support, if he needs, because then I would say "OK, if some of the voice recordings didn't work, let's go back, try this". Because [Proper Name] had a recording problem too, with one of her PCs, I'm not sure what it was. Anyway, but I wasn't sure how to solve, I called Teacher leader 1 and, and then the other thing, for her, was she wasn't sure how to share it, so we went through the whole sharing process and what, how to publié.

Interviewer: Publish .

Teacher Leader 5: Yeah, how to publish, so what to click off, what to click on, and then right away when she was done she sent me the link and the first thing I did was do a video

comment, so she could show her kids and be excited about it. And they were, which...she was super proud, it's nice to see...

Interviewer: Success

Teacher Leader 5: Yeah.

General topics

Interviewer: What is your view of ICT use in education?

Teacher Leader 5: I think it's a great tool; it's something that's great to engage students. I think, like I've said before, it's talking their language. I think it's taking something I love, books and pencil and paper, which is not their generation, face the facts, so I think it's, it's um, it's our key as teachers to unlock their full, true potential, and that's big.

Interviewer: When you think in ICT in education, any other comments?

Teacher Leader 5: Well, I can see, I could be negative and say "Ah, we're not getting enough support, we don't have enough" but I think the real answer to that, is it's good to bicker and all that, but really you don't need that much technology in order to work. My dream would be that it would be OK in a school to bring in your cell phones, and your iPads, and your cameras, cameras being allowed, because there's so mu--, they have so much, the kids. We have, most of our schools, out-dated technology, when they have iPhone 4s, they have iPads.

Interviewer: Your elementary school kids have iPhones?

Teacher Leader 5: No, well some fifth and sixth graders, yes. Yeah, and you ask who has an iPad at home, and I'm not sure, this is not reality for Cycle 1, you wouldn't let the kids bring in their iPads to school. Some might. But no, I am...because little kids, they really need the basics too. Technology is kind of the enhancer. Of course, they love it and, and "How can I use that? I want to use that", and they know. They know so much already, about technology. But the way I see more, especially where there's a big gap between...anyways, at our school, and I think in our board, how much technology is used at the elementary, and then the discrepancy with how little it's used in high school. And you think, yet these kids have everything they need, if it would just be allowed. They could do so much.

Interviewer: Describe how a teacher learns a new ICT tool (i.e., selection of a tool; learning resources (e.g., guidebooks, online tutorials, friends/colleagues); learning process; trouble shooting) What do you see as key ingredients in to that process? What happens process- wise and tool-wise,[and there might be different cases as not everybody learns the same way] when a teacher learns a new ICT tool?

Teacher Leader 5: OK, just the ICT tool we're talking about. I think they need to be taught, first of all. Modeled. For example, ideally would be to do a one-on-one, modeled like that, or in a small group. After that, the teacher needs to take it home, or during their spares or whatever, play around with it. They need time to learn themselves. Seeing is the first thing. It's nice if we have time during the face-to-face that they, which we've had, they can play around with it and be more comfortable, but it's not going to happen in one shot I don't think...didn't happen for me. Unless you're like, gifted...technology gifted. And then take it back home and play around with it. I think there are different levels of difficulties of tools, so depending on the tools...

Interviewer: How complex it is?

Teacher Leader 5: Yeah, and you know, the sad part, or the funny part, the good part in a sense too, is that you learn from your kids too. So often, like even power points, I didn't even know until recently that you could take a picture and put that as your background, and then move the text forward, and but the kids, play with it, they're not that scared. And they do take those risks more. So I think definitely she needs, or he needs, to have that comfort level, where they feel that if something goes a little wrong, they can help with the troubleshooting, if not, no. So, modeling and giving some time to work on their own, and using it in school, in their class.

Interviewer: Does it work to provide resources?

Teacher Leader 5: Well some have used it, I've seen my posters in a few schools, and some have said that they've tried that in that activity, though unless they're really keen on starting to use technology, they don't see the point of doing the whole training part. But I know for a fact that like, [Proper Name] and [Proper Name], both have told me that they went through all the activities with their kids, preparing them, teaching them safety...I think that's more a concept with, for example, plagiarism, we talked about digital citizenship. Um, it's more like a Cycle 3 thing, we've realized, because that's when they use more technology. Usually teachers are more...I find that with Cycle 1, I've done it in my class, with the minimal simple activities we've put online but, if you're not going to be using the portal, if you're not...if you're leading the Voice thread and all the kids are doing is coming up and recording their voices, then of course you don't see the need. But it's nice that it's there so, when the need does arise.

Interviewer: Yeah. OK, those were all my questions. Do you have questions or comments?

Teacher Leader 5: Well how do you see the, just informally, the difference from last year to this year?

