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An Investigation of Multiliteracies Pedagogies in Language Teacher Education: A Mixed Methods Study

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Abstract

Research into teacher preparedness within teacher education programs and its relationship to teacher attrition is an increasing area of interest in Canada and around the world. In Canada, on average, the estimated turnover for second language educators is approximately 30% in the first five years and 50% of these are within the first two years (Canadian Teacher's Federation (CTF), 2004; Karsenti, Collin, Villeneuve, Dumouchel, & Roy, 2008; Siwatu, 2011; Swanson, 2012). The CTF (2004), French and Collins (2014), Karsenti et al. (2008) and Swanson (2012) have reported on several factors that influence language teacher attrition and retention: teacher preparedness, teacher self-efficacy, and teaching for student cultural and linguistic diversity (CALD). Given that language teacher attrition rates remain high and teaching for CALD is a prominent challenge for language educators, there is a high demand to prepare future language teachers to teach multilinguals (Cummins, 2006; Egbo, 2009; Mady, 2007, 2012; Schecter, & Cummins, 2003). Through a mixed methods approach using an online survey and interviews, this study investigated student teachers' knowledge, attitudes, skills, and self-efficacy to teach with technologies and strategies for teaching CALD students. This research is based upon a multiliteracy theoretical framework combining technologies and critical literacy pedagogies. It reports on technologies and multicultural teaching strategies being used in teacher preparation courses and practicum placements. Finally, it provides ways of how teacher education programs could assist in further supporting student teachers in their transition into professional practice to increase self-efficacy and more effectively support Canada's diverse multilingual student body.

Keywords: Language Teacher Education, Cultural and Linguistic Diversity (CALD), Educational Technology, Multiliteracies Pedagogies, Mixed Methods

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Chapter 1

1 Research Positionality

As a language educator who has taught in various provinces across the country, I found many challenges transitioning into professional practice in multiple contexts throughout my teaching career. I have found that intensive training in my teacher education program in the areas of information communication technology (ICT) integration to be extremely beneficial for my confidence, competence, and willingness to integrate technology effectively to enhance language teaching and learning. However, I have struggled considerably due to a lack of preparation to teach and include the multiple student identities and linguistic repertoires of my students.

I began my teaching career as an elementary French immersion teacher and taught many students from various social, cultural, and linguistic backgrounds. In a grade 2 class I had a student from Iran spoke a different home language than that of English or French that was taught in school. He was a bright student, well liked with many friends in the class and in the school. His comprehension of French and English were developing well however he had considerable difficulty in reading, writing, and following multi-step directions. In unstructured environments that were unfamiliar such as classroom excursions he had difficulty coping with the changes throughout the day, he became quiet, distanced, and unengaged, though consistently well behaved. As a beginning teacher I struggled with how best to engage him in the classroom and provide him with adequate support. The school had an English as a Second Language specialist who offered individual support, however this was done during content learning time (e.g. Social Studies or Science) and he therefore missed out from these learning opportunities. I found this frustrating (and so did he) and as a result the administration decided it would be better for him to be placed in a mainstream English classroom ‘to focus on his English first, before learning French’. I was saddened by this decision, as I did not feel as though it was the right decision to remove him from the social connections he had made in our

classroom. I felt as though I had failed him and if I had been better prepared I would have been able to meet his needs.

Aside from this experience, I worked as a Graduate Research Assistant for two years on a major external research project led by Dr. Julie Byrd Clark, entitled "The pedagogical experiences and investments of multilingual student teachers of French as a Second Language in Ontario: From volition to professional insertion". This international research project (2011-2014) was funded through the Social Sciences and Humanities Research Council (SSHRC) of Canada, and as an assistant, I worked on setting up, maintaining and overseeing all of the technology (both synchronous and asynchronous) for communication between the different sites. This project provided me with direct hands on experience with the opportunities and challenges of incorporating technologies into a French language teacher education program. It also gave me insights on multimodal ways of teaching and learning, and how technologies can be used as pedagogical tools to support linguistic and cultural diversity.

I therefore come into this study with a pragmatic worldview: to investigate the ways in which teacher education programs are preparing language teachers to integrate ICTs effectively and to capitalize on student cultural and linguistic diversity. Pragmatism argues there may be both singular and multiple versions of the truth and reality, sometimes subjective and objective, and sometimes scientific and humanistic (Denscombe, 2008). Therefore, within my pragmatist worldview, it is my belief that knowledge is co-created through external influence of society, and internal personal experiences (Creswell, 2005; Schwandt, 2000). My assumptions are that I have developed subjective meanings of the experiences of my participants and these meanings are varied and multiple, which has lead me to look for the complexity of views rather than narrowing meanings or taking them at face value. My ontology (subjectivist/constructivist) is that reality is socially constructed with the possibility of multiple perspectives, as the 'truths' uncovered within my study were complex, multilayered, and conflicting (Creswell, 2005; Koro-Ljungberg, Yendol-Hoppey, Smith & Hayes, 2009; Schwandt, 2000). Overall, my choice of employing a mixed methods

design has taken into account the many advantages (see Chapter 3 Methodology for details), which has assisted me in better answering my research questions of the relationship between language teacher self-efficacy, multiliteracies pedagogies, and how faculties of education are preparing their future teachers. I have also taken into consideration the use of multiple methods to engage with researcher bias by collecting multiple forms of data and data triangulation or "methodological triangulation" (Denzin, 1970). Cohen and Manion (2011) state that, "[Triangulation is an] attempt to map out, or explain more fully, the richness and complexity of human behavior by studying it from more than one standpoint" (p.254). In addition, according to O'Donoghue and Punch (2003) "triangulation is a method of cross-checking data from multiple sources to search for regularities in the research data" (p.117). The methods of triangulation included in this study were: document analysis, an online survey, and interviews.

1.1 Introduction

Research into teacher preparedness within teacher education programs and its relationship to teacher attrition is an increasing area of interest in Canada and around the world. Karsenti and Collin's 2013 study of teacher attrition reported on an average of 40% or higher drop out rate in The United States and The United Kingdom. A recent study in the United States reported the estimated rate of new teachers leaving the professional within the first five years ranges from 40%-50%, with the greatest amount occurring in high-poverty, high-minority, urban, and rural public schools (Ingersoll, Merrill, & May, 2014). In a Canadian study conducted in 2004, the teacher attrition rate was approximately 30%, and in 2013, had climbed to approximately 50% in the first five years. Second language educators, (which includes English or French as a Second Language teachers) were among the highest (Kutsyuruba, Godden, & Tregunna, 2014; Canadian Teacher's Federation (CTF), 2004; Karsenti, Collin, Villeneuve, Dumouchel, & Roy, 2008; Swanson, 2012). In a Canadian wide study of French as a second language teachers (FSL), about 40% of teachers have considered leaving the profession (Lapkin, MacFarlane, & Vandergrift, 2006). According to Karsenti et al. (2008) research in the

area of teacher attrition is increasingly difficult to conduct as it is challenging to obtain an adequate sample size of teachers who have left the profession. Despite this, the CTF (2004), French and Collins (2014), Karsenti et al. (2008), Karsenti and Collin (2013), and Swanson (2012) have attempted to reach out to those who are no longer in the profession and have reported on several factors that influence and affect language teacher attrition and retention. They have concluded that language teacher attrition rates are high as a result of the lack of initial teacher education program preparedness, teacher self-efficacy (a belief in one's capabilities), support and mentoring for transition into professional practice, lack of support from administration, access to adequate teaching materials, work conditions and workload, classroom management, and strategies in teaching culturally and linguistically diverse (CALD) students (French & Collins, 2014; Karsenti & Collin, 2012; Karsenti et al., 2008; Lapkin et al., 2006; Siwatu, 2011; Swanson, 2012). In addition, according to Siwatu (2011) "Research findings suggest that teachers in America and abroad who doubt their capabilities to manage daily classroom challenges are likely to experience higher levels of burnout, resulting in a decision to leave the profession" (Schawarzer & Hallum, 2008; Skaalvik & Skaalvik, 2007 as cited in Siwatu, 2011).

For the purposes of this research, culturally and linguistically diverse students (CALD) are defined as students who speak a home language of other than English or French and are representative of diverse communities and cultural backgrounds from different countries. Studies involving language teachers have also found that integrating technology and capitalizing on CALD are areas in which both novice and experienced teachers require more support (Cummins, 2000, 2006; Duff, 2007; Faez, 2012; Garbati, 2013; Lapkin, et al., 2006; Lapkin, Mady, Arnott, 2009; Salvatori, 2009). Researchers, educational leaders, teacher educators, and policymakers may benefit from increased understanding of how educational systems might assist in retaining teachers. Research has also indicated that studying teachers' beliefs and perceptions about ELLs is important as it shows a connection between teachers' judgements and students' abilities to learn. In some cases if these judgements are negative it could have negative consequences for student learning (Lucas, Villegas, & Martin, 2015).

A growing area of research examines ways in which multiliteracies pedagogies and critical literacies conceptualize cultural and linguistic diversity and the integration of new technologies. Multiliteracies pedagogies refer to teaching strategies or methodologies for the increased intercultural communication (multiculturalism and multilingualism) in the 21st century and how new technologies change the way people communicate (The New London Group, 1996). For example, the multiliteracies approach includes: Overt Instruction (explicit teaching), Situated Practice (connection to prior knowledge and experiences), Critical Framing (critical thinking/analysis), and Transformed Practice (practical application of knowledge) (The New London Group, 1996). According to Karsenti and Collin (2013), the integration of information communication technologies (ICTs) can assist in supporting teachers in the induction phase of their careers in an attempt to reduce the challenges associated with transitioning to professional practice. In addition, Byrd Clark (2012) states:

> With the growing number of multilingual students from diverse backgrounds participating in FSL teacher and language education programs, there is a critical need to (re)shape pedagogies that reflect the complex linguistic repertoires and social practices of youth with multiple, heterogeneous identities in today's classrooms (p. 143).

Therefore, students require a diverse pedagogical approach and trained language teachers who are able to confidently apply a variety of pedagogies.

The focus of this study was to investigate the ways in which teacher education programs are preparing second language teachers to teach for student diversity, explore if and how multiliteracy approaches are instituted within these programs, and how student teachers perceive, understand, and feel about incorporating strategies for technology integration and teaching CALD students. It also measured student teachers' knowledge, skills, and self-efficacy in integrating technology and as well as attitudes, self-efficacy, experience, and beliefs in multicultural education.

This research study contains seven chapters: (1) Introduction, (2) Literature Review and Theoretical Framework, (3) Methodology, (4) Quantitative Data Results, (5) Qualitative Data Results, (6) Merged Mixed Methods Results, and (7) Conclusions.

1.2 Rationale

Over the last few decades, research has called for the increased need for cultural and linguistic diversity education within teacher education programs due to the growing number of multilinguals in Canadian classrooms (Byrd Clark, 2010, 2012; Cummins, 2001, 2006; Duff, 2007; Egbo, 2009; Mady, 2007, 2012; Schecter, & Cummins, 2003). Given that language teacher attrition rates remain high and that teaching for cultural and linguistic diversity is a prominent challenge for language educators, there is a demand to prepare future language teachers to teach multilinguals to increase student teachers' self-efficacy (Cummins, 2001, 2006; Duff, 2007; Egbo, 2009; Faez, 2012; Mady, 2007, 2012; Mujawamariya, 2001; Schecter, & Cummins, 2003). There has also been research into the ways in which the integration of technology through the application of multiliteracies pedagogies assists teachers in planning to teach for CALD. Much of this research (Cummins, 2006; Henderson, 2012; Lotherington, 2007; Lotherington & Jensen, 2011; The New London Group, 1996), however, has been conducted in mainstream classrooms and not in the context of second language education: French as a Second Language and/or English as a Second Language.

Numerous studies that have investigated the ways in which multiliteracies pedagogies conceptualize learning in English (Lotherington, 2007; Lotherington & Jensen, 2011; Cummins, 2000), but few that have focused on language teachers or the impact of language teacher education programs that follow a multiliteracies approach. Other research studies which focus on faculty and/or student perspectives on multicultural education and/or technology integration all took place within the United States (e.g. Bowser, 2008) and did not have a population that included language teachers, a focus on multiliteracy pedagogies, or followed a mixed methods design. There is also no link to teacher attrition as the majority of these studies (Okojie-Boulder, 2010; Hsu, 2009) advocate for a change in social justice and equity and their theoretical underpinnings stem from inequity within a marginalized population.

As language teachers face unique challenges such as teaching for student diversity, integrating ICTs, and access to a lack of resources (see Chapter 2 for more information)

this research is timely as it has investigated ways in which teacher education programs are integrating multiliteracies pedagogies to prepare student teachers for the complex social realities of teaching in a 21st century classroom. This complexity refers to creating awareness for student teachers of the cultural and linguistic varieties of languages and student experiences, as well the technological and increased mobility due to globalization. This study also relates to research in self-efficacy in second/foreign language teachers in Canada and the United States (e.g. Swanson, 2012). Self-efficacy is an increasingly researched area, which has shown that higher teacher self-efficacy is associated with higher teacher satisfaction, lower burnout, and as a result lower attrition rates (Swanson, 2012). Swanson's study found that some teachers leave the profession due to a lack of confidence to teach cultural knowledge, classroom management issues, and teacher burnout. It is evident from this study that many beginning teachers still feel unprepared once they transition into professional practice and eventually leave the profession. Unpreparedness of preservice teachers' transition into professional practice includes a number of factors, two of which will be focused on in this research study: technology integration and teaching culturally and linguistically diverse students. Further explanation about teacher unpreparedness will be given in Chapter 2.

Through a mixed methods approach including an online survey and interviews, this research focused on the relationship between student teachers' perceived preparedness and willingness to teach with multiliteracies pedagogies and if and how teacher education programs are responding to the critical need to educate teachers in the areas of ICT integration and CALD. It is anticipated that the findings from this research will not only be applicable to the Ontario context where the study was conducted, but may also inform other Canadian provinces that have high populations of multilinguals.

1.3 Research Questions

Quantitative:

1. What are student teachers' technological, pedagogical, content knowledge, skills, and efficacy to integrate technology in three different teacher education programs in Ontario?
2. What are student teachers' *Multicultural Efficacy Scale* scores on experience, attitude, and efficacy to integrate multicultural strategies in three different teacher education programs in Ontario?
3. Are there any significant correlations between student teachers' TPACK and MES scores on knowledge, skills, experience, attitude, and efficacy to integrate multiliteracies pedagogies in three different teacher education programs in Ontario?

Qualitative:

4. What are student teachers' thoughts, beliefs, and perceptions of their knowledge, skills, and abilities to integrate technology and multicultural strategies in a diverse classroom?
5. How do student teachers learn about pedagogies to integrate technology effectively, and pedagogical strategies for teaching culturally and linguistically diverse students?
6. What challenges do student teachers feel they continue to face in integrating technology and multicultural teaching strategies?
7. In what ways are student teachers integrating technology and employing strategies for teaching CALD students?

1.4 Context/Background

According to Citizenship and Immigration Canada (2010), 88% of Canada's citizens and permanent residents identified a language other than English or French as their mother tongue. Canada's immigration rate remains one of the highest in the world "Immigration has always been a sustaining feature of Canada's history and continues to play an important role in building our country" (Citizenship and Immigration Canada, 2012). With this ongoing immigration trend Canadian teachers see multiculturalism and multilingualism on the rise, resulting in an increased need to educate future teachers on how to teach for student cultural and linguistic diversity. Canada and Ontario's diverse demographics include not only over 200 foreign languages that are spoken at home, but also include various French and English dialects (Statistics Canada, 2012). These multilingual features make Canada and Ontario unique in the ways in which they structure language teacher education programs to adequately prepare student teachers for the complex social realities of the contexts they will encounter in their transition into professional practice. It is therefore important to investigate and explore ways in which faculty members and teacher education programs are instituting changes to educate their future language teachers through a multiliteracies framework. Multiliteracies offer a way to contemplate this research problem by investigating the ways in which teacher education programs are employing a multiliteracies approach. With increased globalization, new ways of interacting and learning that involve critical thinking, problem solving, and the ability to navigate between various types of texts in a multitude of contexts, "…it is generally expected—in the workforce, in the classroom—that we become adaptable and receptive problem-solvers through a diverse means of communication. The best way to promote this functionality is through multiliterate learning" (Robertson, 2012, para. 5).

Multiliteracies pedagogies encompass different approaches in teaching literacy that include didactic, authentic, functional, and critical literacy which extend from one subject area to form the basis of thinking in all subject areas (Kalantzis & Cope, 2012). They involve a shift from a more traditional approach to teaching (teacher-centered direct

instruction), to one that includes the knowledge, skills, and attitudes to be successful in a 21st century classroom in a variety of contexts. Therefore, in this section I will present information on the context/background of: (a) Canada's linguistic and cultural landscape; (b) French as a second language education in Ontario; (c) Canada and Ontario's language teacher education programs; and, (d) recent changes in Ontario's teacher education programs.

Canada's Linguistic and Cultural Landscape

The Official Languages Act (1969) declared Canada to have two official languages to ensure respect for equal rights for English and French, support the development of English and French in linguistic minority communities and advance the use of English and French (Office of the Commissioner of Official Languages, 1969). Canada's Roadmap to Linguistic Duality was an initiative from 2003-2008 and again in 2008-2013 in order to promote Canada's official language through education, summer bursaries, and support in minority language speaking communities, among other examples. As FSL education is compulsory for students in five Canadian provinces (Ontario, New Brunswick, Newfoundland and Labrador, Nova Scotia, and Prince Edward Island) it is important to follow the pedagogical experiences of FSL teachers. Among the G8 countries, Canada has the highest immigration rates at 20.6%, and by 2031 this is projected to increase to approximately 30% (Statistics Canada, 2015). In 2012, Canada's citizens and permanent residents claimed one of 200 languages other than English or French as their mother tongue (Statistics Canada, 2012). Given these figures and Canada's aim to continue to have linguistic duality, language teachers have an important responsibility to not only have expertise in teaching multilingual students who speak a language other than English or French at home, but also to incorporate into their teaching the varieties of French that exist as part of Canadian culture through a dynamic multiliteracy approach.

As previously stated, multiliteracies pedagogies include four different types of literacy pedagogies: overt instruction, critical framing, situated practice, and transformed practice These provide a framework to teach for student diversity and consider diversity a

resource in teaching (see further explanation in Theoretical Framework section of Chapter 2). According to Kalantzis and Cope (2012) these pedagogies provide a balanced approach to effective literacy teaching and learning and embody strategies that assist teachers in teaching for student linguistic and cultural diversity. A pedagogy of multiliteracies is an adaptable framework which is still widely used from its creation by the New London Group in 1996 to other contexts with high populations of multilinguals such as Australia (Henderson, 2012; Henderson & Exley, 2012).

In addition, The Canadian Multiculturalism Act (1985) also stipulates, "preservation and enhancement of multiculturalism in Canada" (Minister of Justice, 1985). This Act promotes the power and diversity as an "invaluable resource" and shows the importance of how this will shape Canada's future. It fosters appreciation and value of dynamic cultures, races, and languages as a "fundamental part of Canadian Heritage" and advocates for equal opportunity (Minister of Justice, 1985). The Canadian government promotes and values diversity and the language used within this act is a clear example as to why it is important to educate our future teachers about the value of diversity in our schools instead of seeing it as a challenge or deficit.

French Language Education in Ontario

In line with the Ontario Ministry of Education (2013) guidelines, students in publically funded English schools are required to study FSL from grades 4-8 and earn at least one credit in secondary school (9-12) to obtain the Ontario Secondary School Diploma. FSL programming is available to all students in English speaking school boards and includes students with special needs and English Language Learners (ELLs). There are three program options offered in Ontario: Core French, Extended French, and French Immersion. Core French is taught as a subject and students must accumulate a minimum of 600 hours of instruction by the end of Grade 8. In Extended French, students are also taught French as a subject, however this is also with the addition of French serving as the language of instruction in at least one other subject. Finally, French Immersion is also taught as French as a subject with two or more additional subjects taught in French. Each school board's starting points for immersion students and inclusion of English as a

subject vary from Kindergarten to Grade 8. According to Lapkin, Mady, and Arnott (2009) only 3% of students continue to study Core French past grade 9. Due to the dramatic drop out rate of students ceasing to study French in grades 9-12 and students' lack of interest in learning French, Ontario has also introduced in February of 2013, *A Framework for French as a Second Language in Ontario Schools, Kindergarten to Grade 12* (Ministry of Education Ontario, 2013). This was created in an effort to increase proficiency, confidence, and achievement in FSL. In addition, this framework sets out to increase student, teacher, parent, and community involvement in FSL thereby increasing the amount of students studying FSL after the minimum requirements have been fulfilled. This program has been modeled after the Common European Framework of Reference for Languages (CEFR), which is used to describe the achievements and proficiency of students learning an additional language. The common reference levels for the CEFR are divided into six levels (beginner through to proficient) to describe what a learner can do in reading, writing, listening, and speaking (Council of Europe, 2011). As a result of these contextual challenges (e.g. student engagement) the Ontario government is seeking to change the ways in which society views French to be a valuable resource and skill. The *Framework for French as a Second Language in Ontario Schools* also advocates that the programs be designed for all students irrespective of cultural or linguistic background. Through research studies conducted in Ontario on CALD students studying FSL (e.g. Cummins, 2006; Lapkin, Mady, Arnott, 2009), evidence shows cognitive advantages and benefits from learning an additional language.

English as a Second Language Education in Ontario

The Ministry of Education has several curriculum documents on its website for teachers, principals, and other educational professionals to support English Language Learners (ELLs). There are guidelines for kindergarten, grades 1-8, and 9-12 that provide strategies and techniques for teaching ELLs, share research findings, and support measures in working with families, to assist ELLs to achieve curriculum standards while learning English (Ministry of Education Ontario, 2005, 2007a, 2007b, 2008a). In addition, there are also supportive documents for students of immigrant families who

have limited schooling background (2008b), as well as policy and procedures for implementation of programming for ELLs (2007c).

Language Teacher Education in Canada

According to the Association of Universities and Colleges in Canada (AUCC) (2014) there are approximately 59 teacher education programs that provide a Bachelor of Education in Canada: five in Nova Scotia, six in Alberta, eight in British Columbia, four in Manitoba, three in New Brunswick, one in Newfoundland and Labrador, one in Prince Edward Island, seven in Quebec, three in Saskatchewan, and 21 in Ontario. Each province is responsible for providing accredited teacher education programs and certification for teacher education graduates and continuing teachers. Due to the considerable number of programs offered in Ontario in a variety of contexts with various populations and demographics, this study focused on three teacher education programs in Ontario whose programs aim to follow a multiliteracy framework through the integration of technology and/or strategies and theories of teaching culturally and linguistically diverse students.

Language teaching in Canada has seen many changes over the last thirty years. According to Byrd Clark (2012), "French language teaching has tended to be dominated by cognitive psycholinguistic approaches in Second Language Acquisition (SLA) (e.g. Chomsky, 1965) as well as Official language discourses emanating from the Canadian federal government in regards to French⁄English bilingualism (p.143)." For example, the term "second language" is referred to in Canada as English/French bilingualism and in many cases student diversity shows students do not speak English or French as their first language. Many students may be learning French as a third, fourth or additional language. Byrd Clark (2012) further states that despite the advances of sociolinguistics over the past 30 years and the rise of Communicative Language Teaching (CLT), (which centers on the development of communicative competence in foreign and/or second languages), languages are still seen as independent, separate systems. For example, this does not take into consideration how the knowledge, competence, and understanding in one language can assist in learning an additional language. This is problematic as multilingual students

who have already developed a language repertoire of linguistic varieties are not seen as a valuable resource since past methods of language teaching do not allow for students to express or reflect their multiple, social identities (Byrd Clark, 2012). Heterogeneity of languages in today's Canadian classrooms needs to allow for the complex social realities of 21st Century teaching and learning, and adopt methods to educate future language teachers on how to teach multilingual students and capitalize on the diversity. This complexity refers to creating awareness for student teachers of the cultural and linguistic varieties of languages and student experiences, as well as technological and increased mobility due to globalization. The core literacy pedagogies that represent the multiliteracy framework provide in itself a myriad of strategies to suit a multilingual or diverse set of learners that taking into consideration students' prior knowledge and experiences as well as their multiple identities. Teachers exposed to this framework use multiple strategies for different classroom activities to foster student learning. This framework encompasses various strategies that have been used in the past (e.g. direct method, communicative method) combined with newer methods (e.g. integration of information communication technologies) designed to equip students with the necessary skills to succeed in today's society without compromising their identities (see Chapter 2 Theoretical Framework section for more information).

Language Teacher Education in Ontario

According to the Ontario College of Teachers (2014a), of the 21 teacher education programs offered in Ontario, there are several different options and specialties for students to choose from that include: consecutive (two year after-degree program) or concurrent (combined Bachelor's degree and teaching credential). There are also specialty areas of teaching that include: Aboriginal (preparation for teachers of Aboriginal Ancestry), Canadian Native Languages, Deaf or Hard of Hearing teacher, and Technological (focused on IT teaching subjects). There are also options for students to study these programs in English or French; however, of the 21 programs there are only three that certify French as a First Language teachers. The Ontario College of Teachers (OCT) is a unique governing body that regulates teacher accreditation in Ontario however

not all programs have the same mandate for the ways in which they educate their teachers. Each program is structured differently and some are based on context (e.g. demographics based on geographical location). The teacher education programs chosen for this study all have similar goals: programs which have courses that reflect multiliteracy pedagogies such as teaching for student diversity and effective ways of integrating ICTs. These institutions have made this a priority as a means to adapt their programs to be sustainable in Ontario's changing demographics and increased use of ICTs.

Changes in Teacher Education in Ontario

The Transition into Teaching 2013 report (OCT, 2014b) includes statistics about the job market and prospects in Ontario, which includes teachers graduating from teacher education programs, teacher retirement, and surplus (difference) from 2001 to 2013. In the early 2000s retirement was significantly higher in Ontario schools leaving plenty of jobs for new graduates, which created a good balance of teacher supply and demand. From 2003, the amount of graduates in Ontario grew substantially to over 11,000 per year and retirement dropped to circa 4000, leaving a substantial surplus of unemployed teachers. This trend continued through to 2012, when Ontario faculties of education announced in early 2013 that they were extending their consecutive teacher education programs from one to two years and accepting half of the amount of enrollments. It is hoped this change would allow for the surplus of unemployed teachers (approximately 40% in 2012) to find jobs. This also includes French language educators, with more than 50% who reported being unemployed or underemployed throughout the school year, which is a dramatic increase from 15% in 2008.