Interviewer: Well um, it's been nice for us to see the different ecologies at [Proper Names] and [Proper Names]. Uh, what you are doing at [Proper Names] is very impressive, in terms of what you are doing going to visit classrooms and helping...I mean, this is very powerful, and I'm saying that, and I'm listening to Teacher leader 3 and you and thinking about that, in the back of my mind I have questions about the cost effectiveness of that. It would be great if that can continue, if the school board can support that, is it cost effective, you know? The question is in my, on my mind. But you know, the progress you are making at [Proper Name] is quite impressive.

The follow up of interviewers through email

Describe situations that represent one of the biggest challenges/successes you have faced as a BCTN leader.

Teacher Leader 5: Challenges: One of the challenges I think the biggest is technology itself. The computers seem to have a mind of their own and like to cause problems. It takes a while for the technicians to come around at times. Our board seems to struggle with access codes and bandwidth. I know that listening to teachers vent about this is necessary but the challenge remain to get them back on track and sticking with it. Another challenge is meeting the needs of all participants who are all at a variety of levels. Some have been in the project for 5 years others are new bees. Success: I think the fact that we went into each school and met with the teachers to talk about their individual needs and also give them one to one training made a huge impact. We developed that trust and in that increased the amount of face-to-face time, which we all know is very valuable. Many teachers took risks [Proper Names].... the list goes on of all new teachers who took a leap. For example [Proper Name] and [Proper Name] worked on an amazing collaborative project, which included lots of communication with teachers, and students. They even met twice in each other's school. The outcome was fabulous!!!!!! Another example of success was the ongoing email communication I have had with [Proper Name] helping her every step of the way with her Voice thread. Until she did it and was so excited.

Give us an example of ICT use by a teacher that you find particularly good or exemplary from your perspective.

Teacher Leader 5: For this I could pick anyone from St-Johns but that would be biased, but [Proper Name] for sure is amazing!!!She is a fabulous teacher who uses technology to enhance her curriculum. She has used podcasts, word, PowerPoint and wanted to go into comic life next. One day she was away and her students were very disrespectful toward her substitute so she got them to do a podcast teaching others how to treat a substitute teacher. She is not afraid to share her ideas with other staff members and us and is willing to put up all her students

work on the wiki. Her next step would be to collaborate with others outside her school (like [Proper Name] and [Proper Name]). We have so many great teachers!!!!

Interview with Teacher Leader 6

Brief factual questions

Interviewer: How long have you been teaching/working, in the school board, in your current position?

Teacher leader 6: I have been with the school board since the transition...I taught at the high school level for 11 years with [Proper Name]...then I stopped for 12 years when my children were growing up and I came back here in 1997, so I taught until I became principal, this is my fifth year as principal.

Interviewer: In 1997 you came to the, what was it? [Proper Name]? Teaching high school still?

Teacher Leader 6:No I came into the elementary school and I've taught everything from kindergarten up to grade 6, then at the high school level, I taught business English. I taught math for about, well, 5 years I was heavily into math, up to the Cycle 4 level at that school.

Interviewer: Describe what you do as a BCTN Lead Teacher.

Teacher Leader 6: Now one of the biggest...I came into the BCTN project, I think, four years ago, three, four years ago. And, and I uh, the first couple of years I really acted as an observer because I wanted to see the interaction between teachers. Being a principal now, I have to know how to deal with teachers and how to get them motivated. Okay, so when they approached me about the BCTN project, I really wanted to go that route, it wasn't just a case of getting teachers to work together, it was really getting them to reflect on what they have been doing and what they could do together.

Interviewer: I think that was your motivation ?

Teacher Leader 6:That was my motivation, because I am a big project person, I used to teach my projects and I always did my projects cross-curricular and I liked, I like it when teachers work together because I used to, you know, I used to, to be honest with you, pick other teachers' brains, they'd come and help me, but they didn't reciprocate, you know what I mean? They were shy and it's not because the teachers don't want to share, it, for some odd reason they are so outgoing in the classroom, but when they get with colleagues they are afraid of any kind of constructive criticism and so I wiped constructive criticism right out of my vocabulary, and really thought, now we need to go for support. Support of each other but there is no judgment. We did that within our own school here, and I think that's why my teachers, not the teachers that want to come back to teach here, they had to wait to get any of my positions. But they want to come back. And it's just the way we run the school.

Interviewer: What is it called?

Teacher Leader 6: We run it as a regular teaching position.

Interviewer: And the, uh, so you had new teachers?

Teacher Leader 6: I had everything from new teachers to a teacher who has had 44 years' experience and I really have really worked on motivating teachers. And you know what? It's not the really experienced ones; it's my young ones coming in that need the motivation.

Interviewer: That's interesting. I've noticed that as well.

Teacher Leader 6: You have? It's not just incoming?

Interviewer: No.

Teacher Leader 6: And I'm not sure what it is, not sure what it is.

Interviewer: We'll have this discussion a bit later. So you're discussing what you did as a principal at the periphery.

Teacher Leader 6: The periphery of the BCTN Project.

Interviewer: But then, since this year .

Teacher Leader 6: OK so this year...when we really sat and talked about this, and [Proper Name] said "For this year, let's keep it within our own school", because really, I was really interested in that because I want my teachers, I want them to develop a community of practice within our board so that we share resources. That's not saying that we aren't going to share with outside boards, but you know the old baby steps. Start small, which is what, exactly what we've done. What has happened, which was a sidebar to this, is, um, what we ended up hosting, I've done two this year, but this last one we had 4 school boards' representatives, principals and teachers that came to visit the school. And they spent the entire day with us, and they visited the classrooms. The teachers were able to talk to my teachers about how they use technology, how did you, how did you even buy it, let alone use it. And they made some connections there. Connections that I would like to see us, I won't say push next year, but explore a way of doing some inter-board group. But that was a sidebar! We never expected to do that this year, it just happened, ok? What I'm really finding is, the teachers in our board, and this, please keep confidential, what I'm finding is the Northern teachers, the teachers who teach in the smaller communities, tend to do projects together, and the inner-city ones, ok ring a bell?, they're doing projects together. What I'm really pushing next year is to try and get, time's up. How we started to do this though? Because we've got videoconferencing, a mobile unit...we really. [Proper Name]. I had met with [Proper Name] and said, "Look, this is what we need to do". You would not believe, in the last, I would say 9 weeks, the video- conferencing we've had between schools, and it doesn't matter where in the board they are. But if you had asked me this at Christmas, I'd have said that it's a challenge that we are facing. It isn't a challenge anymore because now the people are so keen to talk to each other using the videoconference. Like I mean [Proper Name] moved way down. He shared his videos with my grade 5-6 class; they had a ball. And the kids were able to meet each other.

Interviewer: Where is [Proper Name]?

Teacher Leader 6: [Proper Name] is in, is it [Proper Name]? Yeah. So he's down, he's down towards [Proper Name].

Interviewer: Good. Ok as a BCTN leader can you report what do you do?

Teacher Leader 6: OK, one of the things this year, and I think the biggest thing, is number one, motivate. All right? And I really mean when we have our face-to-face meetings, which, you know I can go into a school, which I've done, and I've motivated teachers, but when you are doing a face-to-face meeting with a lot of teachers within your own board, and you actually can motivate them at the same time, they really, I don't know, there's something, there's a spark there, and they want to continue, they want to do projects. For me to go into a school and say, I go into a school after the face-to-face meeting, and they're all geared up, that's when I've got to give them the support, so the motivation comes first, the support comes second.

Interviewer: So your role is to help?

Teacher Leader 6: Oh it really, you going to facilitate them getting together, getting them on the right path. And it's not that they don't know how to get on the right path, they just need that, that, they need to feel confidence, and when they first come to BCTN, they don't have that confidence. A lot of them, they're confident but they're afraid to share, number one, share and number two, to start and develop projects together. So we make it, what we've done this year, I think, is make it easy for them, give them the time to plan their projects, and I've sent [Proper Name] out, if you saw the list of schools that he's worked in, it's, I don't know how he's done it. But he goes, he sets up, and he'll call me in the morning and he'll say "Look, do you think maybe this afternoon, [Proper Name] could take fifteen minutes and we'll video-conference between these classes. Well, it's not only the videoconference with the students; it's the teachers; them getting to know each other. Then they think, "Oh, maybe we could do a project together". And Voice threads has been a, you know [Proper Name] will be very happy, Voice threads, you should see some of the Voice threads. You people just missed the

Voice threads down here. I was like, going to haul you down. So that's a really big thing, the support, the motivation.

Interviewer: Can you describe BCTN project in your own words?

Teacher Leader 6:I think that the, I think that the word project is used incorrectly. OK? Uh I think it's, I'm not sure that I can say that it's a tangible thing but it's building a community of teachers, that by using technology they're really enhancing what the students are learning. And because I, as you know, this is the most outlying school, we've always felt like we're on the outskirts, we're so far away from everything that, I mean, when I get on a bus to go anywhere, I'm looking at thousand dollars, like I can't do many field trips a year. So it was a little bit selfish too, I mean I started to look at this, but when I say not tangible, I think it's a feeling more than anything. It's a collegial feeling that people are beginning to trust each other and to develop projects and say "Whoa look, we can do this", you know, "We can do—", I mean, I can give you all kinds of examples of the, that is, that have really happened this year, and some of them, the people that I didn't expect to produce what they produce are the ones that are, I mean at Christmas time, one of the girls produced a, and put it up on YouTube, it was a whole Christmas thing. It was fabulous. And I really…

Interviewer: Didn't see it coming?