Since Ontario occupies 21 of the approximate 60 teacher education programs in the country (35%), and includes the one of the highest populations of CALD (Statistics Canada, 2015), this context has offered a broad range of findings in terms of student diversity and teacher education programming. In a study by Gallagher (2014), results showed that Ontario has made dramatic improvements in student learning in the achievements of English Language Learners (ELLs). For example, in 2003 24% of ELLs

were achieving satisfactory results and by 2013, 73% were meeting or exceeding curriculum expectations according to provincial achievement testing (Gallagher, 2014 as cited in Howe, 2014).

Therefore, the participants chosen for this study consisted of student teachers of second language(s) (English and French) to better understand ways in which language teacher education programs prepare for a multicultural/multilingual, technology rich teaching environment. The review of the literature on teacher attrition and challenges includes both FSL and ESL teachers as many face similar demands in their transition in to professional practice (e.g. Lapkin et al., 2006; CTF, 2004, 2011, French & Collins, 2014). Also, by including both English and French language teachers in three different institutions located in various geographical locations in Ontario, the recruitment of an adequate sample size for statistical analysis was achieved. The investigation into these institutions within their unique contexts yielded results based on programming according to the demographics of their geographical location, and/if how they adapt their programs to prepare student teachers for their transition into professional practice. I will expand upon each context within the methodology section (Chapter 3).

In summary, this introductory chapter presented the growing trend of beginning teacher attrition in Canada and around the world, and how language teachers are among the highest due to a variety of factors including work load, administrative support, teacher unpreparedness in teaching for cultural and linguistic diversity, technology integration, and low job satisfaction. This chapter also introduced an increased area of interest in multiliteracies pedagogies within teacher education programs as means of increasing the ways in which teacher education programs can provide education and support for preservice teachers. I also included my positionality in undertaking this research project as former classroom teacher in both ESL and FSL teaching environments. Briefly, this chapter also showed areas in which research has been done to investigate the two main challenges that occur for beginning teachers in their transition into professional practice: technology integration and teaching for cultural and linguistic diversity. It presented research studies in a variety of contexts identifying a research gap in language teacher

education and the role that a multiliteracies approach could play in teacher preparation programs. In Chapter 2, a further analysis of the literature will be presented, highlighting challenges specific to language teachers (in terms of technology integration and teaching for CALD students), and the theoretical framework that provide a lens to better investigate student teachers of languages' preparedness, beliefs, perceptions, knowledge, skills, and self-efficacy to integrate technology and teach for cultural and linguistic diversity through multiliteracies pedagogies.

Chapter 2

2 Literature Review & Theoretical Framework

In this chapter, I situate my research study conceptually by presenting my literature review. The following literature review examines two main challenges that current and future language teachers face: teaching for cultural and linguistic diversity and effective technology integration. After outlining the challenges, this section summarizes: the state of multicultural education in Canada, multiliteracies pedagogies in teacher education, common frameworks, a summary of a new generation of learners (Generation P), technology integration in teacher education, and the effects of teachers' attitudes, knowledge, skills, and self-efficacy, to integrate technology and teach for student cultural and linguistic diversity.

2.1 Challenges of Language Teachers

This study's context is unique in choosing teacher education programs that claim to follow a multiliteracy framework and include a stream of French and/or English as a second language educators. Second language teachers (in particular French) face unique challenges in their practice due to the lack of appropriateness and availability of resources, teaching for cultural and linguistic diversity, and the divide between university-based courses and practicum field experiences (French & Collins, 2014; Lapkin, MacFarlane & Vandergrift, 2006; Van Nuland, 2011). For example, most textbooks, websites, etc. are only available in English. Teachers also reported a lack of materials in general and lack of funding for items such as notebooks and workbooks (French & Collins, 2014). Other issues teachers identified were the low quality of the computer software, lack of library resources and limited community opportunities (i.e. field trips, authentic learning experiences in French), and lack of preparation to teach appropriate digital literacies. The integration of technologies has been recognized as a valuable tool in engaging students. New initiatives in research on technology integration include Bring Your Own Device (BYOD). Mahon (2014) discusses ways in which teachers can learn to effectively integrate technology in their classes. She further recounts

a recent study in the United States that raised awareness of the amount of technology accessible to many of today's youth:

> …18% of children in Grades K-12 have access to a smartphone, and 26% have access to a tablet; 45% of third through fifth graders have access to smartphones, and 48% have access to tablets; 65% of sixth through eighth graders have access to smartphones, and 52% have access to tablets; 80% of ninth through twelfth graders have access to smartphones, and 45% have access to tablets (West, 2013 as cited in Mahon, 2014).

There have also been studies that have identified challenges student teachers face when integrating technology due to a disconnect between what technologies are used in university courses for teaching and learning and the reality of what technologies are used in K-12 classrooms (Fu, 2013; Redmond, Albion, & Maroulis, 2005). In terms of mentoring, studies have shown that student teachers feel as though the modeling of appropriate ways to integrate technology effectively is limited or 'subpar' (Fu, 2013) or that too few teacher educators or practicum mentor teachers regularly provide examples of how to incorporate technology effectively (Redmond, Albion, & Maroulis, 2005). In summary, student teachers require the knowledge, skills, and understanding of the trends and challenges of integrating digital technologies to be competent in applying these in their teaching practice. Upon transition into professional practice, teachers need to cope with the societal and technological changes in order to do their jobs effectively (Van Nuland, 2011).

Technology Integration in Education

Rapid migration, mobility and computer-mediated communication (CMC) are having an impact on the educational needs and identities of students (and teachers). In a world where language is both globalized and globalizing, and internationalization remains a priority in the global workforce; the need for professional language educators continues to grow. Despite increased mobility, and technological advancement, many teacher education programs across Canada have not expanded to include societal multilingualism in classrooms, nor the use of digital technologies. This is significant when one considers that 88% of permanent residents speak a language other than French or English as their

home language (Statistics Canada, 2012). The incorporation of digital technologies and multilingual practices in teacher education classrooms has the potential to transform traditional ways of thinking about languages, cultures, identities and education, particularly with respect to the explicit development of multilingual repertoires demanded by globalization (Vanthuyne & Byrd Clark, 2015). New and growing technologies in education are a powerful tool to engage students with literacy, promoting overall academic development (Cummins, 2006). However, despite the increased access to technology in schools and investments in equipment, only a small amount is used regularly (Cogan, 2007; Dawes, 2001; Inoue & Bell, 2006; Wang, 2005). Cummins notes that when students do gain access, "it is not often clear either to them or to their teachers what they should be doing with these technologies" (2006, p.2). He concludes that the current policies only cater to "white, monolingual, monocultural, middle class students" (2006, p.7).

Societal Changes. A shift from a traditional approach to teaching and learning to a pedagogy that provides sustainability for teaching and learning, includes teachers who are capable of teaching 'new aged learners' or 'Generation P' (Kalantzis & Cope, 2012). Generation P refers to 'participatory' learners:

> …who have different kinds of sensibilities from the students of our past. They have at hand ubiquitous smart devices, connected to the new social media and allowing them to communicate with people at a distance from them at any time of the day and anywhere (Kalantzis & Cope, 2012, p.9).

Though not a homogenous group, Kalantzis and Cope (2012) assert that the majority of Generation P learn better in informal settings and from a variety of sources such as self-directed electronic devices and software applications, and in social media interactions, such as online gaming and interest communities on the web. They continue learning outside the classroom through social media in a variety of contexts throughout the day. Examples of the kinds of work students do are: researching information using multiple sources and reporting upon their findings in an extended web project report; tackling real-world problems, which they have to try to solve; documenting hypotheses; reporting on results; analyzing issues from different perspectives; working in groups to create a

collaborative knowledge output; and working in Internet and other multimodal new media space that bring together writing, image, sound and video (Kalantzis & Cope, 2012). Preparing teachers for technology-rich, 21st century learners demands a deeper understanding of the multimodalities required to teach and learn in a rapidly changing digital classroom. "Teacher preparation programs need to create intentional learning environments, where pre-service teachers can explore issues that are relevant and develop pedagogies that are effective for a knowledge era" (Clifford, Friesen, & Lock, 2004, p. 19). This is why is it imperative to investigate the ways in which teacher educators are using technology in their classrooms and what is working for them.

Benefits of Technology Integration. There are several studies that have focused on the ways in which the integration of technology benefits students including: student-centered learning experiences, creative learning environments, improvement of accessing digital information, motivation, and development of higher-order thinking (Archambault, Wetzel, Foulger & Williams, 2010; Ertmer et al., 2012; Fu, 2013;). First, student-centered or directed learning experiences are necessary in providing the tools for students to construct new knowledge, or build on previous or developing knowledge by accessing and interpreting information. For example, if a student is having difficult with a new math concept, after class they may 'Google' the new concept to find further information, or watch a YouTube video for further instructions or demonstrations. Therefore, teaching students how to access digital information and providing them with appropriate techniques and resources for searching and evaluating materials is essential. Next, there are a plethora of new and developing applications for mobile devices that focus specifically on many types of learning needs. Exposing students to a variety of different applications tailored to their subject area learning needs is beneficial for students to practice or learn about areas of improvement. For example, if students are learning a new language and require assistance with pronunciation, several 'apps' can assist in recording their voices so they can listen to their errors, and provide repetition of proper techniques. Next, higher-order thinking skills are utilized in a variety of ways that are facilitated by technology. For example, in Ertmer et al.'s (2012) study, students employed higher order thinking skills when required to categorize, synthesize, and evaluate items based on a

visual representation of mathematical and geometrical problems. The teacher employed this technique after attempting to teach these concepts without technology and achieving a result of limited student understanding (Ertmer et al., 2012).

Finally, student engagement and motivation is of particular relevance due to the challenging contexts French teachers encounter. Student motivation is of particular concern in French as a second language classrooms, as in some provinces (as listed above) French instruction is mandatory up to grade 9. Many students become disengaged in French because the amount of instruction in most cases is not enough for students to become skilled enough to use the language in a practical context- they therefore become unmotivated to continue learning (Lapkin, Mady& Arnott, 2009; MacFarlane, 2005). Not only is it imperative for students to learn with and about various digital and information technologies to eventually compete within the job market, but they also have expectations of using technology to support and engage in their learning. They are accustomed to having access to copious amounts of information literally at their fingertips and expect to learn in an environment that capitalizes on their multi-tasking, inquisitive nature. In studies that have investigated students' behaviors and perspectives of learning with and about technology (Davies et al., 2008; Geer & Sweeney, 2012; Robertson et al., 2004), several conclusions were drawn that integrating technology can affect student performance. Many students showed increased engagement, motivation, and better on-task behavior. In general, it helped to clarify new concepts learned and provided practical modes of situated learning. In addition, 60% of teachers reported that it better supported learners' diverse needs as it can offer multiple ways for students to acquire new information through multimodalities (text, visuals, audio) (Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur, Polat, 2012; Fu, 2013; Geer & Sweeny, 2012).

Challenges of Technology Integration. There are a number of potential challenges, barriers, and factors that influence ways in which technology is effectively integrated from both a student and teacher perspective. From teachers' perspectives barriers that have been identified are insufficient time to learn applications or how to use devices (i.e. interactive whiteboards, tablets), a lack of in-service or training, technical problems, lack

of knowledge or ideas about how integrating technology into instruction will improve student learning, and lack of pedagogical support (Ertmer, 2012; Fu, 2013). The reality of including the pedagogical and technological knowledge and skills to effectively integrate digital and information technologies in teacher education programs is a process that may be best integrated an individual basis, depending on contextual needs. A one-sized fits all approach in teacher education programs will likely not be the easiest way to expose and/or prepare student teachers for the technologies they are likely to find in schools. Technological knowledge is the knowledge of various types of digital and information technologies. Technological, pedagogical knowledge is knowing how to effectively integrate technology and student assessment and is based on contextual circumstances (Koehler & Mishra, 2009). Not only do teacher education programs require student teachers to take risks including new technologies and pedagogies as they learn to teach, they also require faculty training in this area. In this regard, there is a disconnect between what is taught in teacher education programs and what is actually going on in K-12 schools. In addition, this disconnect also affects how teachers feel once they transition into professional practice and their willingness to include various technologies to support student learning (Fu, 2013; Redmond, Albion, & Maroulis, 2005).

There are few studies that have investigated the ways in which teacher education programs have integrated technologies and the follow up or relationship to what actually happens in schools. A 2012 mixed methods study (Ertmer et al, 2012) involved both student teachers in teacher education programs and teachers already in the field. A comparative analysis was done on a questionnaire distributed to both samples. The results of this questionnaire revealed several inconsistencies in what student teachers were being taught about technology integration for teaching and learning with a student centered approach and the technologies that teachers were actually using in the field. This disconnect is yet another reason why it is imperative to ascertain which types of technologies faculty and student teachers are using within their programs and why they are using them. The Ertmer et al. study concluded that future research should examine sustainable partnerships that facilitate discussion of technology practices to be

implemented into teacher education programs and in-service teacher professional development (Ertmer et al, 2012).

Teachers' Beliefs & Attitudes Towards Technology Integration. There are several studies that have investigated teachers' attitudes and beliefs on the integration of technology (Anderson, Groulx & Maninger, 2011; Cogan, 2007; Dawes, 2001; Ertmer, 2012; Fu, 2013; Kim et al., 2013). Although the definition of teachers' beliefs and attitudes is contested, for the purposes of this research it is defined as a combination of beliefs or attitudes about their capabilities to integrate technology (or a goal/outcome), the value of technology for student learning, and beliefs about teaching and learning with technology (Bandura, 1997; Park & Ertmer, 2007). For example, teachers' beliefs and attitudes towards the use of and strategies for technology integration affect the amount of technology used, the ways in which it is used and the reasons for its use. Teachers are more likely to integrate technology at a higher level (which involves more higher order and critical thinking tasks) to support student learning if they are comfortable (have a high self-efficacy), are familiar with the uses of technology for teaching and learning, and believe it is a valuable tool for teaching and learning. Therefore, investigating how student teachers in teacher education programs are educated is an excellent opportunity to expose future teachers to both the benefits and challenges of using technology for teaching and learning. In addition, measuring teachers' competencies and perceptions of their skills to integrate technology (e.g. TPACK) and comparing it to what they are learning in their programs will provide contextual information as to how to prepare teachers for a technology rich teaching environment.

Teacher education programs have the ability to shape the way future teachers think about technology in making the transition from teacher to facilitator, and progressing through Levels of Use (as defined by Hall et al., 2006) or Five Stages of Evolution (as described by Sandholtz, Ringstaff, & Dwyer, 1997) in technology integration. These 'levels' or 'stages' define the journey teachers take from the beginning stages of technology integration to more advanced integration techniques, resulting in a more student centered approach to teaching and learning. It is likely, entering into today's classrooms that there

will be students who know more about different types of technology than the teacher. Student teachers need to understand how to capitalize on this knowledge and use it as a resource and have students teach them about the technologies that work best for them. Providing student teachers within their teacher education programs the knowledge and skills to adapt to their future students could result in a more positive attitude towards the integration of technology and an openness to let go of the notion of teachers as experts on technology.

> "Tomorrow's teachers need to be comfortable with Internet learning design and delivery platforms- learning spaces that are not just lesson plans, nor textbooks, or student workbooks but are all these things, with a look and feel more like social networking to blogging sites" (Kalantzis & Cope, 2012, p.11).

Multicultural Education

The second concern of language teachers in Canada examined in this study is teacher unpreparedness due to the increasing student cultural and linguistic diversity, in particular language proficiency levels in their classrooms for students whose first languages are those other than English or French (French & Collins, 2014; Lapkin, MacFarlane &Vandergrift, 2006; Van Nuland, 2011). Though the term student diversity can be used in several different contexts to denote special needs, cultural or linguistic diversity, learning disabilities or heterogeneity, for the purposes of this research study, I will focus solely on student cultural and linguistic diversity and at times may use the term student diversity to reflect this. More specifically this study defines student cultural and linguistic diversity as, "students who may be distinguished [from the mainstream culture] by ethnicity, social class, and/ or language" (Perez, 2011, p. 246). Several studies have reiterated the challenges teachers face due to the growing numbers of culturally and linguistically diverse students in their classes, affirming that many teachers become overwhelmed in their responsibilities to meet their needs and capitalize on the opportunities of a diverse student body (Lapkin, MacFarlane &Vandergrift, 2006; Hamm, 2014; Karsenti et al., 2008). Without adequate education, practice, and experience, schools and teachers often decide to remove students from their programs (i.e. French

immersion and Core French) and place them on modified programming, grouping these students in a category of deficit. The results of these actions have several effects including the demotivation of students placed in these programs, teachers' conceptualizations and efficacy that they are not capable of teaching CALD students, and the creation of inequitable learning opportunities for students with a first language other than English or French.

As stated earlier, Canada's linguistic and cultural landscape has changed dramatically over the last 30 years, and the concern for teachers to be equipped with the knowledge base and skills to deliver lessons to a variety of learners include those who do not speak English or French as a mother tongue. This rapid change in the linguistic repertories of younger Canadians, particularly in larger urban cities (e.g. Toronto, Vancouver, Calgary) requires rethinking the way educators adapt to the diversity of learners (and their families) within the educational system. In an attempt to understand and theorize ways in which teacher education programs have responded to these challenges, a discussion of multicultural education frameworks, their benefits, and reasons as to why a multiliteracy approach may be more beneficial in the context for this study are examined in this section.

Multicultural Education in Canada. Over the past, research studies have expressed concern of the state of multicultural education in Canada to prepare teachers with the continuously changing multicultural society (Byrd Clark, 2010, 2012, Cummins, 2006; Duff, 2007; Egbo, 2009; Schecter, & Cummins, 2003). Many teachers and student teachers feel unprepared to teach in a multicultural classroom, and further research is required to support teachers in meeting the needs of children who speak neither French nor English as a first language (L1) (Byrd Clark, 2012; Cummins, 2000, 2006; Duff, 2007; Lapkin, MacFarlane, & Vandergrift, 2006; Lapkin, Mady & Arnott, 2009; Salvatori, 2009). The challenges associated with employing multicultural strategies in the studies listed above relate to self-efficacy, experience, beliefs, and attitudes, as well as knowledge and skills of multicultural education theories and perspectives. There are

many contested and varying definitions of these challenges therefore a brief characterization will be given for each in its relationship to this study.

First, self-efficacy refers to the confidence and skills teachers have that influence their perceived and actual abilities to help students achieve academic success (Nadelson, et al., 2012). Experience, for the purposes of this study relates to teachers' experiences with diversity in their personal, academic, or professional lives. For example, personal experience growing up as a child/adolescent, previous teaching or other professional experience working with a diverse population, and/or academic (school or study) related experience (Guyton & Welche, 2005). Attitude refers to the level of positive or negative viewpoint towards multicultural education, which can be influenced by several factors including ethnicity, gender, political worldview, age, and languages spoken (Nadelson et al., 2012). Faez's (2012) Canadian study of teachers' preparedness to teach diverse learners measured perceptions regarding teachers' levels of empathy towards ELLs, preparedness to teach ELLs, and responsibilities of teaching ELLs. Findings showed that empathy, including "similar backgrounds and experiences to students of different linguistic and cultural backgrounds have been recognized as invaluable in today's multilingual and multicultural classrooms" (Faez, 2012, p. 68). In addition, Faez (2012) posits it as crucial to investigate teachers' efficacy beliefs and to examine them within specific teaching contexts due to increasing evidence that teachers are generally not prepared to work with ELLs.

For the purposes of this study four main viewpoints of multicultural education will be discussed as they are closely linked with the theories and methods: Assimilation, Pluralism, Multicultural Education, and Social Reconstructurist (Guyton & Welche, 2005; Healey & O'Brien, 2014; Nel, 1993). These four main viewpoints are a result of rigorous theories in multicultural education as defined in the theories section and formulate the final question in the Multicultural Efficacy Scale (survey instrument) in the Methods section. According to Healey and O'Brien (2014, p. 43), Assimilation is defined as, "a process in which formerly distinct and separate groups come to share a common culture and merge together socially" and Pluralism refers to, " groups who maintain their

individual identities. In a pluralistic society, groups remain separate, and their cultural and social differences persist over time" (p. 43). More progressive viewpoints such as Multicultural Education approach, refers to a position that actively seeks to protect and enhance diverse groups. This viewpoint reflects teachers who make an effort to incorporate minority students' language and culture into the school program and encourage minority community participation (Nel, 1993; Guyton & Welche, 2005). Finally, the most progressive approach of the four is Social Reconstructionist. Those who relate closely to this viewpoint have a strong focus on equity and justice and work activity towards social structural equality and equal opportunity in schools (Nel, 1993; Guyton & Welche, 2005; Sleeter & Grant, 2006). In an attempt to understand and theorize ways in which teacher education programs have responded to these challenges, a discussion of multicultural education frameworks, their benefits, and reasons as to why a multiliteracy approach may be more beneficial for this study will be examined.

2.2 Multicultural Frameworks

Banks's Five Dimensions of Multicultural Education. James A Banks is a leading scholar in the field of multicultural education. He has developed five dimensions of multicultural education, which include: Content Integration, Knowledge Construction Process, Equity Pedagogy, Prejudice Reduction, and Empowering School and Social Structure (Banks, 2004). Banks developed these five dimensions as a means to engage educators and their students in different disciplines not limited to content areas such as social studies or history. Content integration is one of the most commonly known ways to integrate multicultural perspectives- adding in or making connections from historical events from culturally and racially diverse people (Banks, 2004). The second, Knowledge Construction assists students to understand the underlying concepts and assumptions that commonly used terms bring, exposing students to different perspectives so they become more critical readers and thinkers (Banks, 2004). The third dimension, Equity Pedagogy, Banks (2004) refers to as, "teachers change their methods to enable kids from diverse racial groups and both genders to achieve". He further explains this involves teachers modifying their teaching styles to include cooperative learning,

simulations, role-playing, and discovery. Regarding the fourth dimension, Prejudice Reduction, Banks (2004) asserts that adolescent students come into the classroom with preconceived ideas and beliefs, in essence prejudices against specific groups. He states that educators should employ methods within the classroom to help reduce prejudices and develop more positive racial attitudes. The final dimension, Empowering School Culture and Social Structure, Banks (2004) defines how school culture and society can become more equitable. For example, he suggests examining how the school functions as a whole, the demographic make up of the staff, students and administration- how equally or diverse are the educators compared to the students? Is there a hierarchy of race or are all cultures considered equal, with equal opportunity?

Banks has made considerable advances in multicultural education and has influenced and advocated for equity and social justice among diverse races and populations. These dimensions are an important contribution to research in the area of equity and social justice in multicultural education. Though my study does not explicitly focus on equity and social justice, it investigated how teachers learn and develop strategies or methods to teach a diverse group of students that are most often different from them. Since there is continued evidence of a cultural and racial divide in Canada between teachers and the students they teach, (see Peterborough Partnership Council on Immigrant Integration 2012) it is imperative that teacher education programs ensure student teachers receive the required knowledge and critical literacy skills to teach a linguistically and culturally diverse student body. Through an investigation of the knowledge, skills, experiences, and efficacy of language student teachers', teacher education program missions, and identifying areas of need, and/or philosophical assumptions, this study begins to problematize the specific racial and cultural divide to reach a diversity of learners. Introducing a multiliteracy approach may narrow the cultural and linguistic divide and blur some of the traditional boundaries of culture and race to increase the awareness of social, cultural, and linguistic diversity among student teachers. A multiliteracy approach is appropriate in this context as it encompasses pedagogies and strategies that include meaning making in different cultural, social, or domain-specific contexts and also multimodal representations (oral, visual, gestural, tactile, and spatial patterns)(Kalantzis

& Cope, 2012). These elements of the multiliteracy framework could allow for multilinguals with multiple identities to engage in their learning through meaningful authentic experiences reducing the focus on a marginalized population.

Five Approaches to Multicultural Education. A second important framework that has been used in the past and continues to be developed is the Five Approaches to Multicultural Education by Sleeter and Grant (2006). The first approach, Teaching the Exceptional and Culturally Different, is commonly referred to in the American context as differentiated instruction (Bode, 2009). The second approach, Human Relations, focuses on the development of relationships amongst culturally diverse groups. The third approach, Single-Group Studies, provides information about a specific group of people that are seen as oppressed and identifies ways in which they can gain power (Bode, 2009). The fourth approach is Multicultural Education, which advocates for an educational process whereby educators reflect and support diversity through examination of items such as school curriculum, staffing, testing, etc. (Bode, 2009). The final approach, Multicultural Social Justice Education, involves, "complete reform of the entire education process…and focuses more explicitly on social critique and democratic citizenship participation" (Sleeter & Grant, 2007). Though these approaches are valuable and have been used in research studies to educate student teachers in the United States (i.e. Bowser, 2008), the general perceptions of multicultural education does not align with Canada's multicultural values (Lee, 2013). For example, these approaches employ terms such as "differences", "oppression" which could be construed negatively. **"**One of Canada's national values is multiculturalism and efforts are made to ensure that all citizens keep their identities, take pride in their ancestry and have a sense of belonging in a nation with two languages" (Lee, 2013, p. 1). Despite these aspirations, the growing number of immigrant students continues to experience difficulty in adjusting to mainstream classroom (Lee, 2013). In addition, student cultural and linguistic diversity in Canadian schools is still perceived by teachers as a challenge that they need to overcome or cater for (Cummins, 2006; Duff, 2007; Lapkin et al., 2006). Instead, the classroom should be seen as a place where students have an opportunity to embrace their own conflicting, multilayered, multiple identities as well as their students' (Byrd Clark, 2012;

Cummins, 2006; Egbo, 2009); where students are not required to "leave their identities and languages at the door" (Giampapa, 2010). A multiliteracy approach to teaching and learning may offer a way of reconceptualizing diversity in education as a positive way to include the various cultural and linguistic backgrounds of students, for example, through the integration of emerging technologies.

Multicultural Education in Ontario. According to the Peterborough Partnership Council on Immigrant Integration (2012) the current situation for student teacher education in relation to diversity and inclusion, the principal concern is the cultural, racial, and linguistic divide between teachers and students. The majority of teachers continue to be white, monolingual, middle-class females, despite the increased diversity in Ontario schools (Cummins, 2006). In addition, Ryan, Pollack & Antonelli (2009) found in recent years that the gaps between educators and administrators in Ontario and the students they teach are highly under-representative and have limited experience with students who are not like them. The cultural and linguistic divide makes it even more important to investigate future teachers' perceptions and understandings of multicultural education, and how their attitudes, skills, and self-efficacy about multicultural education influence their practice.

2.3 Multiliteracies Pedagogies in Teacher Education

Multiliteracies pedagogies continue to be a growing phenomenon in Canadian research in teacher education. Due to the shift in what constitutes literacies, it is no longer just the job of the English teacher to teach the required skills for students to be successful in their learning (Hewson & Adrian, 2014). In addition, students come into the classroom with a variety of interests, experiences, learning needs and strengths, and therefore teachers need to be able to recognize this and plan appropriately (Hewson & Adrian, 2014). Although the benefits of integrating a multiliteracies approach to teacher education are becoming more recognized as a way to engage and capitalize on today's increasingly diverse classroom, faculties of education are still struggling with bridging the gap between traditional literacy and multiliteracies (Biswas, 2014). Teacher education programs need to prepare student teachers to teach with multiliteracies once they transition into

professional practice, for sustainable literacy teaching due to the changes in globalization and technology (Ajayi, 2011; Biswas, 2014).

Research studies have investigated ways in which a multiliterate approach is employed in schools (Giampapa, 2010), confirming the need to "create learning environments to engage students in a wide range of literacy practices that are creative and cognitively challenging and that bring together text-based and multimedia forms of meaning making" (Giampapa, 2010). Multiliteracy pedagogies have been shown to be a valuable way of engaging students through four teaching strategies including: Improved student-teacher relationships, increased inclusivity for diversity, positive classroom community, and development of broad repertories of literary practices (Ajayi, 2010; Biswas, 2014; Giampapa, 2010; Rowsell, Kosnik & Beck, 2008; The New London Group, 1996). According to the New London Group (1996) *situated practice* provides learners with authentic learning experiences that involve practical application. This in turn promotes a focus on engagement and collaboration in real-life situations. *Overt instruction* is scaffolded learning by the teacher to foster critical understanding through directions and providing sources of information to the learners. In *critical framing*, the learner analyzes unfamiliar information (e.g. from an abstract topic) and links their understanding to their own personal experiences. Finally, *transformed practice* engages the learners in reflective practice as a result of their personal goals and values (e.g. learners design a personalized research project on a specific topic) thus showing application of knowledge (The New London Group, 1996). These practices are parts of a whole where all components should be employed so learners can develop their own critical thinking skills, and play a role in a structured pedagogical approach.

However, there are also challenges associated with integrating a multiliteracies approach in teacher education programs including a lack of clarity about the nature of multiliteracies pedagogies, an inadequate range of literacy forms, and the relationship of multiliteracies pedagogies to cultural and linguistic diversity (Rowsell, Kosnik & Beck, 2008). Student teachers may have difficulty defining multiliteracies pedagogies and understanding the terminology associated with this approach. What does multiliteracies

mean? What does this look like in a classroom? How can I put this approach into place in my own classroom? As a result of these findings, Rowsell, Kosnik and Beck (2008) suggest, "ee need to go into greater depth on certain key ideas, making them clear through explanation, modeling, detailed examples, and quality practicum experiences" (p.119).

The variety of literacy forms employed in teacher education programs may also be a factor in assisting with student teachers' comprehension of multimodal texts. Student teachers and faculty often utilize traditional, text-based literacies and have not yet transitioned to multiliteracies (Biswas, 2014). In terms of cultural and linguistic diversity, an emphasis has been traditionally placed upon differences or 'othering' and not on theories associated with capitalizing on the various cultures within the classroom and using this as a resource. Rowsell, Kosnik and Beck (2008) propose, "…discussion of differences must be accompanied by constant reference to the many differences in beliefs, practices, and modes of life within groups and, equally importantly, to commonalities across groups" (p. 120). They recommend having students discuss their own lives to expose existing stereotypes or have guest speakers from different sub-groups then once again discuss their lives, opinions, and points of view. Educating student teachers on how to integrate multiliteracies pedagogies could assist them in employing new strategies, thus expanding their teaching repertoires. The four instructional strategies of a multiliteracy approach (overt instruction, situated practice, critical framing, transformed practice) facilitate the learning process for students in helping them become more successful learners (Biswas, 2014).

The challenges discussed within this section make this research timely, as my study has investigated if and how multiliteracies pedagogies within teacher education programs are being utilized to teach for student cultural and linguistic diversity and integrate emerging technologies effectively. Teacher education programs need to begin to educate teachers from being "the talking and testing profession to becoming a hybrid documenting, data-driven profession"(Kalantzis & Cope, 2012, p.10). They also need to have a variety of pedagogies to teach for student cultural and linguistic diversity in an environment where

diversity is seen as a resource instead of a deficit, difference, or challenge. The combination of employing effective strategies for technology integration and student diversity through the framework of multiliteracies could create a sustainable approach for teacher education programs to educate future teachers to be better prepared for their transition into professional practice.

2.4 Theoretical Framework

In this section, I will describe how Multiliteracy Theory and the Theoretical Framework of Technological, Pedagogical, and Content Knowledge (TPACK) have informed my understanding of the research problem described in the Introduction (Chapter 1). I will explain why I have drawn on these theories, what the grounding assumptions are, the strengths and special considerations, and their relationship with mixed methods. Multiliteracy Theory is the theoretical lens through which I have contemplated my research problem linking technology integration and student diversity together. Multiliteracies pedagogies have assisted me in conceptualizing how new forms of teaching literacy include multilingualism, multiculturalism, and new technologies to teach critical literacies. Though the terms 'literacy', 'literacies' and 'multiliteracies' are discussed in detail in this section, it is important to note that these terms encompass more than just the teaching of reading, writing, listening, and speaking. These terms refer to an overall framework of pedagogies that apply to any subject area. TPACK will be discussed in addition to Multiliteracy Theory as it provides a framework for areas of teacher knowledge base, and an instrument to measure student teachers' knowledge, skills, and self-efficacy towards technology integration.

Multiliteracy Theory

The New London Group (1996) introduced the term "multiliteracies" with a view to account not only for the cultural and linguistic diversity of increasingly globalized societies and the plurality of texts that are exchanged in this context, but for the "burgeoning variety of text forms associated with information and multimedia technologies" (p. 60). Multiliteracies pedagogies or Multiliteracy Theory was the lens

through which I investigated the research problem of how faculties of education are educating student teachers for the complex social realities of the 21st century so more language teachers are prepared to teach with technology and for cultural and linguistic diversity.

In the first aspect of the research problem, students' linguistic and cultural diversity in Canadian schools is perceived by many teachers as a problem- thus showing teachers' attitudes are an important factor that influence the ways in which they view their students and how to teach them. According to Dervin (2011, p.187), "Othering is another form of social representation, which is very much related to stereotypes. Othering allows individuals to construct sameness and difference and to affirm their own identity". He further states that Othering results in individuals differentiating between "in-group" from "out-group" and "Self" from "Other" in a way that strengthens and protects "Self" (Dervin, 2011). It has also been noted in other research studies (e.g. Swanson, 2012) that teachers' self-efficacy in teaching diverse learners is a significant factor that affects the ways in which they teach and their ability to offer diverse pedagogies. Multiliteracies pedagogies employed within a teacher education program have the potential to present student teachers with the notion of using the diversity within their classroom as a resource instead of seeing it as a deficit or a problem that needs to be addressed. They also provide student teachers with an opportunity to examine their identities and bring about critical awareness on how they construct differences.

It is important to note how the four different types of literacy pedagogies (didactic, authentic, functional, and critical) have evolved over time in order to better understand the grounding assumptions within each type. Starting chronologically, didactic literacy (direct instruction) is the original form of pedagogy documented from the early 19th century that is still commonly seen in schools today: students learn content from a textbook from a prescribed syllabus that teachers follow, and in turn provide answers on a test (Kalantzis & Cope, 2012). According to Kalantzis and Cope (2012) this form of literacy teaching is still relevant in some contexts for some learners, for example in learning language structures and speaking and writing in a grammatically correct way.

However, they state that this type of literacy pedagogy has little relevance for real life, and is not adequately preparing students for 21st century literacies. Next, authentic literacy pedagogy was created to counteract direct instruction at the beginning of the 20th century, which follows a more learner-centered approach, promoting personally meaningful experiences through immersion. John Dewey, who had great influence on pragmatic philosophy in education, began 'progressive pedagogy' with the notion that student learning should be focused on practical skills and in areas of which they have an interest (Kalantzis & Cope, 2012). The focus of functional literacy pedagogy is on students learning texts that enable them to succeed in society and be successful at school. The goal is for students to understand the purpose of different types of text and how they are meaningful in different contexts (Kalantzis & Cope, 2012).

Finally, critical literacies pedagogies acknowledge the many different types of students and their experiences and perspectives that they bring into the classroom. This form of literacy recognizes that no student is a blank slate- they have a wealth of knowledge and valued experiences. Critical literacies empower students (and student teachers) to be critical judges of social media and to evaluate the various types of text they encounter. Critical literacies help students to recognize how texts can be a construction of values and personal identities and provide them with the skills to analyze and produce multimodal texts as a means to engage in real world issues (Kalantis & Cope, 2012). The four types of literacies mentioned (didactic, authentic, fundamental, and critical) are the underlying principles that form what is recognized today as multiliteracies pedagogies. The multiliteracy framework breaks down into four segments previous described above: situated practice, overt instruction, critical framing, and transformed practice. Introducing student teachers to multiliteracies pedagogies could assist in preparing them for 21st century teaching with technology and the value of cultural and linguistic diversity.

Special Considerations of Multiliteracies Pedagogies

Despite the benefits of multiliteracies pedagogies referenced by the scholars cited in this chapter, there are some special considerations when contemplating the implementation of a multiliteracies framework (e.g Auerbach, 2001). It is still a new concept at work, and as

a result, some critics have suggested that it is a difficult model to put into practice. Therefore, they advocate for teacher education and providing opportunities for student teachers to engage with texts and make meaning using various forms. Implementing multiliteracies pedagogies in ways that fit best with the context and teachers' comfort level is a starting point for student teachers to begin using multiliteracies pedagogies. It is for this reason that I undertook this study within teacher education programs to find out if/how these programs have introduced the concept of multiliteracies pedagogies in their context. A mixed methods research design that combines data from both qualitative and quantitative instruments will demonstrate how faculty members in teacher education programs integrate technology, what technologies they are using (what works and what does not work), as well as the ways in which they are teaching for student cultural and linguistic diversity. The data has shown a convergence and divergence of if/how these programs integrate a multiliteracies framework in terms of: their understanding and inclusion of multiliteracies pedagogies, as well as the challenges and benefits associated with technology integration and teaching for CALD.

Another special consideration among critics is the generation gap that some believe is a factor in integrating technology effectively. Prensky (2001) describes digital natives as those who, "think and process information fundamentally differently from their predecessors" and although this may be the reality in some cases it is unjust to generalize that all those within a certain generation are unable to use technology to its potential for teaching and learning, when, in reality, research shows that it is the novice and inexperienced teachers who leave the profession within the first five years due to the challenges they face in their transition into professional practice. There is also the argument of a digital divide and equal access opportunity to expensive technological equipment in schools (Luke, 2003). Although this goes beyond the scope of my research problem and context, it is a worthy point of addressing the phenomenon of 'best practices' in education. My study's continued goal is to work with faculties of education in a variety of contexts that have different levels of access to technologies and whose teacher candidates are dynamic and representative of diverse backgrounds, and who will likely transition into schools with varied degrees of socio-economic conditions.

A final consideration of employing multiliteracies pedagogies is that it relates specifically to the four types of literacies explained above, (overt instruction, situated learning, transformed practice, and critical framing) in that they must be used in conjunction to be beneficial. Without using these as a whole, the concept is lost and becomes a more traditional type of learning, in particular when applied to language teaching. For example, when overt instruction is linked to situated practice it takes the form of teacher scaffolding as opposed to teacher-centered pedagogy or the direct teaching method (Cope & Kalantzis, 2000). Multiliteracies pedagogies are not meant to be yet another new form of best practices, but were designed to supplement what teachers already do. They were built to extend already occurring practices in assisting teachers to adapt to 21st century teaching.

Technological, Pedagogical, Content Knowledge

The second theory I have drawn upon for this study is Technological, Pedagogical, and Content Knowledge (TPACK) for language teachers (see Figure 1). Koehler and Mishra's studies (2006; 2008; 2009) developed the theoretical framework known as TPACK. They describe TPACK as the elements of the different areas of knowledge required for teachers to integrate technology effectively. Mishra and Koehler (2006) describe Pedagogical Knowledge (PK) as an understanding of how students learn, general classroom management skills, lesson planning, and student assessment practices. They also believe teachers should have deep knowledge about the processes and practices or methods of teaching and learning, including educational purposes, values, and aims. Koehler and Mishra explain their difficulty describing Technological Knowledge (TK) because of the changing nature of technology. However, they do consider it important to have a broad knowledge with the ability to use technology productively at work and in everyday living, to recognize when information technology can assist or impede the achievement of a goal, and to require aptitudes to continually adapt to changes technology presents. Finally, Mishra and Koehler (2006) define Content Knowledge (CK) as a teacher's knowledge about the subject matter to be learned or taught, including

knowledge of concepts, theories, ideas, organizational frameworks, as well as a fundamental deeper understanding of the disciplines in which they teach.

Within this framework there are also overlapping areas of Technological Pedagogical Knowledge (TPK), Pedagogical Content Knowledge (PCK) and Technological Content Knowledge (TCK). The interaction and relationship between these components is contended to be vital in achieving effective technology integration (Koehler & Mishra, 2008). Teachers who have a balanced knowledge base of these specific areas possess characteristics such as creativity, adaptability, and flexibility, and are able to integrate the appropriate types and amount of technology, and be self sufficient in related technical support (Koehler & Mishra, 2008).

Figure 1. Technological, Pedagogical, and Content Knowledge

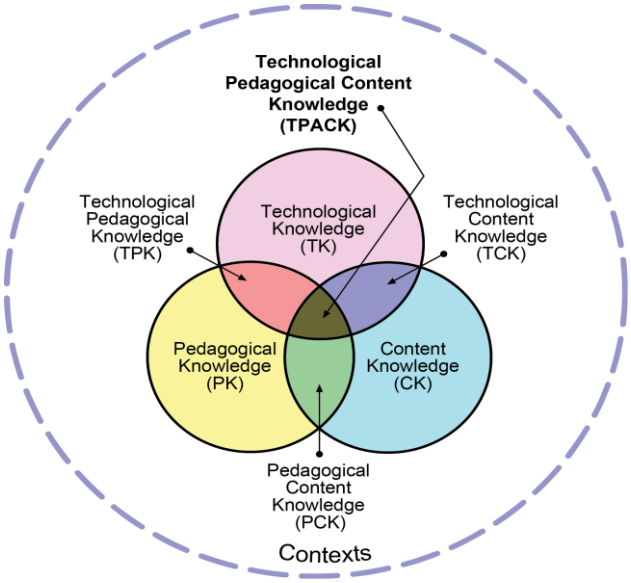

Figure 1. Technological, Pedagogical, and Content Knowledge (TPACK) are the elements of the different areas of knowledge required for teachers to integrate technology effectively (Koehler & Mishra, 2006).

TPACK attempts to capture some of the essential qualities of knowledge required by teachers for technology integration in their teaching, while addressing the complex, multifaceted, and situated nature of teacher knowledge (Koehler & Mishra, 2009, para. 1). In relating TPACK specifically to language teaching and learning, the CK knowledge would be slightly different, as it requires different skills to teach language learners. Previous studies have investigated the connection between TPACK in foreign language teachers (Kang, Ni, & Li, 2010; Koçoğlu, 2009; Van Olphen, 2008) however there are very few studies that have focused on the overall lower technology competencies language teachers educators have due to the increased complexities of including technology in language learning. The basis of these studies include what constitutes the knowledge base for teachers in a foreign language teacher education program, how teachers can use this model to improve their TPACK, and how TPACK can be integrated in language teacher education programs (specifically in teaching English as a Second/Foreign Language) (Van Olphen, 2008; Fryling, 2013; Koçoğlu, 2009; Shyamlee, & Phil, 2012). Thus, there is a need for more research in Canada on increasing the technology competencies and self-efficacy of language teachers within teacher education programs.

Van Olphen (2008) affirms that as teachers prepare to educate a new generation of students in the "information age", the need for effective technology integration has become more pertinent. She contends that there has not been enough research or attention paid to a second language teacher's knowledge of educational technology, computer assisted language learning (CALL) or technology integration as part of curricular outcomes. This literature, in addition to Koehler and Mishra's TPACK studies (2008, 2009) shows that further studies are required in teacher knowledge of technology integration in language teaching and learning. These studies have assisted with the development of my research study in investigating the relationship between TPACK and language teaching and learning.

This developing theory relies on the understanding of how teachers learn to characterize concepts with technologies and implement constructive pedagogical methods involving

technology to teach content. It also involves teachers' increased knowledge of the learning difficulties students face and how technology could facilitate their learning. TPACK includes an instrument, (Survey of Preservice Teachers' Knowledge of Teaching and Technology) which can be used to measure the knowledge base areas described above and is based on teachers' perceptions of their ability to integrate technology effectively (self-efficacy). Investigating self-efficacy about technology integration in teacher education programs has revealed a number of factors: how institutions that claim they follow a multiliteracies framework are using technology for teaching and learning; whether different types of pedagogies or increased instruction or support is needed for student teachers to feel adequately prepared to integrate technology during their practical experience; and the association of TPACK scores to self-efficacy.

Special Considerations with TPACK

As a newer theoretical model, TPACK is subject to criticisms as it continues to develop. With any newly introduced concept, special considerations are necessary when applying this model to a specific research problem. Graham (2011) asserts, "…in order for the model to be viable long term, it must lead researchers and practitioners to understand the constructs in more depth without becoming so complicated that it is inaccessible to all but a few elite researchers" (p. 1955). I have researched the individual and group components of this framework and have read multiple studies that have applied this model to teacher education. These numerous, published studies (see TPACK.org) have used this model to assist teachers in recognizing their strengths and areas of improvement in their knowledge base areas, as well as showing that having a more balanced TPACK (i.e. higher self-efficacy in technology integration) results in greater ease of integrating technology in the classroom. There have also been studies dedicated to the validation and reliability of the instrument that measures TPACK (see Schmidt et al., 2009), again in an effort to show through statistical evidence where teacher education in technology integration could be focused.

In Chapter 2, I have provided a Literature Review highlighting two main challenges that language teachers face: technology integration and teaching for cultural and linguistic

diversity. I have identified several studies that discuss the benefits and challenges of integrating technology and student cultural and linguistic diversity and touched upon the influence of teachers' beliefs and attitudes. In addition, I have introduced my theoretical framework, which includes Technological, Pedagogical, Content Knowledge (TPACK), and Multiliteracies Theory. TPACK attempts to better understand and measure teachers' knowledge, skills, and self-efficacy needed to integrate technology effectively. Multiliteracy Theory conceptualizes new ways of using multimodal texts, new critical forms of literacies and integrates authentic, diverse pedagogies to meet the needs of a complex linguistically and culturally diverse student body. Finally, by combing these theories, I have shown a connection to the main challenges outlined as an avenue to bridge the gap between traditional and multiliteracies in teacher education. In the next chapter, I will outline the mixed methodology used in this research study and a description of the research design using both quantitative and qualitative methods of an online survey and semi-structured interviews.

Chapter 3

3 Methodology

In this chapter, I will provide a brief synopsis of the history of mixed methods, how a methodological approach of mixed methods informs my research problem, and the strengths and special considerations when conducting mixed methods. I will also discuss the details of the procedures involved in a convergent parallel research design. In the methods section, I will provide a description of the participants who were involved in the study as well as an overview of the online survey instruments and interview questions. Finally, I will provide information about the contexts and locations of the study.

3.1 Mixed Methods

Mixed methods have origins in 1959, when Campbell and Fiske used multiple methods to study validity of psychological traits. They encouraged other researchers to examine multiple approaches to data collection in a single study (Creswell, 2003). This prompted others to mix methods, and soon approaches associated with field methods such as observations and interviews (qualitative data) were combined with traditional surveys (quantitative data) (Creswell, 2003). It is important to note that many different terms are used for this approach, such as integrating, synthesis, quantitative and qualitative methods, multimethod, and multimethodology, however more recent studies employ the term "mixed methods" (Creswell, 2003).

Advantages of Mixed Methods Research

There are many advantages and benefits of using mixed methods, however, I have primarily chosen this approach based on the assumption that collecting diverse types of data have provided an in-depth understanding of my research problem. To my knowledge there have not been any other studies that have employed mixed methods to investigate technology integration and student linguistic and cultural diversity through a multiliteracy lens in teacher education programs in Canada. This could potentially be due to the fact that a mixed methodological approach is still fairly new among researchers (Creswell &

Plano Clark, 2011), and it may be difficult to acquire a sufficient preservice language teacher sample size for generalizable results.

An additional strength of mixed methodology is that it obtains different but complementary data on the same topic in order to best understand the research problem (Creswell & Plan Clark, 2011). This is advantageous as this design combines the strengths and non-overlapping weaknesses of the quantitative methods (large sample size, trends, generalization) with those of qualitative methods (small sample, details, in depth) (Creswell & Plan Clark, 2011). This design is also used to triangulate the data by directly comparing and contrasting quantitative statistical results with qualitative findings for corroboration and validation purposes (Creswell & Plan Clark, 2011). It can also uncover the complexities that may be difficult to capture with employing only one methodological approach.

The advantages of quantitative methods are that they are able to show statistical analyses including both descriptive and inferential statistics. This provides an outlook on participant demographics, (i.e. demonstrating a snapshot of who is now becoming a language teacher in Ontario) and multiple analyses can be conducted to reveal trends, correlations, and commonalities and differences between respondents' TPACK (self-efficacy on integrating technology) and the *Multicultural Efficacy Scale* (knowledge, understanding, attitude, and skills about student diversity and pedagogies) (Guyton & Wesche, 2005). The advantages of qualitative data is that it offers an in depth understanding and a different lens to see how student teachers are using technology in language teaching and learning, and how they perceive technology integration and student linguistic and cultural diversity. In summary, Denscombe (2008) advocates that mixed methods research can increase the accuracy of data by providing a more complete picture of the research problem that would be limited by a single approach and potentially overcoming the weaknesses and biases of single approaches.

Overall there are many benefits associated with a mixed methods design but the most important of these listed above is the advantage of choosing methods which best answer the research questions. Also mixed methods do not constrain data collection by following

one particular methodology or being limited to the type of data that will be collected and analyzed. Using a mixed methodology by combining both qualitative and quantitative methods, results have the benefit of presenting multiple perspectives, which could be valuable in contributing to research in second language teacher education in Ontario.

Special Considerations in Mixed Methods Research

There are special considerations I have contemplated throughout the process of employing a mixed methods design to ensure it was the best fit for the research problem. First, the dimension of paradigm emphasis (deciding on the weighting of the quantitative and qualitative data), is seen as a potential weakness by some methodological purists (e.g. positivists vs. constructivists/interpretivist) (Johnson & Onwuegbuzie, 2004). They contend that one should always work within either a qualitative or quantitative paradigm. However, I have employed a mixed methods approach because multiliteracies include multiple ways of making meaning of different forms of diverse data. It also has the potential to engage with researcher bias through a variety of perspectives, interpretations, and comparisons to best understand the research problem.

Another potential shortcoming identified in mixed methods research includes the difficultly for a single researcher to carry out both qualitative and quantitative research, in particular if two or more approaches are used concurrently: for example, the time ordering of the qualitative and quantitative phases and if the phases can be or should be carried out sequentially or concurrently (Creswell & Plano Clark, 2011). Although the quantitative component was carried out first, this was merely a way for me to execute this design type as a single researcher and to recruit participants for the interviews. The questions on the survey and interview were designed to answer some of the same research questions however the interview offered an opportunity for participants to elaborate on their responses as opposed to choosing a number on a rating scale. The interviews confirmed some of the findings from the questionnaire and revealed a more complete response to the questions thus capitalizing on both types of research. In addition, the results from this study will have multiple uses as the quantitative data (numbers) can be quickly and efficiently presented to educational policy members, and

Canadian teacher education administrators. Through open-ended, semi-structured questioning, the qualitative data has added and complemented the quantitative findings.

An additionally identified potential weakness to mixed methodology is that the researcher has to learn about multiple methods and approaches and understand how to mix them appropriately (Creswell & Plano Clark, 2011). I have considered the degree of mixture, and where the mixing should occur (e.g. during data analysis or data interpretation). However, one advantage to mixed methods research is that it unlocks a multitude of ways that a study can be mixed because of the many potential classification dimensions (Johnson & Onwuegbuzie, 2004). For example, the various design of mixed methods include explanatory, exploratory, transformative, etc. Therefore, this study followed a convergent-parallel design, where the two types of data were analyzed separately then merged to produce a set of conclusions in the final chapter. This provided me with an opportunity to identify qualitative themes from analyzing the interview transcripts and cross-referencing them with the quantitative values and variables identified from the online questionnaire. The results have been merged in Chapter 6 to outline a better understanding of the data and provide more complete answers to the research questions (Creswell & Plano Clark, 2011).

3.2 Research Design

The purpose of the convergent-parallel mixed methods design is to obtain different but complementary data on the same topic to best understand the research problem (Creswell & Plano Clark, 2011). The procedures for implementing a convergent design with a parallel-database variant include four major steps. First, I collected both quantitative data (questionnaire) and qualitative data (interviews). These two types of data collection occurred sequentially due to single researcher data collection, and have equal importance for addressing the research questions. Next, I analyzed the two data sets separately and independently from each other using typical quantitative (SPSS, descriptive and inferential statistics) and qualitative (manual thematic coding) analytic procedures. Once the two data sets of initial results were analyzed, interpreted and results reported, I merged the results of the two data sets in the third step. This merging step directly

compares the separate results to link overall themes. In the final step, I determined to what extent and in what ways the two sets of results converge, diverge from each other, are related to each other, and/or combine to create a better understanding in response to the study's overall purpose (e.g. Chapter 6 and 7) (Creswell, 2007). I took an overall pragmatic worldview that shaped my study, which included mixed methods as a means of best answering my research questions. A mixed methodology took into consideration my own personal experiences, assumptions, and biases when collecting and analyzing my data. This methodology combined with the mixed methods, assisted with my data analysis and development of themes that emerged in the interviews. A further discussion of my philosophical implications and relationship to my study's data will be discussed in further detail in the next section.