Teacher Leader 6: Well, I didn't see it coming but she, when she came to me at the face-to-face, she really wanted to so badly, and one of the other people in her school, I called them on the quiet and said "Look, you know she's so keen, let's make sure that she keeps going". I mean, that's your way of motivating. And she said "Oh well, yeah", I said "Oh no no no no, don't be embarrassed, just go and offer your help". She did. And the girl took it. OK? So as a leader you have to, you've going to be aware of who you're working with and, exactly, and you know what? The first time I saw that, you know the BCTN training where we put up the long piece of paper, I tried it and thought "Oh it's nice, but I didn't realize that it had as much value as what it's had. I literally took it out and unrolled it, you know, the other day, and I looked at it and I went "When we go back next Friday, where are they going to put the sales on" I'm going to see how they feel, because what I see is completely different, because I have a teacher here who the minute I say "Can you do this?", and yet she's one of the top ones. But she still has that, just that little bit, um, she wants to share, don't get me wrong, she wants to support, but...

Interviewer: She's timid.

Teacher Leader 6: A little bit, yeah. You wouldn't think so, talking to her, but she is, yeah. She's timid. So next year, I just give her a little more support.

Interviewer: So what would you say of the main features of the BCTN project as you experienced it?

Teacher Leader 6: Collaboration. I think that's probably number one, is being able to collaborate with people. I think we come from such a diverse society that left out on their own, our children would learn. Having teachers that collaborate with other teachers, it just, it opens my children's eyes to the world. It really, really does, and I really mean that, and I think it's the same with a lot of schools. And you know, that's one of the things I miss, well, you can't have it both ways. One of the things that I would like to do next year, when I first came into the BCTN project, we met a teacher from the Gaspé, OK? And she was a teacher who was really, really willing to share, and I seized upon that opportunity. And this one particular teacher who came to me, is this confidential? She came to me after a burnout, she was, and she called me in the spring in tears wanting to know if she transferred here, would I accept her? And I said with open arms. So that fall, I set her up with a videoconference with the girl from the Gaspé. It was, um it was, you know once in a while in your career, you get that high moment where you think "I did something right?" Well, that was the day, because they formed a bond, they met, they emailed, they skyped, that entire year. The kids from there got to know these kids, by name, and about every second or third Friday afternoon, they'd get together,

they'd reach each others' stories, they'd do poetry. There was no planning in it, they just, and they spent the time to connect. So I'm, my aim is to pull that teacher, and she is a fantastic teacher, but she came out of a school that, they didn't understand her, they didn't understand. And that is sad. So that was my, that's my high point. I've had some low points, but that's my high point. So that to me is like, when you can incorporate that, and that's why I don't like to call it, I'm always arguing that that, it's just not a project. This has to be sustainable. The only way that I can see to make it sustainable is to really keep on encouraging teachers to share what they have. And you know, all of these board-wide pet days, and my board, I'm sure would kill me if I said it, they're fine, and it's wonderful to go and hear a speaker, it is, it's motivating, but somewhere along the way you've got to give people time to sit and talk and get to know each other. And that's what these face-to-face meetings do.

Interviewer: And what were the successes that you saw in BCTN?

Teacher Leader 6:Um, well the successes, I mean, we're going to see some of them next Friday. The successes, to me, yes it's about teachers, but even more so it's to walk in and watch a class that has come from, um, from straight old book learning to what they're doing at that particular time in the classroom. I mean, I walk into my own classroom, well, I just bought a response system not too long ago which she has incorporated, these children...I have two autistic children in there, seriously autistic, you cannot tell them apart from another child when she's on that board with them, because it's hands on, they're thinking, they're concentrating. That enhances children's learning. They don't forget what they DO. So that's the type of thing that's a real success for me, that I see, and I go to another school, and...and if I'm training on the Smart board. Like, I often will go in, and the teacher's upset with the kids. I model for her, before I even train, I go model the lesson, OK? So I'll call and say "What are you doing?" and "Oh well I'm doing something on bats" or "I'm doing something on insects" so I bring a little PowerPoint with me and I get the kids up drawing on the board, and she's sitting there, and then after I do her training session, I go "This is how easy it is, plug your computer in and I'm going to show you", and I give her a disk with about 150 different things on it, so the next morning she can bring it in, put it in, pull it up, and she's up and running. You wait a couple of weeks and you call and you say, "Do you need me to come back?" Very seldom, because once she's used it, and then other people in the school start to come by and they start to watch, and that's the point that we're at now. People are asking to get into this project. That's number one. Number two; you want the challenge that's coming up? All right. We had long discussions about this. And I'm not sure if it's the same in every other board but in our board, our children are so high tech when they leave elementary school, and then they hit high school. I have children who come back to me in November, now these are the children that I cultivate in grade 6, and I'm telling them "When you get to the high school, you ask your teacher", and especially my special needs children, "There is no reason why you can't do a book review and do it as a PowerPoint. Ask your teacher." They'll come back to me and they'll go "Well I haven't seen a computer".

Interviewer: You know, it's happening all over.

Teacher Leader 6: Is it all over? Oh boy.