Philosophical Implications. As briefly introduced in the last section and in the Researcher Positionality section of Chapter 1, my overall pragmatic worldview shaped the inquiry and design of my research study. My focus was on designing a study that best answered my research questions of investigating student teachers' knowledge, skills, attitudes, beliefs, and efficacy in technology integration and teaching for cultural and linguistic diversity. The research questions were derived from my personal experiences as an English as Second Language and French as a Second Language educator. Managing, acknowledging, and making explicit the personal assumptions and researcher bias is vital for 'good' qualitative research (Creswell, 2006). Therefore, during the collection and analysis of my qualitative data in the form of semi-structured interviews, I endeavored to maintain engagement with my participants, yet still remained objective in the questioning of my participants. For example, at different times when the respondents described their experiences with technology integration and expressed a dislike or indifferent attitude towards technology, I refrained from further more in depth questioning so as not to project my own beliefs or attitude, and also to maintain equality of time and questionning among the participants. I also followed a systematic approach in my analysis of the transcripts in identifying themes based on the actual recurrent words of participants. At times, in order to increase readability and coherence in the interview data, I employed an interpretivist/constructivist ontological stance (Schwandt, 2000; Creswell, 2013; Mertens,

2014). According to Mertens (2014) interpretivist/constructivist qualitative researchers interpret their data, acknowledge the multiple realities of their respondents and support the validity of their claims based on multiple sources of data (e.g. Mixed Methods) as well as several examples of direct quotes from participants. Creswell states that, "…qualitative researchers conduct a study with the intent of reporting these multiple realities. Evidence of multiple realities includes the use of multiple forms of evidence in themes using the actual words of different individuals and presenting different perspectives" (Creswell, 2013, p. 20).

Reflexivity. Taking into consideration that reflexivity and is a complex, and multi-faceted, every changing process that requires ongoing practice (Dervin & Byrd Clark, 2014; Stîngu, 2012; Walker, Read & Priest, 2013), it represents an important part of educational research and teaching. Polit and Tatano Beck (2010 as cited in Walker, Read & Priest, 2013, p.39) describe reflexivity as "the process of reflecting critically on the self, and of analysing and noting personal values that could affect data collection and interpretation". Researchers, teachers, and students can employ the notion of reflexivity to benefit in a number of different ways including becoming critically aware of current and future practices of teaching and how this can affect student learning.

Walker, Read and Priest (2013), state that reflexivity is widely used in relation to qualitative data collection and analysis, in particular for interviews. Their mixed methods study states that "reflexivity is often regarded as a useful tool for ensuring the standard of qualitative research. Reflexivity provides transparent information about the positionality and personal values of the researcher that could affect data collection and analysis" (p. 38). Furthermore, according to Ryan (2005), the use of reflexivity in teacher education, as a means of professional development, is a widely recognized practice in faculties of education around the world. He states that "often there is a requirement to reflect on practice, which can be traced back to the work of John Dewey and Donald Schön (reflective practice), both of whom put forward the notion that reflection is a critical underpinning of growth and learning" (para. 5). Overall I have contemplated my philosophical underpinnings, and through reflexivity, have acknowledged how my

beliefs, biases, and experiences as an educator have made and impact and at the same time, permitted me to conduct a valid, reliable, and credible research study.

3.3 Participants

Demographics. According to Punch (2009), "the sampling plan should have a logic that fits with the logic of the research questions" (p. 252). As Ontario has a culturally and linguistically diverse population, the participants will likely teach a diverse population of students once they transition into professional practice. In the participant group there were 112 females and 26 males (*N*=138), with an age range from 21 to 42, median 23, and mode 22. Participants were located in urban locations of smaller to larger cities, 61% from Southern University[1], 25% from Central University, and 14% from Northern University. Most participants were enrolled in consecutive programs (97%), (3% concurrent), and 58% were in secondary teaching (35% elementary). Students self-identified with approximately one or more of 41 different races/ethnicities, which included, White/Caucasian (80%), European, Asian, Latin American, Arab, Jewish, and Middle Eastern (see Table 1). Also seen in Table 1, participants self reported approximately 27 different languages, the most frequent being English and French (61%) with others including Spanish, German, Mandarin, Japanese, Polish, Greek, Arabic, Korean and Urdu. Most students (94%) had completed at least one practicum at the time of completing the online survey.

Procedures

Following ethics approval, emails were sent to faculty members within the education departments at Southern, Central, and Northern University (See Appendix A). Targeted faculty members were chosen based on the courses that they were teaching according to the online timetable schedule available on each institutions' website (e.g. French or

[1] Pseudonyms were used for each of the universities that participated in this study as well as all interview respondents for privacy protection

Table 1

Summary of Student Teachers' self-identified race/ethnicity and languages

Race/Ethnic Background		Languages
Chinese	Scottish	English
Aboriginal	Vietnamese	French
European	Kurdish	Korean
Korean	Sri Lankan	German
Caucasian	Latin	Portuguese
Portuguese	Guyanese	Greek
Egyptian	Arab	Polish
Polish	Jewish	Spanish
Dutch	German	Arabic
French	Lebanese	Kinyarwanda
Hispanic	Irish	Kirundi
Middle Eastern	South Asian	Urdu
Rwandese	Trinidadian	Punjabi
Pakistani	Latin American	Mandarin
Caribbean	Taiwanese	Japanese
Italian	Filipino	Cantonese
Metis		Hindi
West Indian		Turkish
Afro-Canadian		Serbian
English		Italian
Palestinian		Tagalog
Jamaican		Konkani
Indian		Kurdish
Black		Khmer
Turkish		Tamil
		Russian
		Hebrew

Note. The Race/Ethnic Background and Languages are result of open-ended questions on the online survey. They are listed in random order.

English as second language pedagogy, multiliteracies pedagogies, multicultural education). Recruitment was then done in person through a short information session given by the researcher about the study, with accompanying letters of information with the survey link provided (See Appendix B). Not all institutions allowed information sessions during class time therefore advertisement posters were placed within their faculties of education (See Appendix C). For example, I was permitted to recruit participants in person at Southern University (I was invited into four classes) and Central University (I was invited into one class), circulate email invitations to potential participants via the teacher education office and put up recruitment posters. However, at Northern University, I was not permitted to enter any classes but the faculty circulated the email recruitment letter and I was able to post recruitment posters. Thus, the recruitment of students from each institution resulted in a convenience sample of volunteers (61% from Southern University, 25% from Central University, and 14% from Northern University). Punch (2009) confirms that often times when conducting research, "the researcher must take whatever sample is available and the incidence of convenience samples is increasing" (Punch, 2009, p. 250).

The survey was transferred electronically using Survey Monkey with an average completion time of 15 minutes (See Appendix D). It was live for approximately seven months. Following the online questionnaire, student teachers provided further descriptive data of the questionnaire through semi-structured interviews. The 13 interviews between the researcher and student teachers began after the completion of the online survey from respondents who indicated they were able to do so in the online survey. All interviews took place over a three-month period and lasted about 20 minutes.

3.4 Methods: Online Survey & Interviews

Online Survey

Survey of Preservice Teachers' Knowledge of Teaching and Technology. This study's design began with two measures distributed as one online survey to participants within three teacher education programs in Ontario. The first measure was the *Survey of*

Preservice Teachers' Knowledge of Teaching and Technology (Schmidt et al., 2009), which is comprised of a 58-item , 5-point Likert scale ranging from *strongly disagree* to *strongly agree.* This instrument will be referred to as the TPACK survey from this point forward. The questions covered the areas of technological knowledge, content knowledge (in various subject content areas), pedagogical knowledge, pedagogical content knowledge, technological content knowledge, technology, pedagogy, and content knowledge combined and finally models and percentages of technological, pedagogical, and content knowledge (TPACK) (see Appendix D). Student teachers' technological, pedagogical, and content knowledge was measured on 5-point Likert scales ranging from *strongly agree* to *strongly disagree* with an additional column for *non-applicable* answers or for participants who chose not to answer. Students were required to rate each measure using the following parameters: *disagree strongly, disagree, neither disagree nor agree, agree,* and *strongly agree* for positively skewed items. All statements were measured using an ordinal scale using numbers, 1, 2, 3, 4, and 5, with a 0 allocated to *non-applicable*. Twenty-one items were excluded from the original TPACK survey for the purposes of this study as they pertained specifically to other subject areas such as Math, Social Studies, and Science content knowledge and the focus for this study was only on language teaching and technology integration. Therefore, I included 37 items divided into seven subscales.

The first subscale, Technological Knowledge (TK), consisted of seven items: *I know how to solve my own technical problems, I can learn new technology easily, I keep up with important new technologies, I frequently play around with the technology, I know a lot about different technologies, I have the technical skills I need to use technology,* and *I have had sufficient opportunities to work with different technologies.*

The second subscale, Pedagogical Knowledge (PK) consisted of seven items: *I know how to assess student performance in a classroom, I can adapt my teaching based upon what students currently understand or do not understand, I can adapt my teaching style to different learners, I can assess student learning in multiple ways, I can use a wide range*

of teaching approaches in a classroom setting, I am familiar with common student misconceptions, and *I know how to successfully organize and manage a classroom.*

The third subscale, Content Knowledge (CK), Pedagogical Content Knowledge (PCK), and Technological Content Knowledge (TCK) consisted of five items: *I have sufficient knowledge about language/literacy, I can use a literary way of thinking, I use various strategies of developing my understanding of languages and literacy, I know how to select effective teaching approaches to guide student thinking and learning in language/literacy,* and *I know about technologies that I can use for understanding language/literacy.*

The fourth subscale, Technological Pedagogical Knowledge (TPK) consisted of five items: *I can choose technologies that enhance the teaching approaches for a lesson, I can choose technologies that enhance students' learning in a lesson, My teacher education program has caused me to think more deeply about how technology could influence the teaching approaches I use in my classroom,* and *I can adapt the use of the technologies that I am learning about to different teaching activities.*

The fifth subscale, Technological, Pedagogy, and Content Knowledge (TPACK) consisted of five items: *I can teach lessons that appropriately combine languages and literacy, technologies, and teaching approaches, I can select technologies to use in my classroom that enhance what I teach, how I teach and what students learn, I can use strategies that combine content, technologies and teaching approaches that I learned about in my coursework in my classroom, I can provide leadership in helping others to coordinate the use of content, technologies and teaching approaches at my school and/or district,* and *I can choose technologies that enhance the content for a lesson.*

The sixth subscale Models of TPACK consisted of five items: *My language/literacy education professors appropriately model combining content, technologies and teaching approaches in their teaching, My instructional technology professors appropriately model combining content, technologies and teaching approaches in their teaching, My educational foundation professors appropriately model combining content, technologies*

and teaching approaches in their teaching, My professors outside of education appropriately model combining content, technologies and teaching approaches in their teaching, and *My practicum mentor teachers appropriately model combining content, technologies and teaching approaches in their teaching.*

The final subscale, Percentages of Models of TPACK was divided into four items: *25% or less, 26%-50%, 51%-75%, 76%-100%,* and a *non-applicable* column. The percentages refer to the frequency that teacher educators (e.g. faculty or practicum mentor teachers) integrate technology in their teaching practices according to the items below. The first item was: *In general approximately what percentage of your teacher education professors have provided an effective model of combining content, technologies and teaching approaches in their teaching?* Therefore, if students selected 25% or less, on average teacher educators provided examples or modeling of ways to integrate technology in their content area 25% of the time or less. The second item was: *In general, approximately what percentage of your professors outside of education have provided an effective model of combining content, technologies and teaching approaches in their teaching?* If students selected 26%-50% for this item, educators not within the faculty of education provided examples or modeling of ways to integrate technology in their content area 25%-50% of the time. The final item was: *In general approximately what percentage of the Practicum Mentor Teachers have provided an effective model of combining content, technologies and teaching approaches in their teaching?*. If students selected 51%-75% for this item, on average practicum mentor teachers provided examples or modeling of ways to integrate technology in their content area between 51%-75% of the time.

Schmidt et al. (2009) study's purpose was to create a valid and reliable instrument to measure preservice teachers' self-assessment of the seven knowledge domains (listed above and detailed in theory section of Chapter 2) which comprises TPACK. In order to determine construct validity of this survey Schmidt et al. (2009) completed factor analyses on each of the seven subscales using a principal components analysis with varimax rotation. Results yielded a 16-factor solution with loadings between .59 and .91

with the majority of high of loadings above .80. To assess the internal consistency of the respondents' answers on the *Survey of Preservice Teachers' Knowledge of Teaching and Technology*, Schmidt et al. (2009), used Cronbach's alpha and computed an overall reliability score of .84. Cronbach's alpha test of reliability of internal consistency is an average of how well scores on each item correlates with the overall test score (Muijs, 2011). Muijs (2011) also contends that, "Cronbach's alpha range between 0 and 1, with 1 being a perfect relationship between the variables that make up the scale, and 0 having no relationship at all" and in addition, "as a guideline, it is said that a Cronbach's alpha above 0.7 is acceptable for research purposes" (p.168).

Multicultural Efficacy Scale. The second instrument included in the online survey was the *Multicultural Efficacy Scale* (*MES)*(Guyton & Wesche, 2005). This 35-item scale was developed to measure some of the complexity of the four dimensions of multicultural teacher education: knowledge, understanding, attitude, and skill (Bennett et al., 1990). This 4-point likert scale measured participants' beliefs about multiculturalism in three areas: (a) experience with others different from themselves, (b) attitudes about multicultural educational practices, and (c) a self-assessment of their ability to incorporate multicultural practices into classroom instruction (self-efficacy) (Guyton & Wesche, 2005) (see Appendix D). Some of the survey questions were modified or omitted as the focus of this study was on language teaching, preservice teachers, as well as to keep the survey completion time low to maximize participation. A total of five items were removed from the *MES* within the efficacy portion of this survey to maintain the focus of the research questions and participants, (e.g. taking into consideration the sample is pre-service teachers and not experienced teachers). For example, questions excluded pertained to school policies: *I can identify school practices that may harm diverse students*, or were more appropriate for experienced teachers: *I can identify solutions to problems that may arise as the result of diversity, I can identify ways in which various groups contribute to our pluralistic society, and I can help students take on the perspective of ethnic and cultural group different from their own*. Two items that were deemed confusing and/or ambiguous were also removed: *I can identify societal forces which influence opportunities for diverse people,* and *I can present diverse groups in our*

society in a manner that will build mutual respect. As this instrument was developed in the United States, three items were modified (one in the second attitudes subscale, and two in the final beliefs scale) since they referred to the United States as their country of teaching (e.g. US History). These were replaced with Canada/Canadian. Overall the changes and modifications resulted in a 30-item scale.

In the first set of subscale questions, students were required to indicate their experience with diversity (Guyton & Wesche, 2005) using the following parameters: *never, rarely, occasionally,* and *frequently*. Within this subscale, the authors provided the following definition, "The authors intend the terms "diversity" and "people different from me" to include people of different races, ethnic groups, cultures, religions, socio-economic classes, sexual orientations, and physical abilities" (Guyton & Wesche, 2005). In the second subscale, students were required to rate their attitudes about teaching diversity (Guyton & Wesche, 2005) using the following parameters: *disagree strongly, disagree, agree,* and *strongly agree* for positively skewed items.

In the third, fourth, and fifth subscales, students were required to self-assess their ability (self-efficacy) (Guyton & Wesche, 2005) using the following parameters: *I do not believe I could do this very well, I could probably do this if I had to but it would be difficult for me, I believe that I could do this reasonably well if I had time to prepare,* and *I am quite confident that this would be easy for me to do.* All statements were measured using an ordinal scale using numbers, 1, 2, 3, and 4, with a 0 allocated to *non-applicable*, and reverse scoring was done in computing subscale scores to ensure accuracy of the negatively and positively skewed statements. There were 30 items divided into three subscales with a final item where students were required to choose one or more statements that most strongly reflect(s) their beliefs about teaching (attitude) (Guyton & Wesche, 2005).

The first subscale about experience with diversity included the following seven items: *As a child I played with people different from me, I went to school with diverse students as a teenager, Diverse people lived in my neighborhood when I was a child growing up, In the past I chose to read books about people different from me, A diverse person was one of*

my role models when I was younger, In the past I chose to watch TV shows and movies about people different from me, and *As a teenager, I was on a team and/or club with diverse students.*

The second subscale about attitudes included seven items: *Teachers should adapt lesson plans to reflect the different cultures represented in the classroom, Teachers should provide opportunities for children to share cultural differences in foods, dress, family life, and beliefs, Discussing ethnic traditions and beliefs in schools leads to disunity and arguments between students from different cultures, Children should be taught mostly by teachers of their own ethnic and cultural background, It is essential to include the perspectives of diverse groups while teaching things about Canadian history, Curricula and textbooks should include the contributions of most, if not all, cultural groups in Canadian society,* and *The classroom library should reflect the racial and cultural elements of the classroom members.*

The final subscale about students' self-efficacy included the following 15 items: *I can provide instructional activities to help students to develop strategies for dealing with confrontations about diversity or diverse groups, I can adapt instructional methods to meet the needs of learners from diverse groups, I can develop materials appropriate for the multicultural classroom, I can develop instructional methods that dispel myths about diverse groups, I can analyze instructional materials for potential stereotypical and/or prejudicial content, I can develop activities that increases the self-confidence of diverse students, I can provide instruction showing how prejudice affects individuals, I can plan instructional activities to reduce prejudice toward diverse groups, I can identify cultural biases in commercial materials used in teaching, I can help students work through problem situations caused by stereotypical and/or prejudicial attitudes, I can help students take on the perspective of ethnic and cultural groups different from their own, I can help students to examine their own prejudices, I can get students from diverse groups to work together, I can help students view history and current events from diverse perspectives,* and *I can involve students in making decisions and clarifying their values regarding multicultural issues.*

The last item on the scale asked students to choose one or more of five different positions to reflect their strongest belief(s) about teaching: *If every individual learned to accept and work with every other person, then there would be no intercultural problems, If all groups could be helped to contribute to the general good and not seek special recognition, we could create a unified Canada, All cultural groups are entitled to maintain their own identity, All cultural groups should be recognized for their strengths and contributions,* and *Some groups need to be helped to achieve equal treatment before we can reach the goals of a democratic society.* Students were also given the opportunity of an *other* option where they could write their own position about their beliefs, however no students completed this.

This instrument was built under the premise that programs or courses in multicultural teacher education address the four dimensions listed above. In addition, this scale was developed as a result of demographic trends on the foundation that teacher education programs need to produce student teachers who are prepared to teach in a multicultural context with competence (Zeichner, 1993). To assess the internal consistency of the respondents' answers on the MES, Guyton and Wesche (2005) used and computed a score of .89 for the 35-item scale, and between 0.72 to 0.93 for the subscale alphas of experience with diversity, attitude about diversity, and self assessment of teaching efficacy related to diversity (Guyton & Wesche, 2005). Since the original instrument was modified for the purposes of this study, and merged with the TPACK survey, an additional Cronbach's alpha test of reliability was done on the entire survey of 67 items, which included both the *Survey of Preservice Teachers' Knowledge of Teaching and Technology* and *MES.* The 67 items that were included in this test resulted in an overall score of .92. This result was higher than that of the original TPACK survey (.84) and the *MES* (.89) conducted separately.

Interviews

Following the online questionnaire, student teachers provided further descriptive data of the questionnaire through semi-structured interviews. The questions focused on how student teachers use technology for teaching and learning, their perceptions, experiences,

willingness to include technology and teach for student diversity, strategies for teaching CALD, and ways in which they felt they could be further supported (see Appendix E). Lewin (2005) agrees that open-ended and semi-structured questions are more suited to qualitative approaches allowing the respondent to give a free response in continuous text. This allows the interviewer greater flexibility to introduce "probes" for expanding, developing and clarifying informants' responses (Scott & Morrison, 2006). The key purpose is for the interviewer to define the interviewee as a person who is actively constructing his/her own world, and to draw upon the interview text to develop insights into such worlds (Scott & Morrison, 2006).

Contexts/Locations of Study

Three teacher education programs in Ontario were purposefully chosen for this study's sample based on the research questions and geographical locations. They were chosen through document analysis of educational institutions websites, course outlines, and mission statements. This was done in order to examine the approaches, strategies, and methods of integrating technologies and multiculturalism into language teacher education programs. The three different locations also represent both concurrent and consecutive programs, varying geographical locations, and as a result, a cross-sectional sample of future language educators in different years of their degree programs. Pseudonyms were used to protect the identity of the institutions. Northern University, boasts a technological focused teaching and learning education program. The program focuses on how students use and understand educational technologies in their own contexts through practice and reflection. This is a consecutive program that aims to support a technology-rich teaching and learning environment. Their program is also based upon key educational principles that include reflection, praxis, technology, and diversity. Central University, offers a five-year concurrent program (combined undergraduate and professional teaching qualification), where the focus is on practical experience in diverse contexts. This program focuses on principles of equity, diversity, and social justice and includes mandatory courses on inclusive education (ELLs and exceptional learners). Finally, Southern University, includes courses to support ELLs, multiliteracies pedagogies, and

uses for technologies in education. Although these courses are not mandatory at Southern University, they are strongly recommended and offered as elective choices.

The online survey sample (*N*=138) yielded a 95% completion rate, from the original 145 participants. To be included in the sample at least 90% of the items had to be completed in any given subscale. Participants were student teachers of languages with a primary focus in FSL, ESL education or both. They were all located in urban locations of varying sizes, enrolled in both concurrent and consecutive programs, with elementary or secondary teaching areas. The student teachers were bi/multilingual and from various ethnic/racial backgrounds. The follow-up semi-structured interviews (*n*=13) were conducted with volunteers who indicated in the online survey that they would be willing to sit an interview at a later date (See Table 2). The interviewees included a balanced sample size from each location with intended teaching area of FSL, ESL, or both.

Ethical Considerations. Ethical protocol submissions were approved by the Research Ethics Boards at each of the institutions, with appendices of recruitment and consent documents (i.e. letters of consent, recruitment posters). There were no known potential risks to the study's participants. I remained diligent throughout the research study to ensure confidentiality for participants. Pseudonyms were used for the institutions as well as for each student participating in the interviews. Students were not asked to disclose their names on the online survey and were given the opportunity not to answer any questions by choosing non-applicable (N/A) or neither agree or disagree. In addition, at any given time participants were informed that if they were concerned about loss of confidentiality or felt any discomfort during the research study they may opt at any time to withdrawal consent and no longer participate. To protect the participants' privacy, all digital data (word processing files and audio files) were stored in a locked filing cabinet on a password encrypted USB in the researcher's office. All personal identifiers were removed from the digital data and students were assigned pseudonyms for coding and analyzing the interview transcripts and surveys. No participants withdrew consent and there was no loss of anonymity during the data collection and analysis process.

Table 2

Interview participant demographics

Pseudonym	Gender	Intended teaching area	Institution
Edith	Female	ESL and FSL	Northern University
Nancy	Female	ESL	Northern University
Rena	Female	FSL	Northern University
Adam	Female	FSL	Northern University
Andrea	Female	FSL	Southern University
Isabella	Female	FSL	Southern University
John	Female	FSL	Southern University
Cathy	Male	FSL	Southern University
Naomi	Male	ESL and FSL	Southern University
Josh	Female	FSL	Central University
Abbey	Female	ESL and FSL	Central University
Sadie	Female	FSL	Central University
Laura	Female	ESL and FSL	Central University

This chapter began with a further connection of the philosophical implications of my research based on a pragmatic worldview. I acknowledged how my previous experiences as a language educator, beliefs, attitudes, and assumptions have influenced my data collection and analysis and in doing so described how I managed these biases, in a systemic and ethical way. I provided a brief history of mixed methods research and associated advantages and special considerations when conducting a study with multiple forms of data. I described the procedures of my convergent-parallel design, and how the choice of employing a mixed methodology was purposeful in best answering my research questions. The demographics of my survey and interview participants were included, the contexts in which the data collection took place, as well as a description of the two main survey instruments: *Survey of Preservice Teachers' Knowledge of Teaching and Technology* and *the Multicultural Efficacy Scale.* In Chapter 4, I will outline the quantitative data analysis procedures and provide the results and discussion of my statistical analyses by answering the quantitative research questions.

Chapter 4

4 Quantitative Results

In this chapter I will describe the quantitative data analysis procedures, and provide results of for Research Questions 1 and 2 for online survey instruments scores that pertain to student teachers' technological, pedagogical, and content knowledge and multicultural efficacy. Next I will include results for Research Question 3 about the correlation between the two instrument scores and findings of the principal components analysis. Finally, I will include a discussion of these findings and how they relate to the overall research problem of teacher attrition in terms of preparation, perspectives, and challenges associated with teaching and learning with technology for a culturally and linguistically diverse classroom.

4.1 Data Analysis Procedures

The quantitative data analysis was done using predictive analytics software Statistical Package for the Social Sciences (SPSS Version 21) for both descriptive and inferential statistical analyses. Descriptives including means and standard deviations of the total instrument scores and subscale scores are reported. In addition, t-tests, correlations, and analysis of variance (ANOVA), were performed to compare the results of the three different institutions on the *Survey of Preservice Teachers' Knowledge of Teaching and Technology* and *the Multicultural Efficacy Scale*. A Principal Components Analysis (PCA) identified the highest loading components to reaffirm content validity and a Cronbach's Alpha analysis was completed for reliability.

4.2 Research Question 1 & 2 Results

Research Question 1

What are student teachers' Technological, Pedagogical, and Content Knowledge scores on knowledge, skills, and efficacy to integrate technology in three different teacher education programs in Ontario?

Research Question 2

What are student teachers' Multicultural Efficacy Scale scores on experience, attitude, and efficacy to integrate multicultural strategies in three different teacher education programs in Ontario?

In order to answer Research Question 1 of student teachers' scores on the TPACK survey, univariate, descriptive statistics were used to find each of the seven subscale scores and a combined total instrument score (total TPACK score). Cumulative means and standard deviations for each of the seven subscale scores are shown in Table 3. When combining the 37 items listed above, students' total TPACK scored between the *neither disagree nor agree* and *agree* parameters. Within the subscales, students' scores of TK, PK, CK, and TPK were slighter higher rated than overall TPACK since the models of TPACK and percentages of models of TPACK subscales scored the lowest between *neither disagree or nor agree* and *disagree* parameters.

In response to Research Question 2, univariate, descriptive statistics were used to find each of the three subscale scores and a combined total instrument score (total MES score). Cumulative means and standard deviations for each of the three subscale scores are shown in Table 3. When combining the 29 items, students' total MES scores resulted in M= 3.07, SD = .49. Within the subscales, the average score of students' experience with diversity fell in the category of *occasionally*, attitudes skewed positively resulting in *agree somewhat*, and for self-efficacy, option B, *I could probably do this if I had to, but it would be difficult for me* was mostly commonly chosen. As seen in Table 3, within the *MES*, cumulative means for the three geographical locations scored lower than the TPACK instrument scores. For the three subscales, experiences with diversity, attitudes towards diversity, and self-efficacy of teaching and learning for diversity, students also scored close to the *neither disagree or agree* (neutral position). In the final question that showed students' belief(s) in one or more of the five selections (Tolerance, Assimilation, Pluralism, Multiculturalism, and Advocacy), the multicultural view was the highest at 32% (see Table 4) which mimics Guyton and Wesche's 2005 study.

Table 3

Summary of Student Teachers' subscales and overall TPACK and MES scores

Subscales	*n*	*M*	*SD*
Technical Knowledge	138	3.92	.68
Pedagogical Knowledge	138	4.17	.48
Content Knowledge	138	3.90	.73
Technological Pedagogical Knowledge	138	3.93	.76
Technological Pedagogical Content Knowledge	138	3.76	.86
Models of TPACK percentage	138	2.92	.90
Models of TPACK	138	2.98	.93
Total TPACK score	138	3.60	.48
MES experience with diversity	138	3.02	.70
MES attitudes	138	3.17	.54
MES self-efficacy	138	3.04	.70
Total MES score	138	3.07	.49

Note. The first eight items belong to the TPACK survey and the last five items belong to the MES.

Table 4

Students' Conceptualizations of Multiculturalism

Multicultural Views	Frequency of responses	Cumulative %
Tolerance	61	19.6
Assimilation	40	12.9
Pluralism	60	19.3
Multiculturalism	98	31.5
Advocacy	52	16.7

Note. Tolerance, Assimilation, Pluralism, Multiculturalism, and Advocacy are the multicultural viewpoints that students could select one or more.
Frequency indicates the number of times a student selected this response.
Cumulative percentages show an overall calculation of the breakdown of responses out of 100.

Students were able to choose from one or more of the statements that best described their overall view of multicultural education.

Due to the lower subscale scores of the models of TPACK and percentages of models of TPACK, the following two hypotheses were formed to see if these scores were associated with student teachers' overall TPACK: (1) Mentoring/modeling (either academic or professional) the integration of technology is associated with students' overall TPACK; and (2) The frequency and amount of mentoring/modeling of technology integration is associated with students' overall TPACK.

To test hypothesis 1, I used Muijs (2011) suggestion of using t-tests to compare means or correlations to determine if two variables are associated. The continuous variable was the overall TPACK instrument score and the test variables for the two different tests were: models of TPACK subscale scores, and percentages of models of TPACK subscale scores. The t-test provides statistical significance, while Pearson's *r* is a measure of the relationship between two continuous variables, also called the correlation coefficient (Muijs, 2011). A correlation coefficient for this test shows whether or not a high score on one variable is associated with a high score on the other variable. In the first test, the subscale scores of models of TPACK were statistically significant with overall TPACK scores, resulting in $r(139) = 0.68$, $p < .001$, indicating a moderate effect size. In the second test, the models of TPACK percentages subscale score was also statistically significant with overall TPACK scores, resulting in $r(5139) = 0.68$, $p < .001$, indicating a moderate effect size. This indicates that mentoring/modeling, and frequency of mentoring/modeling were associated with TPACK. Since the results of these two tests were both significant ($p < .05$), effect sizes are also reported to show a measure of the strength of the relationship (Muijs, 2011). "Pearson's *r* coefficients vary between –1 and +1, with +1 indicating a perfect positive relationship (a high score on variable X = a high score on variable Y), – 1 indicating a perfect negative relationship (a high score on X = a low score on Y), and 0 indicating no relationship" (Mujis, 2011, p.98). According to Mujis (2011, p.99), "the strength of the relationship, the closer it is to +/–1 the stronger it is, the closer to 0, the weaker it is. He includes this rule of thumb on effect sizes: <+/–.1

weak, <+/–.3 modest, <+/–.5 moderate, <+/–.8 strong, >=+/–.8 very strong (Mujis, 2011). It is important to measure the strength of the effect size in order to determine if and how generalizable a study's results are to the general public (Muijs, 2011).

To test hypothesis 2 to see if students who encountered a low frequency (low percentage) of technology integration in their classes (both academically and practical experience) would also experience a low level (e.g. teacher centered technologies only) of technology integration, a scatterplot (Figure 2) was analyzed for associations between the models of TPACK and the percentages of TPACK subscale scores. The scatterplot revealed a positive correlation between students' perceptions of the models of TPACK and the percentages of technology integration from the models of TPACK, therefore Pearson's r was calculated, $r\ (139) = 0.55$, $p < .001$, which relfects a moderate effect size. There was also a positive correlation between overall TPACK scores and each of the models of TPACK and models of TPACK percentages, both being $r(139) = 0.68$, $p < .001$, indicating a moderate to strong effect size. This indicates that student teachers who reported low levels of technology integration mentoring also reported low frequency of technology integration by their mentors.

Upon reporting the descriptive statistics, a comparison between the three different geographical locations was based on the teacher education program descriptions and course offerings. Therefore Hypotheses 3 and 4 were formed: (3) Students who attended Northern University would have a higher TPACK score than the other locations based on the technological program initiatives and proposed access and support of technology and; (4) Students who attended Central University would have a higher MES score than other locations based on the urban location having the most diverse population and integration of multicultural strategies.

To test hypothesis 3 and see if student teachers at Northern University would have higher TPACK scores and subscale scores, between groups analysis of variance (ANOVA) tests were conducted. The independent variables were the three different geographical locations: Northern University (NU), Central University (CU), and Southern University (SU). Means and standard deviations are reported in Table 5 for each of the locations.

Figure 2. Linear relationship between the subscales of mean models of TPACK and models of TPACK percentages

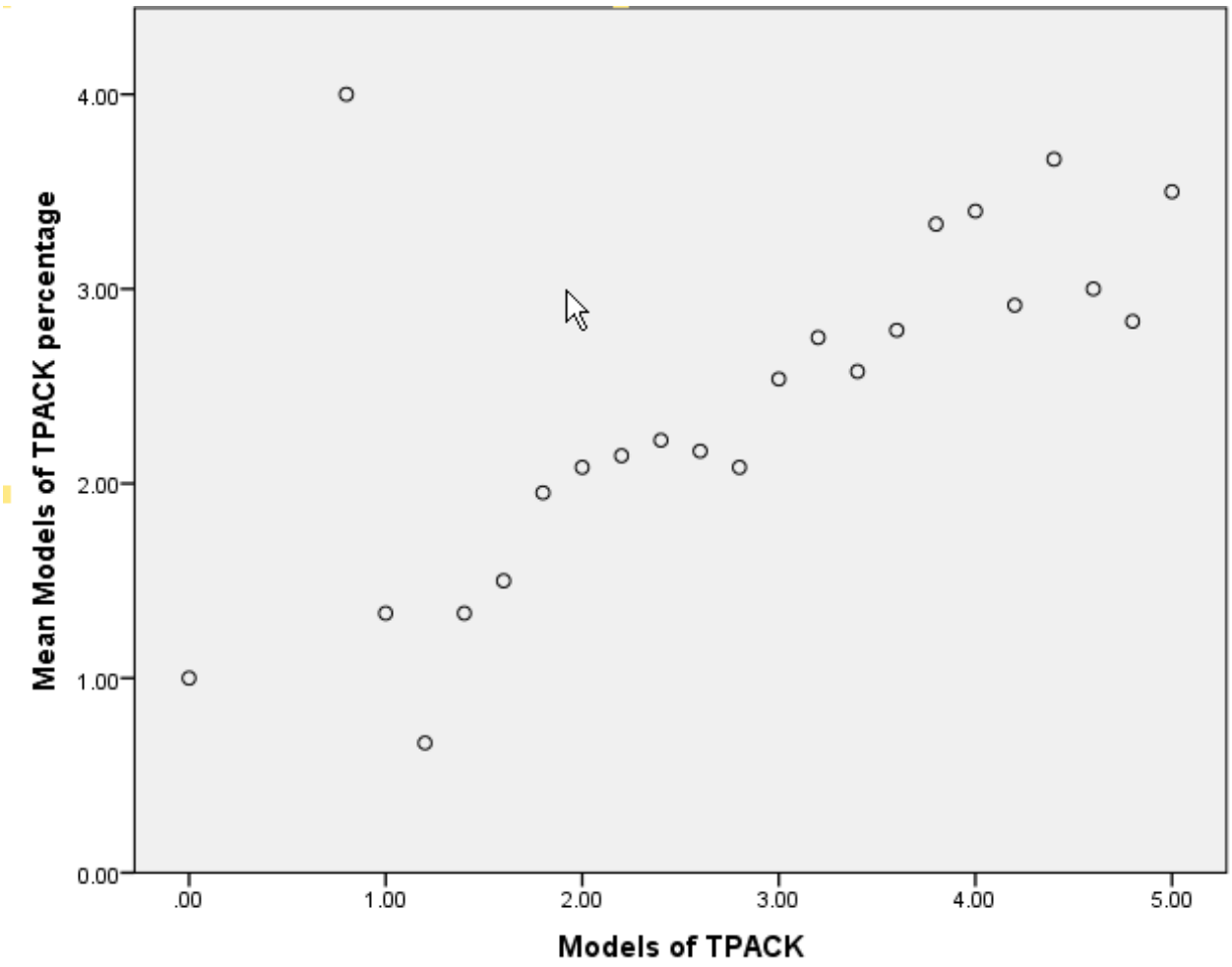

Figure 2. An example of the scatterplot used to determine if the relationship between each the subscales were linear in order to proceed with Pearson's *r* to test for correlation. Means scores for the subscale of models of TPACK (level of technology integration) and percentages of TPACK (frequency of technology integration).

Table 5

Student Teachers' subscales and overall TPACK and MES scores based on geographical location

Subscales	Geographical Locations					
	SU (*n* =87)		CU (*n*=19)		NU (*n*=34)	
	M	*SD*	*M*	*SD*	*M*	*SD*
Technical Knowledge (TK)	3.92	.67	3.92	.77	3.91	.55
Pedagogical Knowledge (PK)	4.13	.50	4.25	.46	4.14	.40
Content Knowledge (CK)	3.90	.83	3.98	.47	3.78	.54
Technological Pedagogical Knowledge (TPK)	3.85	.82	3.94	.66	4.30	.51
Technological Pedagogical Content Knowledge (TPACK)	3.69	.87	3.79	.88	4.04	.67
Models of TPACK percentage	2.42	.91	2.46	.79	3.09	.81
Models of TPACK	2.91	.91	2.84	.85	3.60	.91
Total TPACK score	3.54	.52	3.60	.32	3.84	.40
MES experience with diversity	2.97	.72	3.06	.71	3.15	.54
MES attitudes	3.19	.49	3.11	.61	3.14	.61
MES self-efficacy	3.05	.74	2.99	.68	3.11	.55
Total MES score	3.06	.55	3.03	.37	3.12	.36

Note: SU =Southern University, CU=Central University, Northern University (NU)

The dependent variables were: (1) overall TPACK score from the *Survey of Preservice Teachers' Knowledge of Teaching and Technology*; and (2) each of the subscale scores from TK, CK, PK, TPK, models of TPACK, and models of percentages of TPACK. The between groups ANOVA conducted on technical knowledge (TK), pedagogical knowledge (PK), content knowledge (CK), technological/pedagogical knowledge (TPK), and TPACK across the three universities were not significant ($p > .05$). There were no significant interactions of technical knowledge between students in different geographical locations $F(2, 138) = .776$ $p > .737$ or pedagogical knowledge $F(2, 138) = .398$ $p > .977$.

There were no significant interactions of content knowledge between students in different geographical locations $F(2, 138) = 1.66$ $p > .067$ or technological, pedagogical knowledge $F(2, 135) = .936$ $p > .531$. There were no significant interactions of TPACK between students in different geographical locations $F(2, 135) = 2.09$ $p > .019$, or the overall score for the *Survey of Preservice Teachers' Knowledge of Teaching and Technology*, $F(2, 135) = 6.38$ $p > .013$. This means that there were no significant differences in the technological or pedagogical knowledge scores in the different locations- most students scored about the same. Finally, there were no significant interactions of models of TPACK between students in different geographical locations $F(2, 135) = 1.03$ $p > .433$ or percentages of models of TPACK $F(2, 135) = 1.84$ $p > .053$.

To test hypothesis 4 if student teachers at Central University had a higher MES score than the other locations, between groups analysis of variance (ANOVA) tests were conducted. The independent variables were the three different geographical locations: Northern University (NU), Central University (CU), and Southern University (SU). Means and standard deviations are reported in Table 5 for each of the locations. The dependent variables were: overall MES score, and each of the subscale scores from the MES (experience, attitudes, and self-efficacy). There were no significant interactions between students in different geographical locations in experience, $F(2, 137) = .619$ $p > .897$ or attitudes, $F(2, 137) = 1.24$ $p > .248$. There were no significant interactions of self-efficacy between students in different geographical locations $F(2, 137) = .668$ $p > .907$, or the overall score for the *MES*, $F(2, 137) = .779$ $p > .826$.

To find out if ICT or multicultural education courses are associated with student teachers' technical knowledge, skills, or efficacy towards integrating technology or multicultural strategies, Hypotheses 5 and 6 were formed: (5) Students who took an ICT course would have a higher TK, TPK, TPACK, and overall TPACK survey score and; (6) Students who took a multicultural education course would have a higher MES self-efficacy score.

To test Hypothesis 5 to see if student teachers who took an ICT course would have higher scores than students who did not take an ICT course on technological knowledge, technological, pedagogical knowledge, TPACK and overall TPACK scores, between groups ANOVA tests were conducted. The independent variables were the three different geographical locations: Northern University (NU), Central University (CU), and Southern University (SU) and ICT course taken, and the dependent variables were the subscale scores of TK, TPK, TPACK, and the total instrument score from the TPACK survey. From Southern University seven students indicated that they took an ICT course and 80 did not. From Central University two students took an ICT course and 32 did not, and from Northern University 15 students took and ICT course and four did not. Means and standard deviations are shown in Table 6. There were no significant interactions found on technical knowledge, $F(2, 137) = .568$ $p > .568$, technological, pedagogical knowledge, $F(2, 137) = 2.08$ $p > .128$, TPACK $F(2, 137) = 1.17$ $p > .312$, or total TPACK $F(2, 137) = 1.05$ $p > .351$. This means that students in the different geographical locations who had taken an ICT course did not score higher than those who had not taken an ICT course.

To test Hypothesis 6, to see if students who took a multicultural education course would have a higher self-efficacy than those who did not take a multicultural education course to integrate multiculturalism, a between groups ANOVA test was conducted. The independent variables were the three different geographical locations: Northern University (NU), Central University (CU), and Southern University (SU) and

Table 6

Comparison of student teachers subscale scores for ICT course or ME course taken

Location	ICT Course	TK		TPK		TPACK		TOTAL TPACK		MES Course	MES Efficacy		MES Total	
		M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*		*M*	*SD*	*M*	*SD*
SU	yes	4.26	.54	4.42	.53	3.82	.49	3.73	.26	yes	3.01	.70	3.02	.59
	no	3.89	.68	3.79	.82	3.67	.91	3.52	.54	no	3.08	.79	3.11	.50
CU	yes	4.42	.60	4.50	.70	4.40	.56	4.00	.21	yes	3.10	.59	3.09	.36
	no	3.89	.78	3.90	.66	3.75	.89	3.57	.31	no	2.65	.87	2.85	.36
NU	yes	4.05	.60	4.21	.50	3.92	.69	3.80	.38	yes	2.93	.95	3.30	.51
	no	3.89	.69	4.60	.48	4.45	.44	3.97	.17	no	3.18	.30	3.16	.29

Note. SU= Southern University, CU=Central University, NU=Northern University
ICT=information communication technology course, ME=multicultural education course
TK=Technological Knowledge, TPK=Technological Pedagogical Knowledge, TPACK= Technological, Pedagogical, Content Knowledge, MES=Multicultural Efficacy Survey

multicultural education course. The dependent variable was the self-efficacy score on the *MES*. There were no significant interactions on self-efficacy between students in different geographical locations who had taken a course on multicultural education, $F(2, 137) = 1.54$ $p > .218$. This means that students who took a course on multicultural education did not score higher than those who did not take a course on multicultural education. The next section provides the results of Research Question 3, which was based on one final hypothesis of associations between student teachers' knowledge, attitudes, and self-efficacy within the TPACK survey and MES.

4.3 Research Question 3 Results

Research Question 3

Are there any significant correlations between student teachers' TPACK and MES scores on knowledge, skills, experience, attitude, and efficacy to integrate multiliteracies pedagogies in three different teacher education programs in Ontario?

The final Hypothesis 7 related to the third research question to find out if there were any significant associations between student teachers' *MES* and TPACK scores. To test Hypothesis 7 to see if students teachers who scored lower or higher on the TPACK survey also scored lower or higher on the *MES*, a scatterplot (Figure 3) was analyzed for associations between the total *MES* instrument score and overall TPACK instrument score. According to Figure 3, there is a positive correlation between MES and TPACK scores resulting in $r(139) = 0.37$, $p < .001$, which is a modest effect size. This implies that student teachers overall scored higher on the TPACK survey than on the *MES* survey. This could indicate that students have a higher self-efficacy and/or attitude in relation to the integration of technology than the implementation of multicultural strategies. The next section will discuss the validity of this study's instruments.

Validity

Muijs (2011) states that there are three different types of validity, which are all important in determining an instrument's validity: content validity, criterion validity, and construct

Figure 3. Linear relationship between the Total MES and TPACK scores

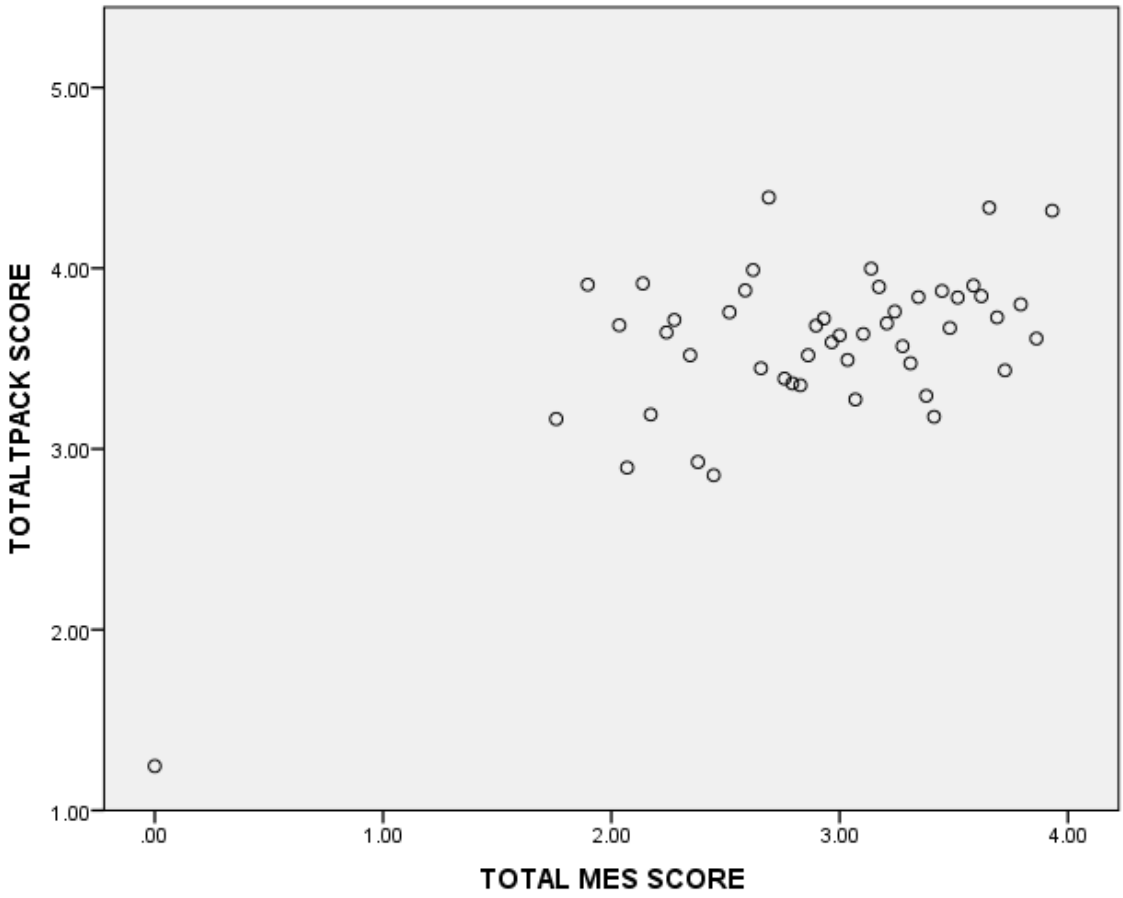

Figure 3. Overall mean scores from the TPACK instrument and the MES instrument. There is a positive correlation between MES and TPACK scores indicating that participants scored higher on the TPACK survey than the MES survey.

validity. Content validity refers to, "whether or not the content of the manifest variables is right to measure the latent concept that we are trying to measure"(Muijs, 2011, p. 48). Criterion validity (predictive and concurrent) includes whether an instrument can predict an outcome or relate to other measures, and if the scores on the measure align with other expected factors (Muijs, 2011). From the validation and use of these two surveys in previous studies (Guyton & Wesche, 2005; Schmidt et al., 2009) the survey itself was judged to have good content and criterion validity. In addition, to further establish content and criterion validity, Muijs (2011) also suggests using techniques such as correlation coefficients (e.g. Pearson's *r*). Based on this current study's findings, significant correlations were reported as part of the response to Research Questions 1, 2, and 3 (e.g. Figures 1 and 2).

Principal Components Analysis (PCA). As previously stated in the Methods section (Chapter 3: Methodology), a principal components analysis was conducted to demonstrate construct validity, showing if the instrument is measuring the intended underlying constructs (Mujis, 2011). Muijs (2011) describes principal components analysis as a statistical technique of factor analysis that reduces a set of variables to a smaller number of underlying factors. It also detects relationships between variables and can show if variables are indicators of underlying constructs based on the correlation between them (Muijs, 2011; Yong & Pearce, 2013). Principal components analysis attempts to explain as much of the variance as possible. A principal component analysis was performed on the 67-item survey using an oblique rotation (direct oblimin). According to Yong and Pearce (2013), oblique rotation is when the factors are not rotated 90 degrees from each other, and are considered to be correlated.

From the validation of these two surveys in previous studies (Guyton & Wesche, 2005; Schmidt et al., 2009), it was determined that the variables were correlated (i.e. attitudes, efficacy) and showed good content validity. Yong and Pearce (2013) state that *Kaiser's criterion* (Kaiser, 1960), which is a rule of thumb; propose retaining all eigenvalues over 1. In addition they also suggest using a scree test in conjunction with this method due to the overestimation of the number of factors extracted (Yong & Pearce, 2013). Therefore,

to determine which factors to eliminate, the scree plot was examined and any eigenvalues under 1.00 were excluded (Figure 4). As a result, eigenvalues of greater than 1.00 extracted a 16-factor solution with a cumulative 76% total variance, with the first factor totaling 20% of the variance. The total range of factor loadings were from -.41 to .94. The cut-off factor loading score for all three components was set at items less than .40, which more rigorous than the recommended .30 or less than -0.30 (Mujis, 2011). Means and standard deviations of factor loadings are presented in Table 7. Each component was renamed to describe more specifically the underlying construct. Loadings of variables on components, percent of variances, and commonalities (h^2) are presented in Table 8. Yong and Pearce (2013) affirm that factor analysis uses variances to produce communalities between variables. The variance is equal to the square of the factor loadings. According to Mujis (2011, p. 155):

> Principal components analysis will try to explain as much variance as possible with the first factor extracted. This variance is then removed, and a second factor is extracted to explain as much as possible of the remaining variance, and so on, until 100% of the variance has been explained

Factors that explain a limited percentage of variance (eigenvalues under 1.00) are unsubstantial and only factors that are substantively important and explain enough of the variance were included (Mujis, 2011).

The first factor, Instructional Multicultural Efficacy, loaded five variables of the original 15 from the *MES* survey in the area of efficacy, 13.2 eigenvalue (20% of the total variance) and included items pertaining to instructional efficacy about multiculturalism. This included self-efficacy related to planning activities, materials development, and pedagogies to teach for diversity. All had factor loadings between .70 and .80. The second factor, TPACK 6.62 eigenvalue (10% of the total variance), included all five items from the overall TPACK section of the TPACK survey. These items pertained to the overall knowledge and skills teachers require in the areas of pedagogy and content to integrate appropriate technologies. All had strong factor loadings between .80 and .90. The third factor, Technology Knowledge, 5.32 eigenvalue (8% of the total variance), included six of the seven items in the TK section of the TPACK survey. These items

Figure 4 Preservice Teachers' Knowledge, Skills, and Attitudes Towards Technology and Multiculturalism

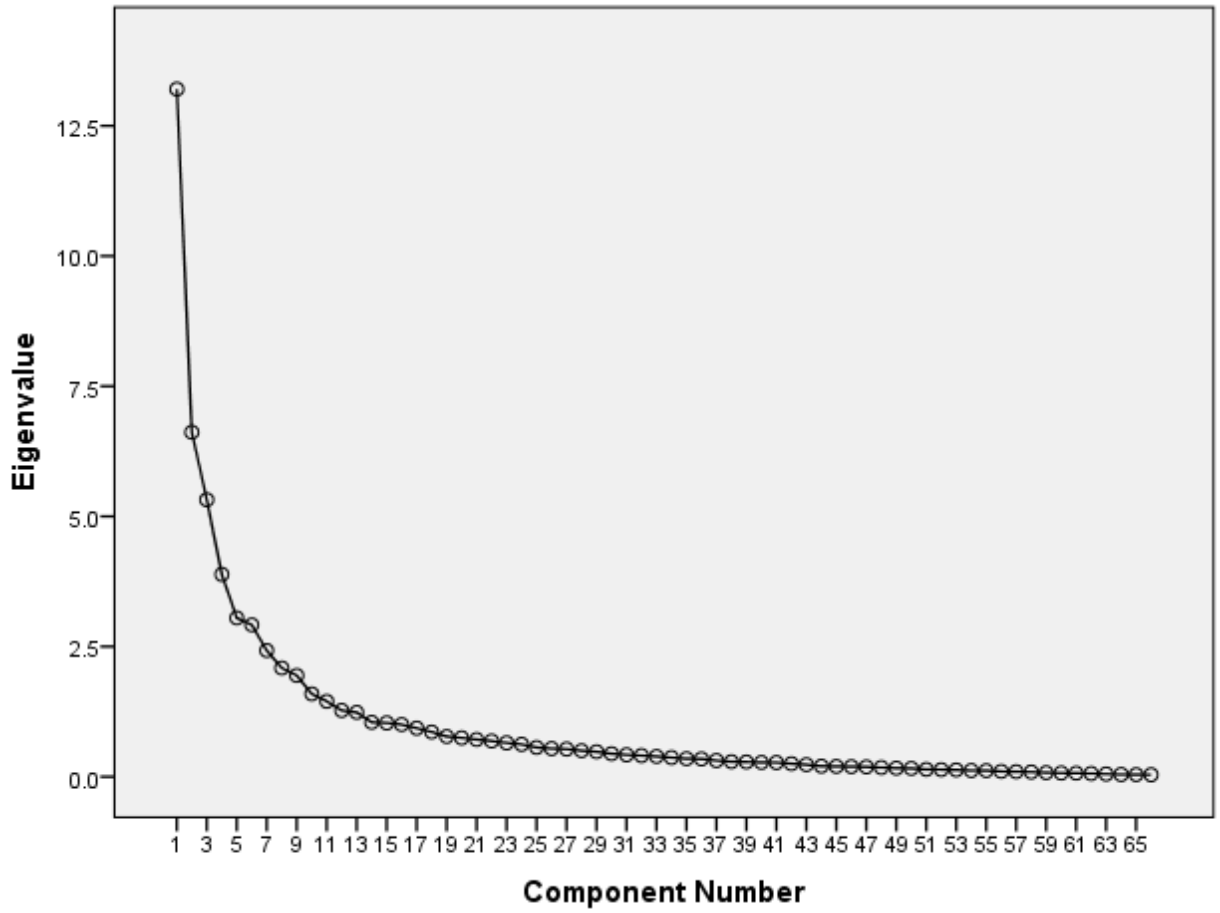

Figure 3. A scree plot for principal components analysis solution was used to determine which factors to eliminate. Eigenvalues under 1.00 were excluded as a result of a 16-factor solution.