Interviewer: I wouldn't say all over, but in other school boards.

Teacher Leader 6: So, our board, when the measure came down this year, it was, we really looked at this, because I sat on the committee, and we decided, you know what? We are doing our children a disservice. Yes, some of our elementary school, yes we need smart boards, but it'll come in the 2nd phase. We need to put Smart boards in every cycle 1 in our school board at the high school level. We need to train those teachers. That's the challenge this year.

Interviewer: Is that all?

Teacher Leader 6: We really talked about that too, and so the Smart boards are going into the high school, and we're going to try, really try, and base it on the, on the science area, because we've got science teachers who are pretty keen, so if we work with the science section, we're

going to start to pull in other people. If they see us in the high schools and they see our go-to teachers, this is the other thing, having a go-to teacher means they're willing, even though they're an elementary school teacher, they're willing to go and meet with a cycle 1 teacher at the high school level. Think about what it does for their confidence. So that's what we're looking at, that's the challenge.

Interviewer: Now, what are the challenges that you see?

Teacher Leader 6: I think one of the biggest things, or one of our challenges, this coming year, would be to really get that community of practice, um, let's get some solid things, let's put some, let's make sure we've got a portal or something that we can start and build a resource bank for everybody to use, OK? Using that resource bank, I can see that that's where we might make the connection with other boards, OK? Don't keep it closed; leave it open for other, other boards, that wouldn't say, "Oh look, they've got flip cameras, maybe we could, you know". Um, so that's—

Interviewer: Other challenges?

Teacher Leader 6: Other challenges… Um, I think probably just making sure about the teachers who are still reticent, uh, one of the things I really found interesting, when we called around to see, because we know what they're doing, but common courtesy dictates that I call and say, "So what are you doing? Is there something you could present, like, next week?" And they're still reticent. "Oh I did this project, oh but it's not good enough to show" "No, OK?" So, that's something that we need to cultivate next year. That there is nothing that you can show us that isn't good, because you didn't do it before, so it's going to be good no matter what. And people have to learn to trust themselves. I don't know what it is with our teachers. It's generalized. They're so confident in the classroom, but not when you get them together.

Questions with Scenarios/vignette

Scenario 1.

Interviewer: Kate is a teacher new to BCTN and she wants to do a project with ICT in her class. She has been teaching for over ten years, but has barely used computers in her class. She wants to learn about ICT tools she can start using with her students, but there are some issues inhibiting her. First, she is a bit nervous about all the tools available and all the new learning. Second, she is worried about the little time she has to learn them. Finally, she feels that the methods of teaching she has been using so far are still efficient in terms of students' learning, class control and time management. What are the challenges in this context? Describe your approach to getting Kate to participate in the BCTN Network.

Teacher Leader 6: You mean what would I do to help her?

Interviewer: yes, what your approach would be.

Teacher Leader 6: What my approach would be, OK. I think what my, what the main thing is. First of all, what type of equipment is going to be available to her? So it's a case of sitting down with her and saying "You know what? Your teaching methods are fine. Don't question them. The biggest thing is, let's look and see, is there something that you think your students would really want to do? And if you have the equipment, we'll start there". Let us say, for example, it would be a Smart board, if she could get a Smart board in her room, all right, I would then say, "Well how about if, you know what? How about if I come down to your school, and you're going to start this project, I'll come down to model a lesson, and you can watch, OK? Ask questions". And I said, "You know what, I'll guarantee you in half an hour those children will be up writing that". She'll say, "No, I know, no not my class". "No, just watch". So you go down and you model the lesson for her. And when she sees what the children are doing, because let's face it, especially teachers at the elementary school, they really care about their kids, and if they see their kids' interest is sparked, it's going to spark their interest, OK? And it wouldn't matter if I have to go down for two days in a row, three days in a row, then you start to work with her, and very, and I mean, you know we always say

we laugh about the baby steps, but you have to say to her, "OK look, why don't we put it all up on the Smart board? I'll come down, I'm going to be here to, you know, if you run into any problems, I'm here to help you, OK? And you know what? Ask the kids. If there's something that you've forgotten, ask the kids, because they're going to remember how to use that Smart board". And you have to get her to develop that trust in her own class that the kids learn faster than we do. And I blog with my five-sixes here and it's like, "Oh what did I do wrong? Somebody set this up for me", you know? And they think this is really funny. Uh, so I would work with her very closely, I would, if I had a BCTN teacher in her school, somebody who is going to share and check up with her, or you know, has a prep, when she's, you know, do up their prep with them, just make sure that everything's fine. One of the big things is, depending on what you're using, if it's one Smart board then that's a different matter. If you're using the flip cameras and there's four or five of them, um, they can leave two people in there. You never want them to have failure in that first learning curve. OK? So you make sure that there is no failure. Because I've taught classes and I've fallen flat on my face, but you know I've been tech- technical for a long time, and so, but you know what, that can happen to a new teacher, OK? And then you let her pace herself for a while, but you always call, every couple of weeks and say, "How you doing?" You know? "Anything I can help you with?" And if she says, and this is a biggie, "I'm having trouble with something", if it's something technical, you want to be on the phone to that IT department and you get that fixed. If it doesn't get fixed, she starts to revert back. That's why we need the IT departments so desperately. Because I have watched, I have, one of the biggest challenges, I'll tell you, it...well I've seen teachers fall flat on their faces, you know, they'll go in, they're set up, their lesson plans, they're fabulous, and five out of the twenty computers won't work, and they just pack it in and walk away. It's heartbreaking. It's heartbreaking! I always warn my teachers, "You know what? Keep something in your back pocket".