Table 7

Means and standard deviations of factor loadings within the principal components analysis

Component	*M*	*SD*
Instructional Multicultural Efficacy	.75	.04
TPACK	.85	.04
Technology Knowledge	.78	.10
Pedagogy Knowledge	.65	.12
Practical Mentoring	.74	.19
Experiences with Diversity	.67	.18
Academic Mentoring	.64	.16
Content Knowledge	.71	.10
Technical Pedagogies Knowledge	.58	.12
Multiculturalism Attitude	.80	.10
Teaching Students about Diversity	.71	.10
Multicultural Teaching Attitude	.84	.03
Technical Skills	.61	0
Teaching for Diversity	.77	.06
External Experience with Diversity	.67	.06
Pedagogy for Understanding	.53	0

Table 8

Component loadings, communalities (h^2), and percents of variance for principal components analysis with direct oblimin rotation

Items	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	h^2
MESself2	**.801**	.040	.049	.000	.014	.094	.003	-.049	-.035	.067	.144	.043	-.032	.053	-.002	.033	.796
MESself1	**.761**	.003	-.049	-.027	.015	-.166	-.036	-.078	-.003	.004	.057	.015	-.145	.072	-.038	.027	.756
MESself3	**.758**	.030	-.015	-.036	-.006	-.011	-.018	.008	.039	.058	.143	.041	.076	.069	-.006	-.018	.774
MESself4	**.715**	-.069	.025	-.014	.092	-.044	.084	.049	-.157	-.005	.083	-.040	.100	.157	.027	.041	.788
MESself5	**.699**	-.098	-.027	-.041	-.048	.004	-.098	.039	-.005	-.029	.030	-.026	.031	.188	.031	-.034	.702
TPACK5	-.058	**.901**	.050	.049	-.009	.019	.024	-.026	-.110	-.011	.157	.047	-.090	.016	-.087	-.053	.857
TPACK2	-.030	**.899**	.008	.096	-.072	.001	.002	.100	.033	-.055	-.044	.005	-.023	.117	.043	.043	.862
TPACK4	-.054	**.842**	-.043	-.067	.125	-.012	-.051	-.016	.028	.037	.021	-.026	.089	-.033	-.079	.051	.775
TPACK3	-.047	**.839**	.090	-.021	-.065	-.035	-.111	.042	-.075	.042	-.012	.004	.109	.036	.052	-.090	.686
TPACK1	.159	**.798**	-.016	-.065	-.023	-.101	.040	.105	.098	-.044	-.127	.065	-.025	-.056	.053	.046	.785
TK3	.095	-.060	**-.898**	-.055	-.051	.051	.008	.029	.079	.064	-.046	.055	-.066	.014	-.040	.031	.787
TK2	.006	-.027	**-.864**	-.090	-.084	.008	-.030	-.053	.046	-.189	-.044	.055	-.017	.058	-.033	-.086	.785
TK4	-.094	-.043	**-.800**	.120	.104	-.035	.005	-.002	.027	.054	.240	-.048	.048	-.066	-.004	.029	.702
TK1	.011	-.020	**-.779**	-.016	-.019	-.044	-.021	.036	-.023	-.062	-.107	-.150	-.043	-.035	-.006	-.045	.694
TKS	-.046	.100	**-.753**	.018	.063	-.084	.048	-.088	-.161	.082	.049	-.024	.056	-.010	.005	.042	.706
TK7	.099	.038	**-.603**	.080	.150	-.016	-.042	-.100	-.222	.045	-.020	-.108	.247	.007	-.024	-.035	.700
PK1	-.078	-.098	-.089	**-.839**	-.056	.075	-.035	.024	-.066	-.039	-.016	.036	-.075	.032	.074	.098	.717
PK4	.101	.114	.032	**-.667**	-.024	-.136	-.027	-.104	-.012	-.139	.018	.036	.026	.099	-.229	-.072	.626
PK5	.222	.088	.080	**-.654**	.163	.058	.131	.197	.001	-.027	.015	-.041	.176	-.136	.022	-.076	.722
PK6	.160	.061	.046	**-.647**	.032	.117	-.050	.199	-.048	-.042	-.039	-.160	.050	.019	.127	.116	.647

PK3	.025	-.048	.022	**-.622**	.040	-.122	.064	-.095	.063	.135	.074	.093	.103	.119	-.005	-.236	.572
PK7	.010	.220	-.156	**-.450**	.221	.162	.030	.148	.044	.091	-.034	-.094	-.315	.087	-.031	.134	.609
modper3	-.038	-.019	.017	-.027	**.935**	-.015	.083	-.036	-.055	-.087	-.043	.035	-.077	.060	-.039	.012	.860
modTPACK5	.109	-.046	-.005	.019	**.738**	.009	-.107	.192	.198	.013	-.041	.028	.042	.028	.103	-.170	.736
modper2	.008	.034	-.113	.008	**.546**	.062	-.265	.009	-.155	.150	.039	-.013	.150	-.019	.063	.195	.653
MESexp2	.084	.068	-.044	.013	-.056	**-.845**	-.053	.025	.043	.001	-.026	.052	.126	-.041	.018	.009	.757
MESexp3	.007	.092	-.004	.019	.111	**-.730**	.012	.014	.094	-.027	.171	-.038	-.029	-.122	.246	-.068	.756
MESexp7	.006	-.033	-.034	.020	-.043	**-.707**	.061	.163	-.049	.167	-.049	-.074	-.106	.133	.079	.097	.660
MESexp1	.067	.126	-.030	.122	.299	**-.413**	-.009	-.074	.182	-.059	-.064	.150	-.300	.167	.305	-.222	.792
modTPACK2	.044	.071	.072	.062	.030	-.056	**-.791**	-.036	.002	-.063	.050	-.136	.059	-.029	-.183	-.099	.671
modTPACK4	.008	.005	-.087	.052	.067	.203	**-.757**	.144	.155	.171	-.169	.086	.056	.061	.132	-.114	.760
modTPACK3	.055	.021	-.023	-.017	-.018	.031	**-.703**	-.007	-.105	-.071	.043	.147	-.151	-.093	.101	.222	.686
modTPACK1	-.044	.012	.010	-.094	.026	-.311	**-.518**	.021	-.124	-.022	.061	-.020	-.069	.150	.092	.005	.559
modper1	-.061	.086	-.018	-.157	.257	-.069	**-.424**	-.128	-.340	.145	.172	.008	.005	.063	-.065	.294	.755
CK1	-.003	.126	.082	-.029	-.046	-.070	-.022	**.802**	.079	-.036	.050	.030	.040	.006	.040	-.048	.776
CK3	.013	.030	.017	.086	.114	.049	.034	**.782**	-.173	-.064	.149	.054	.085	-.018	-.035	.064	.765
CK4	-.053	.004	.106	-.266	.089	-.131	.007	**.722**	-.082	.020	.132	.152	-.066	-.094	-.153	.030	.800
CK2	.004	.144	.022	.022	.014	.008	-.077	**.716**	.166	.004	.009	.004	-.181	.099	.085	.047	.704
CK5	.092	.065	-.170	.044	-.011	-.212	-.061	**.549**	-.316	-.124	-.111	.073	.024	.075	-.233	-.160	.720
TPK3	.046	-.023	.057	-.119	-.003	-.017	-.154	.035	**-.736**	-.011	-.062	.063	.147	.046	.155	.079	.736
TPK4	.152	.144	-.111	-.013	.059	.094	.035	.024	**-.656**	-.108	-.018	.103	-.335	-.024	.044	.033	.761
TPK2	.041	.184	-.212	.042	.026	.098	.030	.173	**-.530**	.127	-.006	.062	.148	.113	.139	-.351	.832
TPK1	.114	.255	-.212	.100	-.067	.071	-.021	.153	**-.523**	.063	-.050	.004	.083	.042	.164	-.364	.859
TPK5	.190	.255	-.196	-.059	-.107	-.004	-.206	.074	**-.436**	.126	-.132	.070	-.256	-.058	.135	-.189	.801
MESattitude4	.059	.022	-.024	.073	-.107	.041	.077	-.018	.055	**.866**	.061	-.022	-.095	-.075	.113	-.061	.781
MESattitude3	.011	-.062	.093	-.057	.097	-.178	-.086	-.080	-.038	**.728**	-.087	.121	.081	.067	-.287	.064	.755

MESself15	.182	.041	-.048	-.016	-.004	-.070	-.019	.067	.042	.046	**.810**	.031	-.009	.021	-.003	.007	.870
MESself14	.100	.056	.093	-.021	-.069	.105	.049	.060	-.008	.001	**.774**	.008	.005	.165	.074	.033	.840
MESself13	.178	-.040	-.045	.009	-.064	-.055	-.017	.061	.026	-.043	**.773**	.086	.014	.103	-.051	-.127	.881
MESself12	.060	-.126	-.116	-.037	-.011	-.013	-.016	.154	.022	-.020	**.638**	-.020	-.055	.291	.156	.004	.828
MESself11	.188	.039	-.036	.074	.124	-.030	-.034	.039	.087	.055	**.573**	.075	-.033	.282	-.011	.091	.795
MESattitude6	.015	-.053	-.090	-.043	-.006	.039	-.046	.100	.084	-.004	.084	**.870**	-.099	-.018	.035	.077	.812
MESattitude5	.158	-.014	-.015	.002	.054	.028	.076	-.004	.036	-.001	-.111	**.864**	-.037	-.089	.067	-.049	.783
MESattitude2	-.037	.084	.072	.140	.063	-.072	.068	-.023	-.162	-.050	.018	**.839**	.022	.065	-.059	-.015	.825
MESattitude1	-.087	.085	.059	.033	.019	.013	-.007	-.029	-.097	.094	-.062	**.821**	.098	.138	-.045	.091	.773
MESattitude7	-.043	-.013	.093	-.115	-.085	.032	-.101	.085	.058	.029	.178	**.810**	.051	-.100	.046	-.089	.790
TK6	.041	.257	-.419	-.167	.033	.077	.058	-.080	.110	-.073	-.069	.014	**.612**	-.044	.031	.096	.749
MESself7	.110	-.023	.033	.000	.019	.017	.019	.038	.050	-.066	.095	.031	-.014	**.808**	.064	.042	.859
MESself8	.139	.058	-.015	-.048	.037	.089	.014	-.028	-.057	-.014	.039	.032	-.068	**.802**	.000	.042	.840
MESself6	.136	.022	.103	-.012	.077	-.060	-.005	.011	-.008	.017	.047	-.034	.082	**.801**	-.066	.046	.852
MESself10	.102	.053	-.053	-.032	.003	-.016	-.006	-.038	-.001	.020	.108	-.018	-.058	**.784**	.108	-.007	.857
MESself9	.080	.033	-.022	-.025	-.016	.034	-.040	.018	.008	.005	.261	-.034	.041	**.659**	-.047	-.204	.781
MESexp4	.107	.034	.041	.061	.128	-.038	-.059	-.080	-.068	-.088	.049	.069	-.020	.018	**.733**	-.050	.690
MESexp6	-.131	-.088	.040	-.089	-.028	-.224	.032	.073	-.087	-.023	.030	.094	.158	.282	**.681**	.013	.748
MESexp5	.047	.008	.063	-.036	-.022	-.301	.004	-.103	-.136	.084	.034	-.025	-.131	-.108	**.600**	.050	.616
PK2	-.142	.008	-.060	-.524	.227	.093	-.053	-.132	-.106	-.035	.133	-.065	-.139	-.050	-.042	**-.533**	.770
Percent of variance	20.00	10.02	8.06	5.89	4.62	4.42	3.67	3.17	2.95	2.41	2.20	1.92	1.87	1.58	1.57	1.52	
Cumulative variance	20.00	30.03	38.09	43.98	48.60	53.01	56.70	59.86	62.80	65.21	67.41	69.34	71.21	72.80	74.36	75.88	

Note.
h^2 = communalities (equal to the square of the factor loadings)

MESself=multicultural self efficacy about teaching diverse students, strategies for multicultural teaching
TPACK=technological, pedagogical, and content knowledge
TK=technological knowledge (technical skills, knowledge)
PK=pedagogical knowledge (planning, assessment)
Modper=models of percentages of TPACK (frequency of use of technology)
ModTPACK=models of TPACK (practicum and academic mentors)
CK=content knowledge (subject area)
TPK=technological, pedagogical knowledge (ability to use technology to enhance pedagogy)
MESattitude=Attitude towards multiculturalism/multicultural teaching
MESexp=Experiences with multiculturalism and diversity

focused on current practices, skills, attitudes, and experience with technology. All factor loadings were between .60 and .90.

The fourth, Pedagogy Knowledge, 3.90 eigenvalue (6% of the total variance), included six of the seven items in the area of PK within the TPACK survey. These items pertained to knowledge and skills on general pedagogy in terms of assessment and strategies. All factor loadings were between .45 and .84. The fifth factor, Practical Mentoring, 3.05 eigenvalue (4.6% of the total variance) included items from both the models of TPACK percentages and models of TPACK sections within the TPACK survey. These items focused on the amount of and effectiveness of technology mentoring outside of the faculty of education, for example practicum mentor teachers. All factor loadings ranged from .55 to .94. The sixth factor, Experiences with Diversity, 2.92 eigenvalue (4.4% of the total variance), reverted back to the *MES* survey, and included four of the original seven items within this section. The items focused specifically on childhood experiences (e.g. school, playing). All factor loadings were between .41 and .85. The seventh factor, Academic Mentoring, 2.42 eigenvalue (3.7% of the total variance) included the remainder of the items within the models and percentages of TPACK within the TPACK survey. These items focused on amount of and effectiveness of technology mentoring from faculty or instructors within an educational institution. All factor loadings ranged from .42 to .79. The eighth factor, Content Knowledge, 2.10 eigenvalue (3.2% of the total variance), included all five items from the CK section of the TPACK survey. These items were related to knowledge, skills, and strategies in teaching languages. All had factor loadings between .55 and .80.

The ninth factor, Technological Pedagogies, 1.95 eigenvalue (2.9% of the total variance), included all five items from the TPK section of the TPACK survey. These related to the knowledge and skills required in choosing appropriate technologies to enhance teaching. Factor loadings ranged from .44 to .74. The tenth factor, Multiculturalism Attitude, 1.60 eigenvalue (2.4% of the total variance), contained only two items from the original seven items within the *MES* attitude subscale. These items referred to culture and ethnicity of teachers and discussion of traditions and beliefs in classrooms. Factor loadings were .73

and .87. The eleventh factor, Teaching Students about Diversity, 1.45 eigenvalue (2.2% of the total variance), included five of the original 15 efficacy items in the *MES*. These pertained to the ability to help students in the classroom with multicultural issues and solutions. All factor loadings ranged from .57 to .81. The twelfth factor, Multicultural Teaching Attitude, 1.27 eigenvalue (1.9% of the total variance), included five items (the remainder) from the original attitudes subscale within the *MES*. These concerned attitudes towards multicultural teaching practices in the classroom and access to and use of multicultural teaching resources. Factor loadings were all strong from .81 to .87. The thirteenth factor, Technical Skills, 1.24 eigenvalue (1.9% of the total variance), included only one item (the remaining) within the TK section of the TPACK survey. This item was *I have the technical skills I need to use technology.* The factor loading was .61. This did not load on any other component higher than the cut off from .30 to -.30.

The fourteenth factor, Teaching for Diversity, 1.04 eigenvalue (1.6% of the total variance), included five items from the efficacy section of the *MES* (Guyton & Wesche, 2005). These items referred to teachers' abilities to teach within and for a diverse classroom. All factor loadings ranged from .66 to .81. The fifteenth factor, External Experience with Diversity, 1.03 eigenvalue (1.6% of the total variance), included three items from the original experiences with diversity section of the *MES*. These factors pertained to external influences on diversity such as TV, books, and mentors. Factor loadings were between .60 and .73. The final factor, Pedagogy for Understanding, 1.00 eigenvalue (1.5% of the total variance), included only one item from the PK section of the TPACK survey. This item was *I can adapt by teaching based upon what students currently understand or do not understand.* The factor loading was .53. This item also crossloaded (.52) on the PK factor of the TPACK survey indicating a correlation with pedagogical knowledge. Crossloadings or split loadings refer to an item that loads at .32 or higher on two or more factors (Yong & Pearce, 2013).

The principal components analysis also revealed that the main measures (MES survey and TPACK survey) are relatively independent of one another since all factor loadings loaded on their respective scales. All variables identified or correlated with the original

survey they were a part of and did not load on the alternate survey. For example, as indicated above, all of the TPACK survey variables loaded on TPACK factors and all of the MES survey variables loaded on *MES* factors. This indicates that the components identified above do not measure the same constructs, which is why each of the constructs were given more specific names that related to the construct that they were measuring. In addition, according to the above analysis, the 67-item survey of the combined TPACK and *MES* variables were divided into 16 components. Of the 16 components, nine of the components were associated with the TPACK survey and the remaining seven were associated with the *MES* survey. This indicates that the TPACK survey measured approximately seven different underlying constructs, although two of them (TK6 and PK2) were deemed unreliable as they only loaded one factor each. The rest of the seven constructs loaded into similar patterns measuring efficacy of technical knowledge, content knowledge, pedagogical knowledge, overall TPACK combined, practicum modeling of TPACK, educational modeling of TPACK, and finally the percentages (frequency) of models of TPACK. The MES survey also reported similar constructs to the original survey of experience, attitudes, and efficacy. Although the *MES* survey measured efficacy, these variables loaded only with the multicultural self-efficacy factors and not with any of the technology variables. Of the seven components in the MES survey, components loaded similarly with two pertaining to experience, three associated with efficacy, and two relating to attitude. Overall the principal component analysis showed good construct validity.

4.4 Quantitative Discussion

This section will provide an interpretation of the results and relate the data findings to the overall purpose of the research study, research questions, and hypotheses. The purpose of the survey data was to provide an overview of student teachers' knowledge, skills, experience, attitudes, and efficacy towards multicultural education and the integration of technologies for teaching and learning in language education. It was also to determine the validity and reliability for the 67-item survey that included the two instruments.

Research Question 1. In response to Research Question 1 of student teachers' TPACK

scores on knowledge, skills, and efficacy to integrate technology in three different teacher education programs, students showed an average to high score on the TPACK survey. Within the sub knowledge areas, results showed an adequate knowledge base, skills, and efficacy in technology (TK), and of their subject area content of language education (CK). As these are preservice teachers, it is likely that with increased exposure and practice with using technologies and becoming more familiar with their subject area, that efficacy would increase (Fu, 2013). In terms of technological knowledge scoring, this could indicate that more practice and awareness of technologies used for teaching and learning in language teaching is needed within their programs. Overall students scored higher on knowledge base, skills, and efficacy about pedagogies associated with planning and assessment in language education (PK), than on technical knowledge. This could be due to the fact that many courses undertaken in these programs include components of planning and assessment and some of this knowledge could also be applied to language teaching.

For Hypotheses 1 and 2 of the associations of mentoring/modeling (either academic or practicum experience) of frequency and level of integration of technology, the lowest scores on the TPACK survey were the models and percentages of TPACK. This may indicate that students believe that the modeling within the teacher education program (e.g. faculty, instructors) and within their practicums (e.g. mentor teachers) is inadequate or rare. Since moderate to strong effect sizes were reported as a positive correlation between models of TPACK and percentages of models of TPACK, this shows that modeling could be both rare, and include low knowledge, skills, and efficacy to use an appropriate combination of technologies and pedagogies within the content area to maximize learning potential. This could also be due to the mentors' choice of types of technologies used, availability of technologies, professional development for technology within the locations, the frequency and level of use, time, and willingness to integrate technologies for teaching and learning (Fu, 2013; Laronde, 2010; Redmond, Albion, Maroulis, 2005). Overall, for this population, it could be argued that low levels of mentoring and technology uses for teaching and learning in these programs are associated with students teachers' TPACK resulting in a lower self-efficacy and ability to integrate

appropriate technologies for language teaching and learning.

For Hypothesis 3 to test if student teachers who attended Northern University would have a higher TPACK score based on the technological program initiatives and proposed access and support of technology, results did not show statistical significance. When comparing overall TPACK scores and subscale scores for geographical locations and programming, the lack of statistical significance of findings could indicate that even though a program may include a more technological focus, this may not result in higher knowledge, skills or efficacy in the integration of technology for teaching and learning (See Table 2). This could be for a number of reasons identified in the literature for student teachers' abilities to integrate technology in teaching, which include: teacher attitudes, personal knowledge, skills and experience, confidence and motivation, and perceptions of use (Fu, 2013; Redmond, Albion, & Maroulis, 2005). In addition, since the modeling in all locations was low and rare, it could be argued that student teachers' use of various technologies appropriate for teaching and learning could be associated with modeling/mentoring. Therefore, indicating that student teachers may require further support and modeling from their mentors in both an educational (in class) and practical setting (teaching) to achieve this (Redmond, Albion & Maroulis, 2005).

Research Question 2. Research question 2 reported on student teachers' Multicultural Efficacy Scale scores on experience, attitude, and efficacy to integrate multicultural strategies. Overall students' total *MES* and associated subscales scores were lower than that of the TPACK survey (Table 3). Within the specific subscales, students had low to average experience with CALD, which is not surprising due to the demographic data of the majority of the sample that self-identified with one race or ethnicity (e.g. Caucasian). Students overall had a mid-average attitudes towards multicultural education, which could indicate an openness and willingness to incorporate multicultural teaching strategies or a misguided conceptualization of multiculturalism (see qualitative data). They also scored average on efficacy on their skills to integrate multicultural practices if given appropriate time and practice to research and prepare to teach for CALD. In the final item of the *MES,* students most commonly conceptualized their overall beliefs about

teaching with the Multiculturalism view (Table 4), which is consistent with the initial creation and validation of the *MES* (Guyton & Wesche, 2005). According to Nel (1993), the Multiculturalism view is characterized by having respect for the cultural and linguistic diversity of students, however it is not focused on developing or encouraging collaboration and equity between cultural groups. Overall the main viewpoint focuses on, "assisting culturally and linguistically diverse students to acquire the necessary knowledge, skills, and attitudes to participate successfully in mainstream society" (Nel, 1993). In some aspects, this belief is concerning as it shows that student teachers still require further support and exposure to literature in order to begin to reconceptualize their view of multicultural education and to see CALD as a resource and capitalize on it rather than see it as a deficit.

For Hypothesis 4, to test if student teachers who attended Central University would have a higher *MES* efficacy score based on the program initiatives and the urban location having the most diverse population, results showed no areas of statistical significance. This means students at Central University did not have higher overall scores than the other two locations. This could be for a few different reasons. First, although results showed similar responses, since the sample sizes were unbalanced, the results may not be generalizable. Adding in a larger more balanced sample size in all three locations would assist in better understanding this phenomenon. Secondly, although the geographical locations were purposefully chosen based on the program initiatives and course offerings, this is not indicative of the students' perceptions of what they encountered in their program. Next, the *MES* did not have a component that measured students' perceptions or opinions on mentoring. Since mentoring has been shown to be a valuable component in teacher education for integrating both technology and multicultural education (Nadelson et al., 2012) this would be a further avenue worth exploring in future research directions.

To test Hypothesis 5, to see if students who took an ICT course would have a higher TK, TPK, TPACK, and overall TPACK survey score, there were no areas of statistical significance. Students who took an ICT course did not score higher in technology integration self-efficacy. Despite the benefits and challenges discussed in the literature

presented in Chapter 2 (Literature Review), there could be several reasons for why an ICT preparation course would not yield statistically significance results. First, is the consideration of what technologies are being integrated into teacher education programs- are these appropriately based and aligned with the technologies used in K-12 schools within the same geographical location? If not, then student teachers may be learning about technologies that they would not necessarily be using in their practicum placements resulting in a disconnect between what is being taught in teacher education programs and what is happening in K-12 schools (Redmond, Albion & Maroulis, 2005).

Alternatively, studies have also shown that despite taking an ICT course and as a result having increased intentions of using technologies for teaching and learning, student teachers still find integrating technology challenging due to unfamiliar school environments (Doering, Hughes, & Huffman, 2003 as cited in Fu, 2013). In addition, Choy, Wong, and Geo (2009) contend within their mixed methods study of an ICT preparation course for preservice teachers, that although results showed an increase of proficiency in ICT use, "teacher education programs need to increase awareness of the benefits of integrating technology into student-centered learning approaches, provide pedagogical knowledge related to student-centered learning as well as technology integration strategies" (Fu, 2013, p.120). Furthermore, applying increased importance on advanced skills within teacher education programs offering student teachers meaningful and authentic opportunities to develop lessons that integrate technology may increase proficiency in ICT use (Fu, 2013). This aligns with the notion of a multiliteracies approach to teaching and learning within teacher education programs. Perhaps this would be achieved through the integration of multiliteracies pedagogies whereby student teachers learn about critical literacies and multimodalities, and integrating technologies through authentic, and meaningful experiences.

To test Hypothesis 6, to see if student teachers who took a multicultural education course would have a higher self-efficacy to integrate multiculturalism, similarly to the TPACK and ICT course, no areas of statistical significance were identified. Students who took a multicultural education course did not score higher in multicultural efficacy than those

who did not take a course. This could be due to a number of factors. First, this could be related to Hypothesis 4, in terms of mentoring, and also the unbalanced sample size. Second, other studies (e.g. Moore, 1996; Naldeson et al., 2012) have shown that teacher preparation for multicultural education is based on four main factors: multicultural coursework, personal learning experiences, models of culturally diverse teaching, and encouragement by other educational professionals. Finally, in addition to these four factors, evidence in some cases has shown that one multicultural education course within a teacher education program would have minimal impact on student teachers' perceptions or self-efficacy to integrate multicultural strategies. Further to this, the effectiveness of the course is based on course content, goals and objectives as well as the opportunities to work with a diverse student body (Ambosia, Sequin, & Hogan; Banks, 1993; Locke, 2005 as cited in Nadleson et al, 2012). In relating back to a multiliteracy approach within teacher education programs, there is the potential to encompass the five factors listed above if the multiliteracies pedagogies were taught and practiced in several different teacher education courses such as language arts, social sciences, music, etc. Nadelson et al. (2012) state that, "it is apparent that exposure to multicultural education can come from a course structured to specifically address issues of diversity, courses integrating diversity issues into the traditional curriculum, and through the use of different instructional approaches" (p.1193).

Research Question 3. For Research Question 3, to test for significant correlations between student teachers' TPACK and *MES* scores on knowledge, skills, experience, attitude, and efficacy to integrate multiliteracies, statistical significance was found within the data. These results addressed Hypothesis 7: to test to see if student teachers who scored lower or higher on the TPACK survey also scored lower or higher on the *MES*. Overall, students scored higher in their knowledge, skills, and efficacy of integrating technology. There could be a variety of explanations for the strong effect size indicated and this will be discussed further in the qualitative and mixed results chapters. First, students may believe that they are more prepared to use technology for teaching and learning in a second language environment than to teach for CALD. Second, they may be more aware of or have more opportunities, access to, or experience (self motived

practice) with technologies than with strategies for teaching in a multicultural classroom. Third, some may believe they will not encounter cultural and linguistic diversity in their classrooms (see qualitative data) therefore their efficacy remains neutral. Finally, they may see technology as 'optional' (see qualitative data) and are therefore unconcerned about their knowledge and skills to use technology to enhance learning and engage learners.

Validity. As described in the methods and results section, the principal components analysis was performed to confirm construct validity of the instruments. This section shows overall good construct validity through an explanation of each of the component loadings. The principal components analysis resulted in a 16-component solution. Three of the components loaded constructs from the original TPACK survey and were unchanged: CK, TPK, and TPACK. Another three components loaded all of the original items from the *MES* self-efficacy section but were separated into three different constructs (five items in each). This could be that the items of self-efficacy split into different themes: instructional efficacy, student efficacy, and diversity instruction. *MES* experiences loaded with all original items, but were separated into two different components. This could be since four of the items specifically referred to experiences as a child and the other three items referred to external influences such as television. Technical Knowledge and Pedagogical Knowledge components loaded all with the same original items from the TPACK survey with only one item missing from each. The missing two items loaded as separate components (one item in each). These were the two weakest component loadings and it may be that participants found these items ambiguous or unclear, or difficult to self rate in areas of knowing which technologies they need, or the confidence to assess students' needs appropriately at this stage of their development. There have been several studies over the last 10 years that include reasons why student teachers have difficulty integrating technologies, which include dealing with issues related to technology in social media (cyberbullying), practical applications of technology in teacher education classes, mentoring relationship between student teachers and practicum advisors, and disconnect between what technologies are used in teacher education classes and use of technology in K-12 schools (Fu, 2013; Redmond, Albion, &

Maroulis, 2005; Van Nuland, 2011).

MES attitudes loaded onto two separate components, leaving a weak result of a two-item construct. The items that loaded separately were not closely aligned as they referred to culture and ethnicity of teachers and discussion of traditions and beliefs in classrooms. It is possible that students could have misinterpreted these questions as they were negatively skewed and all of the other items were positively skewed. Finally, the items that related to models of TPACK and percentages of models of TPACK loaded as two separate constructs with a mixture of both items. A reason for this could be that the items were separated into categories: faculty mentoring and practicum teacher mentoring.

In this chapter, I have included a discussion of the data analysis procedures, tests for statistical significance, and validity and reliability of the online survey instruments. The answers for Research Questions 1, 2, and 3 presented the scores from the online TPACK and *MES* survey, of student teachers' knowledge, skills, experience, attitudes, and efficacy towards multicultural education and the integration of technologies in language teacher education. Analyses revealed statistical areas of significance including the importance of the role of both academic and practical mentors for both multicultural and technology integration strategies. This section also discussed the underlying constructs of the online survey showing good construct validity through a principal components analysis and a high reliability score through Cronbach's alpha. The next chapter will show the qualitative results and discussion from the interview data.

Chapter 5

5 Qualitative Results

In this chapter, I will present my qualitative data findings from interview with student teacher participants through interviews conducted over Skype, telephone, and email. I will describe my data analysis procedures and provide a discussion and interpretation of the results to increase readability and coherence in the qualitative data (Schwandt, 2000; Creswell, 2013, Mertens, 2014). The themes outlined in this chapter developed from the frequency and recurring, overlapping wording in the transcripts as per the description in the Philosophical Implications section of Chapter 3. The three main overlapping themes that emerged from the interview data were: Preparation, Perspectives, and Challenges. Each of these themes also included subthemes that are detailed, explained, and linked to the Research Questions 4, 5, 6 and 7 and which include: student teachers' thoughts, beliefs, and perceptions of their knowledge, skills, and abilities to integrate technology and multicultural strategies, how they learn about pedagogies to integrate these strategies effectively, and finally, challenges student teachers face when attempting to integrate these strategies.

5.1 Qualitative Data Analysis Procedures

Thirteen students from the online survey completed a follow-up, semi-structured interview for an average of 20 minutes. Due to time constraints, most participants were only able to commit to a session of 20 minutes in duration. Therefore, in order to have a balanced sample from each geographical location and maintain an equal distribution of time, 20 minutes were allocated to each of the interviewees. There were five students from Southern University, four from Central University and four from Northern University. It was my original intention to recruit a balanced sample size of at least four students from each location. I acquired one additional student from Southern University who preferred to respond to the interview questions through a series of emails. Of the thirteen interviews, the first two interviews were conducted over Skype, however due to considerable connection difficulties, the remainder of the interviews were conducted over

the phone which the exception of one student who preferred to answer via email correspondence. As a result, a series of emails were exchanged to prompt for further details and clarity.

The interview schedule was comprised of ten semi-structured interview questions [see Appendix E]. The first two questions were intended to situate the participant and ease them into the interview by prompting a brief discussion of their program and experience. The next set of questions sought to investigate the ways in which student teachers used technology in their own learning within their B.Ed. classes and how their instructors and practicum mentor teachers had integrated technology. Next, a similar set of questions was intended to address the ways in which student teachers talked about and/or experienced multicultural teaching strategies within their B.Ed. or practicum classes. The remaining questions attempted to delve deeper into student teachers' self-efficacy about teaching for CALD and technology integration. Finally, the student teachers were offered the opportunity to provide suggestions of ways in which their initial teacher education program(s) might have assisted further in their overall development. Originally the questions were designed to discuss a multiliteracy approach to teaching and learning, combining their knowledge of the use of technologies for teaching and learning in a CALD environment. However, this question was modified after three interviews, as most students were unfamiliar with the term multiliteracy. Interviews were transcribed and coded manually in order to identify recurring themes.

Manual coding. I first read each of the interview transcripts completely and made notes about the frequency of responses. My initial findings included 10 themes which included: types of technology integration, strategies for technology integration, strategies for teaching for cultural and linguistic diversity, previous experience with cultural and linguistic diversity, previous experience with technology, beliefs and attitudes towards technology, beliefs and attitudes towards cultural and linguistic diversity, self-efficacy in technology integration, self-efficacy in teaching for cultural and linguistic diversity, and ideas for further support in BEd programs. I reread all of the transcripts several more times and using different color highlighters, I highlighted where each of these themes were present in the student teacher's responses to show the frequency. The coloring

indicated the most frequent responses in overarching themes: Preparation, Perceptions, and Challenges. I grouped the responses that discussed student teachers' experiences and self-efficacy into Preparation, as these topics occurred in every interview and the most often. Therefore the subthemes of Preparation were prepared/unprepared and efficacy. The next most common theme highlighted were the challenges that student teachers identified. They referred to the lack of mentoring or modeling of examples of strategies for technology integration or CALD, funding for additional qualification courses, and time to be able to practice these strategies (or learn more about them), due to the time consuming demands of the program. Therefore mentoring, time, and funding were listed as subthemes of Challenges. Finally, perceptions of technology integration and CALD were not as frequently discussed and only occurred in four of the interviews. Only four students made reference to theory/viewpoint and how it made them rethink their perspectives on teaching CALD. As a result, the final theme of Perspectives was divided into two subthemes of familiarity/unfamiliarity and theoretical viewpoint.

In the next section, I will present my qualitative data findings around Research Questions 4 and 5 with participant quotes from the transcribed data. These quotes illustrate the student teachers' knowledge, beliefs, perceptions, attitudes and self-efficacy towards technology integration and multicultural education and their acquisition of knowledge in strategies to integrate technology and multiculturalism.

5.2 Research Question 4 & 5 Results

Research Question 4

What are student teachers' thoughts, beliefs, and perceptions of their knowledge, skills, and abilities to integrate technology and multicultural strategies in a diverse classroom?

Research Question 5

How do student teachers learn about pedagogies to integrate technology effectively, and pedagogical strategies for teaching culturally and linguistically diverse students?

Responses for Research Questions 4 and 5 are identified within the first two themes of Preparation and Perceptions. In terms of technology integration, overall many of the 13 students interviewed felt prepared to integrate technology effectively, which aligns with the quantitative survey results of student teachers' average to high TPACK scores. The data included from the interview transcripts below assist in explaining their beliefs, and how they have acquired the necessary knowledge, skills and self-efficacy to determine if they would be prepared or unprepared. For multicultural education, student teachers' quantitative *MES* results of mid-average scores aligned with the interview data. Excerpts from the interview transcripts below reveal that some students did feel moderately prepared to teach to a diverse student body and others did not. These quotations complement the quantitative data by providing insights as to why some student teachers felt more prepared than others and the effects that their beliefs and perceptions have on their self-efficacy to integrate multicultural strategies. Finally, the data also report on ways in which some student teachers have learned how to integrate these strategies.

Preparation

The first, most prominent theme identified was Preparation, which was present in every interview and most frequently discussed. This refers to student teachers' thoughts, feelings, and views about multicultural education and technology integration in language teaching and learning. There were two subthemes that emerged within Preparation: unprepared/preparedness and efficacy. Teacher preparedness, for the purposes of this study, refers to student teachers' perceptions of their ability to meet the needs of a culturally and linguistically diverse student body in the areas of multicultural teaching strategies and technology integration (Albion, 1999; Swanson, 2011). Preparedness or unpreparedness includes the result of the knowledge acquired (or not yet acquired) through completion of coursework within their respective faculties of education, previous personal/professional experiences, and practicum placements. As explicated in the literature review section within teachers' beliefs and attitudes towards technology integration, Bandura (1997) defines self-efficacy as the belief in one's capabilities to achieve a goal or an outcome, and in this study specifically refers to student teachers' beliefs in their capabilities of integrating technology and or teaching for CALD.

Technology Integration Preparedness. Student teachers who identified as being prepared to integrate technology in their teaching had taken courses within their education degree or previous degrees had a genuine personal interest in technology, a positive attitude towards technology, coupled with a willingness to include technology in their teaching. For example, those students who discussed integrating technology enthusiastically had taken elective courses involving the use of and practice with technologies for education or had taken personal time outside of classroom hours to work with specific technologies (i.e. Smartboards). Some faculties of education within this study had various technologies available outside of class time where students could practice using it. Students who valued the use of technology with a positive attitude towards technology felt more prepared and willing to integrate technologies into their future teaching. Rena from Northern University stated, "I'm really adventurous. I love using technology into anything I do, I think it's really important" (interview, August 5, 2015). She discussed having a prospective job offer and added:

> In terms of technology, I feel very prepared for that particular level. I have volunteered since I finished my B.Ed. in a classroom where they were using iPads and Smartboard technology. They [students] came up and interacted with the Smartboard as part of a learning center. I think that I'm now a little bit more familiar with the things that you can do at that level. (interview, August 5, 2015)

Another participant from Northern University, Edith, who had taken a technology course, felt somewhat prepared to include technologies that she had seen her instructors use in class. "…I would definitely use it in the classroom but I feel like I would need to get more practice with some of the technology, and just to familiarize myself a bit with it" (interview, May 31, 2015). Naomi, from Southern University, responded to her thoughts on integrating technology in her future classroom:

> Absolutely, I'm comfortable and am I'm always open minded to learn about new technologies, new applications…I think it's also a matter of your background, as in perhaps the generation or just your family or your own upbringing and your own comfort with technology. And I myself I'm rather comfortable. I've met other teachers [who are also comfortable] it's not necessarily a matter of age…I've met other instructors who are older than me, who are just as comfortable as me. And I've had instructors that are as young

> as or younger than me who are--do not use technology well. (interview, July 21, 2015)

Naomi makes an interesting point here when referring to age. Age may not be a factor in the ways in which technologies are used for teaching and learning, as it may depend more often on one's personal experiences with technology. This further substantiated another student's response, Sadie from Central University when discussing the limitations of her ability to use technology in teaching to those she had used before:

> just the ones [technologies] that I've learned about, so I'm very well versed in say, laptops, Smartboards, and iPads, graphing calculators, that type of thing, but for anything beyond that, I don't know anything else. I wouldn't know if there's anything that even exists. (interview, August 8, 2015)

Further to this experience, Laura from Central University exhibits a positive attitude towards technology due to the ways in which she witnessed it being used in a practicum, "I did a placement in a special education classroom and it's [Smartboard] fantastic for the kids" (interview, June 6, 2015).

In summary, the students who responded positively and felt as though they were prepared to integrate some types of technology were those that had personal or professional experience with technology or an interest in technology. In addition, students reiterated that they were comfortable in using only the technology they had previously used. In referring back to the literature examined in Chapter 2 in the challenges and benefits associated with technology integration, this also shows that student teachers who studied within a program that aligned with technologies that were used both in practicums and teacher education classes felt more confident in employing these technologies in their own classrooms (Fu, 2013; Redmond, Albion, & Maroulis, 2005). Furthermore, student teachers who were exposed to and had experience with technologies in their classes, both educational and practical, had a higher self-efficacy in technology integration (Ertmer et al, 2010). In an investigation of preservice teachers' competencies and their relationship to levels and usage of ICT integration and TPACK, significant results revealed that ICT usage and phases are both important variables for preservice teachers' TPACK competencies (Yurdakul & Coklart, 2014). This means that preservice teachers who had more experience in working with, integrating or using technologies at various levels

would have more knowledge on the ways in which technology could be effectively integrated into teaching and learning.

Multicultural Education Preparedness. Student teachers' interview data revealed several different ways in which they felt they had become prepared to teach linguistically and culturally diverse students. Most students who felt prepared had some type of personal or professional experience teaching CALD students. For example, two student teachers had taught English as a Second Language overseas (e.g. Korea, China), and others had taken a course specifically designed to teach English Language Learners (i.e. Additional Qualifications (AQ) or ELL/ESL elective). Rena, Northern University, (interview, August 5, 2015) explained that her knowledge and preparedness was attributed to an AQ course she had taken, "I just finished an ABQ[2] in primary and I think before having done this ABQ, the answer would have been a resounding no." Similarly, Andrea, Southern University, (interview, June 22, 2015), discussed an aspect within an equity and diversity elective course she had taken within her program, which she made the connection of learning additional languages:

> What I really liked about it was the kind of the aspect of what it's like to be a language learner and that sort of stuff. And there's a lot of things like, *Okay, the langue of instruction is English, so how do you help the students be successful in mathematics when it's being taught in English or Science when it's being taught in English?* And I thought that's really applicable to French. And I found myself asking the same questions in my French [Immersion] classes. (interview, June 22, 2015)

The notion of reflexivity is apparent here, as the student makes the comparison of how she would teach the literacy skills required for students to be successful in their subject content areas (i.e. math, science). As previously mentioned in the methods section of Chapter 3 on the notion of reflexivity, Byrd Clark and Dervin (2014) assert that:

> …we need to take into account the ways in which we make and index meaning (e.g., through gestures, voice, movement, music, online discussions, signing, texts, styles, recordings, drawings, etc.)—that is the complex,

[2] Additional Basic Qualifications

> overlapping, and multiple modes of representations that allow us to configure (and reconfigure) the social world—but more importantly, the ways in which we invest in certain social meanings and representations (e.g., in this case, multilingualism, identities, etc.), as well as in our performances of them. (p. 3)

Thus, reflexivity becomes an important process for researchers, students, and teachers, to become critically aware of their current and future practices and how this can affect student learning and performance. This is a prime example as to how a multiliteracy theoretical approach would be beneficial: it merges and connects the notion that all teachers are teachers of languages and literacies, and that preservice teachers require exposure to a diverse pedagogical approach that values CALD (Byrd Clark, 2012; Henderson, 2012; The New London Group, 1996).

Another example of multicultural education preparedness was from Sadie from Central University who discussed her preparedness as a result of her professional teaching experience abroad:

> Yes, I have done that before [teach CALD students]…I'd be obviously willing to try and it would be something that I'm ready to try, but I wouldn't say I'd be perfect right off the bat because of what I would need to know. I'd get a level of how much they know and how willing they are to work with me on it. (interview, August 8, 2015)

Although Sadie responded that she was prepared to teach CALD students, she admits that she would still require more practice and learning in this area. However, her positivity is encouraging and belief in her abilities is apparent. Finally, John, Southern University, also describes his preparedness as a result of his experiences teaching abroad as well as other attributes that contributed to his preparedness:

> I do believe so because of my experiences living, working, and travelling abroad. Having a diverse group of friends and colleagues, being a multilingual individual and generally being an open-minded person. This is not to say that there isn't anything more I could learn. There are continually new things to be introduced to and improve upon. (interview, June 19, 2015)

There are several factors that have been mentioned in this section that appear to contribute to student teachers' preparedness to teach within a CALD environment. Previous experience, which includes studying and teaching abroad, a positive attitude,

and course work, are key areas that may influence the level or degree of preparation. As previously stated in the quantitative discussion (Chapter 4), there are five different factors that appear to influence student teachers' preparedness to teach multicultural education: multicultural coursework, personal learning experiences, models of culturally diverse teaching, and encouragement by other educational professionals (Moore, 1996; Naldeson et al., 2012).

Technology Integration Unpreparedness. There are several reasons why students responded negatively to being prepared to use technology. One student who felt unprepared had a conflicting view of technology to those described above. John from Southern University stated his beliefs about technology, "…it's bothersome to see how we're being forced to swallow technology everywhere and use it because it seems to be the trend- regardless of how effective or necessary it is" (interview, June 19, 2015). This shows how student teachers' attitudes play a key role in the willingness to include technology in their teaching. If they do not value or see technology as being important for teaching and learning they are less likely to want to include in their classroom practices. He elaborated further:

> I feel that technology, like Smartboards, and the push for it in our classrooms is largely overrated and sometimes complicates things further. Technology use can be an excellent tool in the classroom, but from experience both as a language learner and teacher I think there are many more ways to effectively learn how to communicate with one another through simple means like role plays, games and activities, and using one's imagination. There is a place for technology in the class and I have used iPads with a few apps, but I don't believe *technology* as we now think of it should replace things like face-to-face, pen and paper…(interview, June 19, 2015)

This raises an interesting point that student teachers not only require practice with technologies being used in classrooms, but also the skills to choose effective and meaningful technologies (when appropriate) to enhance teaching and learning. John's comments above could also be related to the effects of attitudes and beliefs on technology integration. Referring back to Chapter 3 (Methodology), teachers' beliefs and attitudes towards technology integration influence the ways in which technology is used and amount of technology used. For example, teachers are more likely to integrate technology

at a higher level to support student learning if they have a high self-efficacy and believe it is a value tool for teaching and learning (Anderson, Groulx & Maninger, 2011, Cogan, 2007; Dawes, 2001; Fu, 2013; Kim et al., 2013; Ertmer et al., 2012).

Another reason why student teachers felt unprepared to use technology was from lack of practice. From Southern University, Andrea (interview, June 22, 2015) felt as though there was not enough in her B.Ed. program. "I have to say I was surprised this year at the lack of technology that we were using. There was a lot of talk about it but we weren't actually using it…so what I felt was missing from my program was there wasn't technology immersion". Although Andrea overall felt unprepared, she had a positive attitude and willingness to include technology in her teaching. She mentioned a creative example of a way she used technology in her practicum through asynchronous videos and expressed an interest to improve through professional development, "I want to learn more about technology and I have a professional learning network on Twitter…I've done some PD over the past year just on my own and that helps to get those connections with the people who are using the technology a lot and saying, *where do I make a first step*?" This could indicate that through increased frequency of practice and exposure, student teachers may perhaps recognize the benefits of integrating technology in appropriate contexts.

Multicultural Education Unpreparedness. Student teachers identified several reasons why they felt they were unprepared to teach culturally and linguistically diverse students. The majority of the students interviewed did not feel prepared to teach CALD students and most were concerned and critically aware that they would struggle if they did not take it upon themselves to be educated in this domain. They also exhibited overall positive attitudes towards CALD students and felt as though it was part of their responsibilities as teachers to be prepared and meet the needs of their future students. For example, Abbey from Central University when asked about her preparedness, she stated, "I think I would go in and I would try, definitely. But I also know that's exactly why I'm taking the ESL part 1, because I want to make sure I'm prepared for something like that when it happens. Because it will happen eventually" (interview, May 29, 2015). A great point is made here showing the awareness of the likelihood that they will encounter CALD students. Isabella from Southern University reaffirmed the importance of having

the skills and strategies to teach CALD students due to the probability of having CALD students in her future class, "I know that in the city I live, there's a lot of English language learners; cause we have a high population of immigrants. And if I were to teach here, it [ELL/ESL course] would be really, really useful" (interview, July 21, 2015). Another student from Northern University, who also felt unprepared, shared her thoughts about teaching CALD students. This quote also demonstrates her positivity and willingness to ensure she is capable of meeting the needs of her students:

> I unfortunately do think I feel unprepared. I really would feel nervous. But I also would do everything I could to make sure I could give them the best education possible and get them to where they need to be. (Nancy, interview, June 22, 2015)

She also positions the students as 'them', as different from her or other students, which relates back to the lack of awareness or reflexivity in teacher education programing (particularly when it comes to the analysis of one's own interactions). Presenting student teachers with a different perspective or awareness to shift away from framing 'us' versus 'them' would be an important aspect of teacher education courses. Creating awareness for student teachers to be mindful of how they are positioning their students would be beneficial. Without this critical awareness, this positioning could further widen the racial and/or cultural divide. A higher sense of awareness in critical literacies and diversity through the integration of multiliteracies could be the beginning of reflexive teaching for the social realities of a 21st century teaching and learning environment.

The final two comments not only show students' reservations about teaching CALD students, but also their belief that their initial teacher education programs [coursework] did not provide enough guidance and exposure to teaching within a multicultural classroom, leaving them unprepared:

> I think I could manage but I think I definitely don't have all the skills and strategies…We didn't do anything really with language learners that don't have the languages [English and French] that I will be teaching. I think I would probably have to take an English as a Second Language Learners class. (Laura, interview, June 6, 2015)

> In terms of courses, I don't think they prepared me at all for something like that; a situation where a student didn't speak English at all, or speaks very

> little English. Some other courses, they were focused on specific aspects [of multiculturalism], but there were some elements lacking. Like how do you teach students who may not feel comfortable in English? (Abbey, interview, May 29, 2015)

It is clear that many students who were interviewed did not feel as though they would be prepared to teach CALD students who did not speak English or French as a first language. The next subtheme relates closely to preparedness and unpreparedness as it discusses student teachers' beliefs about their self-efficacy with technology and capabilities about their future teaching of CALD students.

Technology Integration Efficacy. Within the subtheme of efficacy, student teachers with higher self-efficacy to include technology all had previous experiences through practicums, personal interest (self taught) or formal instruction in their programs. A student from Northern University stated:

> I think I would be comfortable at least trying different types of technology because I've had so much exposure to it in my program. Going into my program I didn't have a lot of background knowledge in regards to different programs that would be useful so I found out that taking, not just a course in but having the same technology access as my peers was really beneficial…so I feel like if I was going into my own classroom I would be comfortable now, trying things out at least. (Edith, interview, May 31, 2015)

Within Central University, one student discussed his thoughts and self-efficacy in relation to technology integration, "I think I'm good with technology even more so because I practiced with students in placements rather than just seeing it in the classroom because I've already used it." He elaborated, further confirming that his ability to implement new technologies would be limited to those that he had already used either through personal practice as stated above or in a classroom, adding "…but if there's like new apps and new websites that I'm not familiar with- I'd have to familiarize myself with it, but things that I've already used, I think I'd be okay with" (Adam, interview, July 29, 2015). Another important aspect of this comment is the positive attitude towards technology and the willingness to incorporate it. Isabella from Southern University also showed a positive attitude towards technology with a high self-efficacy, "I am completely ready to

use technology in the classroom in September" (interview, July 21, 2015). When prompted, she further elaborated on her readiness by saying:

> I think I just have a natural tendency to go towards technology. I remember when the first iPods and iPads came out, like I was always on top of that. I know that my high school really pushed us to use those kinds of things; also that has prepared me. (interview, July 21, 2015)

Another student from Central University also related her self efficacy to her personal experiences, "I think me personally I'd be okay to use technology in the classroom, just because I grew up using technology and it's part of who I am. I have no problem using it and figuring out how to use it" (Laura, interview, June 6, 2015). There are many commonalities that emerged for technology integration within the theme of Preparation and several of these are discussed below on the topic of multicultural education.