Interviewer: Scenario 2. Maureen is a cycle-3 teacher who has been in the BCTN Network since the beginning. Last couple of years she has had her class involved in collaborative projects using digital story telling, voice threads, etc. She is quick to learn new tools, and is confident in using them with her class. What challenges do you see in this situation? What could be her next steps in the BCTN network? What would be your suggestions to her?

Teacher Leader 6:I think her next step is to teach others right off the bat. That is, you know when it gets down to it, that's the main purpose of the BCTN project, to make people confident enough to share, to teach, to coach. That's part of the reason why, when we sat down to plan for next year, that, we looked at, you know, there was a big argument about lead teachers. I don't like the word lead teacher, to me, says, "You know more than I do", OK? So we call them go-to teachers. Those are the people who have been in the project for four years. Who really know what they're doing. I'm going to send them out into other schools, to do what all we lead teachers are doing. So, when your network, as it grows, like, people like Teacher leader 4 and I, why can't we do inter-board things? Our go-to teachers will get to that some day, but you know what? They're comfortable going to the schools in their own school board. That's where I see them going next. That's, number one that's a challenge, number two, let's face it, there is always something new in the multimedia coming out that they can learn, and we never ever stop them from learning. Like, right now, there's everything from that motto out there to whatever; we've got iPad projects that are going on. Uh, not many people in the BCTN network are using iPads, but guess what? They're out there, let's put them to use, let's see what kids can do.

Interviewer: Do you have iPads?

Teacher Leader 6: I'm going to have three next year, Uh, I have one now that I'm actually using here in the resource room, it's fabulous, the kids love it. So I've ordered two more, uh,

for use, and they're on days when my resource teacher isn't here, they're in the classroom. So my iPads are going to be used all the time. So that's what I've been doing.

Interviewer: Scenario 3. Jane, a cycle-2 teacher, wants to do a collaborative project with Blabberize in her class. She is not experienced enough to facilitate student group activities with ICT. What issues/challenges should be considered as she designs and implements her project? (e.g., grouping, responsibilities, classroom management, assessment).

Teacher Leader 6: I think that she's designing it, because she's lacking in that experience, that's where she needs some support. Uh, I would suggest then, if we have go-to teachers, and she's willing to work with them, that the go-to teacher come in, number one in the planning stages, number two, to be able to say "OK, when you start the project I'll be there to help you, we're going to work through all that, because you know we're all g-, we all hit roadblocks, so I'm going to be there to help you over that", because that's the teacher that we're talking about. If she falls flat on her face, she'll never do it again. That's what I'd like to use these go-to teachers for, and the teachers within their own schools, because we're trying to really expand the BCTN, but every school's got people in it that have been through the BCTN Project. And it's not just people coming from another school, because I mean let's face it, at 3 o'clock in the afternoon, the teachers get together, you hear them standing around and talking, so if I've got a teacher in every school that's been through the BCTN project, guess what's going to happen?

Interviewer: It spreads.

Teacher Leader 6: It spreads like wildfire.

Interviewer: Scenario 4. David is the new principal at an elementary school. After hearing you talk about the BCTN Network, he contacts you to get his school involved. He wants to start with one teacher, just to see how the network operates. He says that other teachers may get involved later if things work out well. He asks your advice on how to proceed. What are the challenges in this context? What would be your suggestions to David?

Teacher Leader 6: Well, number one, I would uh, I mean, it's already happened. You meet with these principals, uh, we met as a group but I had also, I had talked to every one of these nine principals beforehand, got on the phone with them, had a long talk, before...because I don't believe in calling principals to a meeting without them knowing what they're really coming for. They don't have the time, all right? And I don't have the time, so I sit at my desk and I talk to these people. And I did have, I had that, that exact scenario. I had a fellow call and he said "I'm really interested, but what do I have to do?" And I said "One thing, and one thing only, you have to support your teacher. That is prime. You, your teacher has to know that when they go to you for support, that if you can't support them, you're going to provide somebody that is". That, I think that's one of the biggest things. The other thing that I have found this year, we didn't d-, yes we did it before but this year because I guess it's our own principals, after we had our meeting I had two of the three other principals that called, and it's exactly the same thing, the principal (world is going to teach the world?), but if there's nine of those principals getting together, I should maybe get in on that, and teachers could benefit. That's what we're seeing now, OK? And that's a good thing, that's a good thing. You have to motivate the principals exactly the same way, and that's another thing that I told them. They all looked at me and I, you know, I went and followed up on it, but for now I just wanted to let it sit. I said to them "Don't ever, ever give me the excuse that you are too busy to walk down that corridor and say to the teacher "Can I come in and help you for fifteen minutes?" Because I said "You know what? That's the best kind of support you can give them", you know? If you've going to stay fifteen minutes longer in your office to finish up paperwork, so be it. But that's how you get your teachers to appreciate something. And so this young guy said, "I hear you, and I'm going to try it". So for one week he had those calls, at least a half an hour a day.

He called me at the end of the week and he "Will you be my mentor next year?" he says, he said "You wouldn't believe, now they're coming to my office and saying 'what do you think? Should I try?'" And I said, "You know, that's how at least one worked, because I got out of here at 6:30 at night. So that's what I would do with principals, but you know what? Principals also need a mentor, and principals need, I'll tell you something, principals need the reassurance, that, and again, for us in our board it's a biggie, we need the assurance that the IT department's going to be open to a call and say "Hey, I've got four computers that need to be looked at, can you please send someone?" Not on a regular, monthly schedule. I get a tech one day a month, and you know what? That needs to change, because if I've got a teacher in the BCTN Project...now that's the challenge, and I'm not sure whether that's a fixable, yes it is, if we get the right, I think if we get, I think we'll get the support from the IT department if we approach it properly. But beating them over the head isn't going to do it, coming and saying "Look, we really need help. This is where our board is going, these are our goals, we need your help".

Interviewer: Hopefully you will have it.

Teacher Leader 6: Better with sugar than with sale, eh?

Short Scenarios.

Interviewer: What would be your response to these situations? (To avoid/solve these problems) (a) Suzanne has prepared her content in digital format, to be presented to class on the smart board. The computer freezes; she does not know what the problem is. After a few minutes of trying to restart the computer, etc. she gives up, and decides to present the material without the smart board.

Teacher Leader 6: You know that's the situation of dread, when you say if it happens, a teacher...I, I think my response, because she's going to tell somebody about it, "I tried it and it didn't work, and I'm not doing it again". OK, so if you have a BCTN teacher in that school, we know who hears this, that's when you, and I mean you've trained these people carefully. When that happens to somebody, make sure you go in and say, "Look why don't we, I'll come in and I'll help you. Let's see what went wrong so we can fix it". Because we always tell these teachers, you and I know something's always going to happen. So you've got to be prepared for it. So without being judgmental or something, if she feels somebody's there who's going to look at this with me, she may pick it up and keep on going. And if she, if you can just get over that, that hump, you know that bump in the road, she'll keep going, she'll keep using it. And the more she uses it, the more she's going to be able to solve her own problems. Because nine times out of ten, it's a case of "You know what? Shut the computer down, let it sit for a couple of minutes, and let's turn it back on and see if it'll reset itself, because people are click-happy. It's a human nature thing. I call it the click-happy syndrome. Well it's true, you sit there and if it doesn't, they click, and then, so the computer freezes!

Interviewer: (b) Michael has started using voice thread in is classroom. Students take turn in recording their voice but at the end when he listens to the voices he notices that due to the Internet failure, some of the sound has not been recorded, or there are cut offs. He feels helpless, as the technical support for a better connectivity in school is not available.

Teacher Leader 6: Not available or...?

Interviewer: For better connectivity .

Teacher Leader 6: For better connectivity. I think that's a case when you have to either try a different route or, or you talk, and you know, this is where we talk to the school principal, you say "You know what? I have no connectivity in this room, is there any way we can get a point put in?" Because at least that's showing that teacher that he's getting that support from his principal. And that's one of the things we, that when we've talked to the principal, we say "A lot of people don't want to do this because they're afraid that when they do it, they're going to hit this stumbling block that they can't solve a problem, you've got to be there to support

them". And you know what? If that's 400 dollars for that point, it's 400 dollars well spent. So that not being available, then he might have to look at, at, maybe readjusting the Voice threads, maybe uh, recording them outside and then, because you can send your recorder home with a child and then get it up on the Voice thread. There's always ways around it, OK? We have these little 50 dollar recorders that are, well the digital with the memory. Because we use them in our, in our grade 1, they record themselves, and a month later they listen to, they reread the story and then they listen to themselves, and they do self- reflection on it. So we have these things, so it's not hard to have a child sit down, record that, and then...

Interviewer: Yeah.

Teacher Leader 6: There are ways around it, and teachers need to know that the path is not this way, that there is openings all the way down, so that if something doesn't work, you going to be creative.

Interviewer: And flexible, aware also of the alternatives.

Teacher Leader 6: This is why I always tell them "Have something in your back pocket".

Interviewer: Yeah, exactly. Plan B. All right, thanks Teacher leader 6, that was not too uh... Teacher Leader 6: Oh I'm still standing. I'm not sure it was what you wanted.

Interviewer: Sure!

General topics

Interviewer: What is your view of ICT use in education?

Teacher Leader 6: I think if we don't, if we were to step back and not allow, and I, I mean allow, I don't mean teach our children, but allow our children to use the technology, they are, they're not going to succeed in the outside world. They really aren't. And whether we like it or not, it's here to stay.

Interviewer: So it's part of success?

Teacher Leader 6: It has to become part and parcel of their education. And you know, I'm not saying to leave the books behind. I mean, you've seen my library, it's used, don't get me wrong, it's used. But, for example, when iPads came out, you know the board was very iffy, "Oh it's a Mac, yeah well I don't know", and "You know what? I need to let these children explore". And that's why I've got three going next year, because I want them to explore. I want them to see the difference in technology. And I want them to use it. And I'll tell you something. The challenge is never-ending. My children are using technology that defies their parents.

Interviewer: Do you want to elaborate on that?

Teacher Leader 6:Yeah, um, we've had some episodes on Facebook. Um, not very pleasant. A letter was sent home to the parents, you know, explaining to them, that what they model their children, we find that, our children will tell you I, [Proper Name] I'm on the wrong website, I shouldn't be here. Different generation. They weren't led through the process of using the Internet. My kids know that I walk them through an...um, I'll tell you a good story. We had a teacher here, uh, an older teacher, her granddaughter, they live just outside of Vancouver, well actually about two hours north of Vancouver, and this girl's daughter, who was 14 or 15 got on the internet with some guy who she thought was 16 years old, so they back and forth ok, on Facebook, on whatnot, and he talked her into going, taking a bus to Vancouver to meet him.

Interviewer: She's 15?

Teacher Leader 6: She's 15. She's in high school. So the mother went to work, the daughter went to school. At 10 o'clock in the morning the mother ran down to pick up coffee and donuts for the staff in her building and she went to use her credit card and her credit card was gone out of her purse. And she was panicking, so she phoned her husband and the husband went back home, and the credit cards not there. So they called the credit card company to cancel the credit card, and the credit card company said, "Your credit card was used this morning". So then they called the police. The kid had stolen the mother's credit card, used it to buy a bus pass to Vancouver, so the police met the bus, and guess what?

Interviewer: The 16 year old guy was a...?
Teacher Leader 6:43 years old and a child molester!
Interviewer: He has a record?
Teacher Leader 6: A record! So, you know what? These kids were told about that. Because I have young girls here telling me "Oh I met this guy on the Internet and he's in Montreal, Mrs. [Proper Name], he's 12. And I say, "No, he's not 12 dear". So the teacher whose granddaughter this was, she comes in to tell it. And you know what? We have had nothing since, nothing. So our kids know how to use the Internet properly, but their parents? If you'd see what they put up on Facebook...well, I'm to the point that the next thing that goes up, I'm going to shut the whole thing down. So that's, in a nutshell.
Interviewer: Describe how a teacher learns a new ICT tool (i.e., selection of a tool; learning resources (e.g., guidebooks, online tutorials, friends/colleagues); learning process; trouble shooting)? What do you see as key ingredients in to that process? What happens process- wise and tool-wise,[and there might be different cases as not everybody learns the same way] when a teacher learns a new ICT tool?
Teacher Leader 6: How do they learn?
Interviewer: Yeah.
Teacher Leader 6: Hands-on. It has to be hands-on. We did that day, the board offers where we had them choose what they wanted. I cannot tell you how many teachers emailed me after it and said it was one of the most valuable experiences, but, there's a but, I made very sure I knew who went to which workshop, and we called them back and said "Hey are you using that? Are you trying it out?" And if they said "No, I uh, I forgot to do..." then "You know what, [Proper Name]'s going to be around there, he'll stop in and just give you a little refresher". And that's how the teachers in the BCTN started to really use their stuff. They learned that day it was hands-on, they were taught by another teacher, not by me per se, but by another teacher, and there's another thing that brings in the collegial, because it's a teacher teaching a teacher, but it has to be hands-on. You can talk from now 'til Doomsday, and unless they get a chance to sit down and try it, like they did the Send Live, we did the Send Live that day. Talking about the Send Live means nothing until you can actually get on and hook up. They were having a ball; they were talking to each other, the next thing, and "Oh wow look at this Gail!" They would have never used it though if they hadn't had hands-on. And the same thing with the Voice thread, unless someone's sitting beside them and showing them how to do Voice thread, uh...I hope you're coming next Friday?
Interviewer: Yes I am.
Teacher Leader 6: Because you're going to be amazed at what's going on…