Multicultural Education Efficacy. Teachers' perceptions, beliefs, and confidence about their knowledge, skills, and abilities to teach CALD students affect their performance (Swanson, 2012). Despite having a positive attitude within this study, many students who had little experience in the classroom with diverse learners find this prospect daunting. Similar to the subthemes described above, feeling prepared can contribute to overall self-efficacy in teaching. Naomi (interview, June 12, 2015) expresses her thoughts about teaching in a multicultural classroom and although she had previous experience teaching overseas she still feels uncertain, "I'm still a new teacher… interacting with different cultures and students as ELLs, I think it has prepared me well…I don't know if I'd be comfortable but I would not be- I don't think I would be drowning." In addition, Isabella, Southern University commented on her perceived ability to teach CALD students. Although she is willing and has some confidence in her abilities, she also believes increased coursework and collaboration with experienced teachers in this specific area would assist her further:

> I think that I could. I might be a bit hesitant, but I think I'd want to collaborate with my colleagues and stuff, so I make sure that I'm actually doing the best I could. But I wish I had taken a class for ELLs, just for that reason. (interview, July 21, 2015)

Similarly, Laura from Central University (interview, June 6, 2015) contributed to this discussion of the importance of having some exposure to CALD students. She describes a practicum where she assisted her mentor teacher with ELLs but her self-efficacy was somewhat low if faced with a situation where students did not speak English or French, "…most of them knew some English so it was easier to work with them. But if I was in a class that had no English I feel like it would be a really difficult thing for me to work with." Finally, Adam from Northern University experienced CALD within his practicum placement, which affected his overall efficacy. Having increased exposure to CALD teaching environments appears to lead to a slightly higher self-efficacy as a result of practical experience and mentoring of strategies:

> I did experience that in my placement, so I think I would be okay with it. I think I'd be able to manage…going into the practicum placement, you work with the students but you use the strategies that are already in place by the teacher… I did enjoy them [practicum placements] and I learned a lot from them. (interview, July 29, 2015)

The theme of Preparation included the subthemes preparedness and unpreparedness, which in many cases influenced student teachers' self-efficacy. Previous experience, coursework (i.e. electives, AQs), attitude, willingness, critical awareness, and in one instance, reflexivity were all factors that students identified as areas that assisted in their preparation to teach CALD students and integrate technology. Those who had a positive attitude, willingness to learn about and 'play around with technology', had a higher self efficacy therefore felt as though they would be more prepared to use technology in their future classroom. In terms of multicultural strategies, although most students exhibited positivity towards CALD, those who had higher efficacy in multicultural strategies had positive interactions and/or exposure to CALD teaching environments or taken elective or AQ courses (in addition to their regular coursework) outside of school hours. Many students also paid extra for these courses feeling their programs fell short and it being their responsibility to meet the needs of their students. This calls to question if there are valuable attributes of courses that are in fact assisting students in becoming more prepared (or increase their self-efficacy), why are they not integrated into the mandatory courses in initial teacher education programs? A further in depth analysis of these topics

is discussed in the next section of Challenges as well as the findings of Research Question 6.

5.3 Research Question 6 Results

Research Question 6

What challenges do student teachers feel they continue to face in integrating technology and multicultural teaching strategies?

In response to Research Question 6, student teachers identified challenges they still felt were obstacles in acquiring the necessary knowledge and skills to integrate technology and multicultural strategies effectively. In terms of technology, this theme also aligns with the quantitative survey results about the models of TPACK and the percentages of models of TPACK. This refers to the mentoring by faculty or practicum advisors of technology integration practices and the frequency of which technology is integrated in faculty of education classes and practicum placement classes. Students overall indicated both in the survey findings and interviews that modeling of these strategies were both low and infrequent. The *MES* did not specifically measure the occurrence or practices of mentoring, and focused predominantly on experience, attitudes, beliefs, and self-efficacy. Student teachers did indicate within the interviews that the mentoring or modeling or multicultural strategies they experienced were low to average and how mentoring in this manner may be associated with their knowledge, skills, attitudes, beliefs and self-efficacy to teach a diverse student body.

Challenges

The next recurrent theme is Challenges and there were three subthemes that emerged: mentoring, funding, and time. For the purposes of this study, time and funding refer to the limited amount of extra time and money student teachers expend to complete their coursework, participate in practicum, and pay for supplementary education (e.g. electives, AQs) in addition to their B.Ed. courses. Mentoring signifies both educational and professional mentoring by faculty in initial teacher education programs and mentor teachers during practicum placements. As reported in the quantitative data results and the

previous section, Preparation, many students mentioned mentoring, time, and funding as some of the challenges they felt hindered being adequately prepared to integrate technology and teach CALD students.

Technology Mentoring. Student teachers identified challenges of technology integration that related primarily to the limited use of and mentoring of technology for teaching and learning both in their practicum placements and B.Ed. classes. Mentoring played a significant role in many of the student teachers' abilities, skills, and efficacy to integrate technology. Overall, student teachers only used technologies that were used by faculty, and were comfortable trying out new methods and applications if shown how to use them in class, or if given the opportunity to integrate them as part of an assignment or classroom activity. A student from Central University, Laura (interview, June 6, 2015), discussed the limited types of technology used in her B.Ed. classes, "Mostly slideshows, sometimes my English class would encourage us to bring laptops or tablets…She used the projector to show videos sometimes. We didn't use much technology really." She also further commented about a different instructor's class, "She would mostly be speaking so she actually kind of discouraged using technology because she didn't like people going on their own." At Central University, Josh (interview, June 24, 2015) did not feel there was adequate support with the expectations of integrating technology, "There wasn't really a technology aspect. They just assume you know it and a lot of people have trouble with it." He further commented about the disconnect between what types of technologies are used in the B.Ed. programs and those that are used in schools, "It [technology training] would be helpful cause then you know what you're doing when you go to practicums." Further to this, in a practicum experience Laura from Central University, (interview, June 6, 2015), found the technology used within the school placements to be outdated and as a result was used sparsely, "My second associate teacher was kind of old school so she had the old projector, the one with the flip lights and everything." She continued to describe attempts to use technology, "We tried to use laptops for research projects as well but it was really difficult to get them going because they're really slow". Edith from Northern University (interview, May 31, 2015), also found a disconnect between what was available and used in B.Ed. classes and those that were in her practicum placements, " At the university, it was easier to play around with it

[technology] that way…because schools it was not, a lot of schools were kind of more into different things." Although it may be a challenge to provide student teachers with all of the technologies that would be used in their future classrooms, increasing the communication between the surrounding school boards in the geographical area where students are studying may assist with the disconnect between what is used in post secondary institutions and K-12 schools.

Use of digital projectors for presentations was most commonly employed in initial teacher education programs and in a few select classes students were shown how to use Smartboards and iPads through modeling and or mentoring. In these cases, students were engaged and quite enthusiastic about the ways in which these devices could assist with delivering the material. A student from Southern University, Isabella (interview, July 21, 2015), commented on her Math instructor, "…she would use the Smartboard to teach us; but then, show us how we could use it in the Math class." In another instance a student commented enthusiastically about a positive way technology was used. Naomi, Northern University (interview, July 21, 2015) discussed a way in which her history professor assisted in providing resources as way to integrate technology into that subject area, "My history pedagogy instructor made us do an exercise where we all contributed to a website or application; it seemed to work very well. So we had, let's say a list, we had a compiled list of what might be useful things." This activity includes several different ways it could help student teachers become more prepared to teach with technology. From the example given above, the outcome of this task was two-fold, consisting of several different beneficial skills including learning how to contribute or develop web content. It could also serve as an activity student teachers could do in their future classrooms, and provides a list of resources that may be applicable for future teaching practices.

Multicultural Education Mentoring. As presented in the quantitative data, many students rated the academic and practical mentoring to be quite low. The above interview data discusses benefits and implications of mentoring. Similarly, there were thematic frequencies within the multicultural teaching strategies and modeling. The three examples given in the quotations below show enthusiasm and personal connectedness student teachers felt during activities in which the faculty or practicum advisors

purposefully integrated examples of ways to teach for cultural and linguistic diversity. Several of these examples were three-fold in that they were used to teach about diversity, perspectives, and also provided ideas of ways in which they could include CALD in their future classrooms:

> One of the teachers was from Indigenous ancestry, so it was kind of set up to bring that into the classroom…She would try and find ways to incorporate that [Indigenous perspectives] into the different things that we were teaching. So when it was Earth week-- so finding things that were related to Mother Nature and finding examples of how to take care of the earth. (interview, Edith, May 31, 2015, Northern University)

> One of the activities she taught us to do was kind of a self-portrait of multilingual visibility where they feel each language is represented within themselves. And then they also did kind of a storybook where they would work in groups to do chapters and they would translate it in to all the different language that were represented in the classroom. (interview, Laura, June 6, 2015, Central University)

Finally, John describes an activity within an international education course to assist students in understanding what it might be like to be an ELL:

> …we had to silently join a card game and learn the rules as we went from how people were playing. After a certain amount of time we would switch into a new group and have to play again, however the rules had changed without us knowing and we were still not allowed to communicate verbally. This was an excellent way to demonstrate the importance of awareness, communication, understanding and difference, as well as what kinds of situations incorrect assumptions can place us in. (interview, June 19, 2015, Southern University)

The next set of quotations show specific ways in which language instructors included strategies for teaching culturally and linguistically diverse students. Isabella from Southern University (interview, July 21, 2015), " I know our language arts instructor paid special attention to that [teaching CALD students]. I know that in French, the new curriculum proposes that the French curriculum can be taught to anyone; regardless of English background as well." It is encouraging to see that language instructors who value the linguistic varieties of French that exist in Canada, and ensure that the curriculum is explored in ways that not only include content knowledge but also the knowledge,

perspectives, and research initiatives that support FSL instruction to all students regardless of background (Ontario Ministry of Education, 2013):

> There was such a wide variety of French level in the class that she definitely accommodated for that quite a bit in her instruction. She use English as a last resort otherwise she would find different ways to explain something in French. And at the same time she would tell us you know, that is what you have to do if someone's not understanding…She would explain the same concept multiple times, multiple ways if necessary…or readdress the topic in a much more practical way or come back to it in a day with a source text or visuals or something. (interview, Cathy, July 16, 2015, Southern University)

> …she definitely explained to us a lot on who she had students write books…they actually created book where half of it was in French and the other half was in a language of their choosing. She also used a personality or my language portfolio type of thing and the kids had a picture of themselves. They colored it in different areas for how they see where French lies or they might have different languages that they're a part of. It was also a nice way and it's a good starter point to see what you got in your classroom…that was one teacher in particular that did that and I think her specialty was multicultural language learning. (interview, Sadie, August 8, 2015, Central University)

Alternatively, there are other instances in which student teachers related multicultural teaching strategies to a perceived deficit on the part of the learner and assumed these did not fall within the teaching responsibilities of instructors. One student commented on a fellow classmate who she deemed an ELL and grouped teaching strategies for CALD into 'external supports' for those she did not categorize as homogeneous:

> Honestly there wasn't too much modeling going on in terms of that [multicultural teaching strategies], but our classes are fairly homogeneous in nature. There was a student in my class who did have difficulty; clearly, a second language English learner…So what I could tell by working with him was that a lot of his support was coming from the university itself rather than the Bachelor of Education program. He was getting a lot of support from the career center and the writing help center and things like that. (interview, Rena, August 5, 2015, Northern University)

The notion of homogeneity calls into question philosophical assumptions that can be potentially perpetuated within institutions. Homogeneity refers to "being all the same", and this message in fact does gets reproduced in and at school through commonsensical,

neutral, objective standardized language which tends to benefit those who can master the micro-cultural norms at school as well as an idealized set of skills (and language) while at the same time, disadvantaging others, who for whatever reason, cannot master this set of segmented skills (or a certain way of doing things)(Byrd Clark, personal communication). Many strategies that follow a multiliteracy approach include all types of learners, taking into consideration their previous knowledge, strengths, and abilities. Multiliteracy pedagogies offer potential and represent one way of challenging homogeneity and an ideology of standardization. Irrespective of cultural or linguistic background, the strategies employed are meant to utilize their strengths and prior knowledge by incorporating an expanded view of text to include visual, digital, and other multimodal formats (O'Bryne & Smith, 2015). They also assist in making meaning through authentic learning experiences.

Funding. With potentially limited means, student teachers are often in their fifth or sixth years (in a row) of post secondary study, which includes paying for tuition, and often, in addition, living expenses (rent, food, utilities, etc.). Due to the time constraints, demands, and intensity of B.Ed. programs (discussed further in next section) students are usually not able to have a job for supplemental income while completing their programs. This, in turn, leaves students to acquire enough knowledge through their program courses and practicums to be successful in their transition into professional practice. In addition, the availability of funding for technology resources in universities and schools are not equally distributed, maintained, or managed. Many students who have studied or visited different institutions and schools are aware of the digital inequalities that exist and the varying access and support that faculty or practicum mentor teachers have access to. Laura from Central University (interview, June 6, 2015), described a positive experience with Smartboards in a practicum placement but realized the limitations of funding in schools, "They [students] really got to manipulate things and see them on the board, kind of play around with things and I though it was great. But funding is not too great for that." Naomi, Southern University (interview, July 21, 2015) also acknowledged the lack of preparation that results from limited funding. Although she was comfortable with trying new technologies, more hands-on practice would have been beneficial, "…a more hands-on practice with the Smartboard…it's just a matter of funding…I mean I've never

had a Smartboard in any of my [university] classrooms yet. But if that day should come I'm not prepared for it." Finally, Abbey, from Central University suggested a way in which she felt it would be easy to learn about new technologies:

> I think that if they had offered workshops or even taken a simple 10 minutes at the beginning of one of our classes *so today we are going to figure out how to use a Smartboard* that would have definitely made a huge difference. But to this day, I still have no clue the purpose of a Smartboard. (interview, May 29, 2015)

This is a measured and thoughtful suggestion, however this would also require the faculty have access to the technologies within their institutions, to be able, willing, supported, and educated in the types of technologies that are being used in schools.

Time. Many student teachers discussed the limited time they had in completing tasks within their program. As most were enrolled in one-year B.Ed. programs (97%), they felt the program length did not allow for them to have the opportunity to take all the required courses they would have liked. Those who were enrolled in the one-year programs attended full time and often had up to eight hours of class per day and additional time was needed to complete assignments. Some of the elective classes were taught in the evening and were at an additional cost; therefore students were not able financially nor had enough time to take supplementary courses. Nancy from Northern University discusses this point:

> I also know that electives are done at nighttime, and cost a lot of money. So I'd say that, I think it [ELL course] needs to be part of the program. Because people don't have time when they're doing nine to five courses, they don't have time to take another three hour elective. I know people would want to take it, but I know there are parents and there are people who have lives. (interview, June 22, 2015)

Scheduling conflicts were also an issue for one student who had an interest or devotion in teaching Religious Education and therefore was unable to be accommodated to have a course on teaching ELLs and Religious Education. Students are often not permitted or considered for positions in the Catholic education sector if they do not have a Religious Education course. Edith from Northern University (interview, May 31, 2015), " It [the university] did offer an ESL course but because I wanted to also work with the Catholic

Board that took precedence so I didn't have the option to take it because it was only offered in one semester."

Although time and funding are not as prominent challenges for teacher candidates to be adequately prepared to teach with technology and for CALD, the constraints in which these students complete their degrees is worth mentioning. One-year B.Ed. programs were identified as making it considerably difficult for student teachers to be adequately versed in the many areas required of them when making the transition into professional practice. With increased time, student teachers would have the option of completing the required courses with adequate opportunity to reflect on the vast amount of content they have to absorb. With increased funding, they and faculty, could have access to the technologies they will be presented with in their future classrooms and the time, practice, and educational opportunities to work with new devices to support their teaching and student learning.

Perspectives

The coding process revealed saturation of responses from the participants. The saturation of ideas among the student teachers' transcripts is demonstrated through repetition of the same ideas, with no new ideas, themes, or topics emerging in the last three interviews. The last theme is Perspectives and there were two subthemes identified: familiarity/unfamiliarity and theoretical viewpoint. For the purposes of this study, Perspectives refers to students' preconceived notions, opinions, and ideas about technology and multiculturalism. The subthemes relate to student teachers' familiarity or unfamiliarity with strategies and or theoretical viewpoints about technology integration or CALD.

Familiarity/Unfamiliarity. Overall students demonstrated a positive attitude towards culturally and linguistically diverse students, however in some cases their unfamiliarity with CALD resulted in a perspective of grouping ELLs into a category of special learning needs as opposed to seeing the strengths that ELLs bring and capitalize on the diversity. Nancy from Northern University, (interview, June 22, 2015) stated her in class experiences, "…all my classes incorporated it [multiculturalism], I just mean every time

we talked about something, my professors would reference like – *this is why it this is important and this is why a child who is coming from a different cultural would benefit from this*." This demonstrates her positive attitude, the importance of meeting the needs of students, and her awareness of the growing CALD in schools:

> I think it's just one of things like spec ed. I think those [strategies for teaching ELLs] are just things that are necessary. It's not like you're going to walk into a classroom and maybe never have a child with special needs; that's not the case. And same with language; it's just not the case in Canada. So I feel it's super important and not thought enough about at this point. So I would say they need to make a course on ELL that's mandatory. (interview, June 22, 2015, Northern University)

In another instance, John's unfamiliarity with ELLs showed when asked what strategies he was aware of when teaching CALD students:

> I didn't learn many strategies or practical applications, just ideas about it…There was a student, he was in ESL…A lot of the time he would be exempt from French and do work on English stuff. I don't know if that's really a strategy but that's a plan for him, to be exempt in grade 9, so just come through and understand a little bit, and them just get him to pass, and that's it. (interview, June 19, 2015, Southern University)

This piece shows how unfamiliarity with CALD results in a limited understanding of the strategies that could be employed when teaching ELLs. As previously stated in the literature review (e.g. Lapkin, Mady & Arnott, 2008; Ontario Ministry of Education, 2013), students who already speak more than one language are often just as or more successful than their English counterparts when enrolled in FSL. They are able to take their already developed knowledge of language learning and apply it to their French language teaching context. Adam, Northern University (interview, July 29, 2015), shares a similar view to John, as he associates learning about CALD with legal issues surrounding students with disabilities, "That was the only one [diversity course]. And when they talk about legal we have a like a law type course talking about a bit with students who had a disability, that sort of thing". Finally, Rena from Northern University (interview, August 5, 2015) also relates her exposure to multiculturalism to students with exceptionalities, " We did talk about multiculturalism. A lot of the times we covered it in terms of exceptionalities. We didn't go a lot in terms of language, which I think was

probably something lacking." Rena makes reference to CALD as an exceptionality as the framework her institution follows 'teaching the diverse learner', includes all types of learners from ELLs to students with special needs. The final section of the chapter responds to research question 7 of ways in which student teachers are employing strategies for teaching culturally and linguistically diverse students and integrating technology.

5.4 Research Question 7 Results

Research Question 7

In what ways are student teachers employing strategies for teaching CALD students and integrating technology?

There were also examples of strategies of ways in which instructors shared perspectives of teaching ELLs. A student who had personal and professional experience with CALD in teaching overseas commented on a mandatory class she was required to take at her institution that focused on teaching ELLs:

> Every week there was a specific focus…And each group would present a week and present something. So for ours, for my week, it was actually focused on identity texts, and the importance of students feeling respected and included in the classroom in terms of identity. (interview, Abbey, May 29, 2015, Central University)

In this case, although Abbey already had experience teaching CALD students, and was familiar with ELLs through a positive experience in her B.Ed. classes, she still felt the need to enroll in the ESL part 1 AQ upon completion of her degree to ensure she was adequately prepared. Other ways in which students showed their perspectives through familiarity of CALD was in the description of their classroom activities. For example, the ways in which the instructors would frame the tasks, "in my ESL class we had couple of case studies where there were cultural and linguistic or both—kind of a disconnect between the student and teacher and we had to come up with ways to address the problem in a positive manner "(interview, Cathy, July 16, 2015, Southern University). She found these types of activities practical in assisting with supporting ELLs.

Theoretical. Theoretical viewpoint is an important aspect to take into consideration in the education of teacher candidates. Students bring their personal experiences with them into the classroom and accompanying this their preconceived notions of teaching. These could be based on a number of things including their own experiences as a learner. It is vital that student teachers be exposed to a variety of viewpoints and literature within their B.Ed. classes so that they have an informed opinion of ways students learn and can adjust their methods appropriately. With increased familiarity and exposure to multicultural perspectives and teaching practices that value CALD, student teachers can begin to characterize ways in which CALD can be a powerful and resourceful classroom tool for teaching and learning (Henderson & Exley, 2012). For example, a student from Southern University conceptualizes her view of multicultural education when discussing her perspective:

> I think teachers should be educated in multicultural matters, regardless of their teachable subject due to the makeup of Canada's students who, depending on the region one teaches in, are often new immigrants. Even if they are not new immigrants many people retain their cultural value, traditions, language and other aspects of culture. This needs to be taken into consideration in each school or any workplace in Canada because without understanding, respect and communication can easily become an issue. It never hurts to learn more about other people and places, and specifically for teaching, it's extremely beneficial in order to create a more open-minded, accepting and inclusive atmosphere for both students and teachers alike. (interview, John, June 19, 2015)

This viewpoint shows the beginnings of a progressive outlook that Nel (1993) would characterize as the Multicultural Education approach, "which refers to a position that actively seeks to protect and enhance diverse groups." In addition, she suggests that those who fall into this belief "…will make an effort to incorporate minority students' languages and culture into the school program and to encourage minority community participation" (Nel, 1993, p. 123). Further to this, Andrea from Southern University (interview, June 22, 2015), had taken an equity and diversity course which she described as learning about the different aspects of being a language learner. However, she did feel as though the course could have used a more theoretical stance similar to that of the Multicultural approach but also nearing the Social Reconstructurist positioning (Guyton & Welche, 2005; Nel, 1993). She commented, "What I did find missing was the diversity

worldview… Instead of just different languages, what are the students' backgrounds, and what's going to be interesting to them or make their learning relevant?" (Andrea, interview, June 22, 2015). For example, as defined in Chapter 3, a Multicultural Education approach refers to a position that actively seeks to protect and enhance diverse groups. This viewpoint reflects teachers who make an effort to incorporate minority students' language and culture into the school program and to encourage minority community participation (Nel, 1993; Guyton & Welche, 2005). Those who relate closely to a Social Reconstructurist viewpoint have a strong focus on equity and justice and work actively towards social structural equality and equal opportunity in schools (Nel, 1993; Guyton & Welche, 2005, Sleeter & Grant, 2006). Andrea makes the important point of ensuring that culture is part of the everyday classroom and that language is part of culture. She affirmed in her comments that language, diversity, and individuality are important aspects in teacher education courses. One could also deduce that she may be suggesting the need for social justice, exposure to minority languages and culture by taking into consideration students' backgrounds.

Rena from Northern University, described the contribution of an AQ course on her perspective and demonstrates a similar view with her knowledge of making connections between home and school:

> …just knowing things like when you're learning a different language, learning and speaking your home language is really important. And it's really important that your parents are speaking to you in your home language and that language is encouraged in the classroom. (interview, August 5, 2015)

Finally, Laura, Central University when offering her perspectives of strategies of teaching CALD students, discusses the strengths of bringing multiculturalism into the classroom from one of her instructors, "She [instructor] looked a lot at how bringing different languages into the classroom would be a beneficial thing and talking about different languages and using a different language to help teach the target language" (interview, June 6, 2015). Rena also discussed general strategies that she had learned in her B.Ed. classes that she felt were beneficial, "…just even the fact that everybody has different strengths and being able to capitalize on the different types of differentiating learners and that kind of thing" (interview, August 5, 2015).

This final theme of Perspectives shows evidence of the importance of how the other themes play a role in the development, education, and preparation of preservice teachers for a technology rich and culturally and linguistically diverse classroom. Many of the students admitted to being unprepared to integrate technologies for teaching and learning, and those who were prepared had previous experience, training, or personal interest, which resulted in practice. Mentoring clearly plays an important role in both an academic and practical setting since most student teachers only used technologies that they were explicitly taught or shown how to use. From a multicultural education viewpoint, in many cases students shared the viewpoints of their mentors and exhibited a similar outlook on CALD. Those unfamiliar with the capabilities of CALD students saw this as a deficit. This is where a multiliteracies approach could be useful in exposing students not only to varying perspectives about CALD as a valuable resource, but also multicultural strategies that involve a combination of technology integration and teaching for student diversity can be beneficial to all students irrespective of cultural, language, or ability.

Multiliteracies Perspectives. As stated in the research questions and problem, the scope of this study was to investigate student teachers' knowledge, skills, self-efficacy, and beliefs about teaching with technologies and strategies for teaching CALD students. The theoretical frameworks applied to investigate this phenomenon were TPACK and Multiliteracy Theory. According to the interviews, many student teachers were unfamiliar with the term multiliteracies and the ways in which technology could be integrated to teach for CALD. In referring back to the literature in Chapter 2 (Literature Review), this trend was reflected in other studies involving the teaching or employment of multiliteracies pedagogies in that many students teachers may be confused by this term due to the lack of clarity in how this term is taught, the limited use of literacy forms in teacher education classes or the lack of connection of the relationship between multiliteracies and cultural and linguistic diversity (Ajayi, 2010; Giampapa, 2010; Rowsell, Kosnik & Beck, 2008; The New London Group, 1996). On two occasions there were students who despite being somewhat unfamiliar with this term, provided interesting definitions of how their courses included multiliteracy pedagogies. Rena observed, "There was always a class dedicated to teaching the diverse learner. So that's a class where we learned about things like a word program…and then a couple of other

technology supports that you can use for students" (interview, August 5, 2015). Unfortunately when asked to elaborate, Rena was unable to recall the specific name of the program, but nonetheless recognized the value of integrating technology in this type of situation. In addition, Nancy from Northern University, discusses the ways in which multiculturalism strategies were shared in her language arts class:

> So talking about simple ways to help a child who's learning to speak English for the first time in classroom setting, beyond not learning it at home. So it was things like using word walls and lots of referencing, lots of pictures. Visuals were a huge thing in it. (interview, June 22, 2015)

She further makes the connection of how technology would be beneficial for the learners in this type of situation:

> I think that's where big-time technology comes in. Because it's not very easy to just pick symbols that we use with children with special needs or it's not easy to just print off every single word we want to reference, a picture of that. So, it's important, I think, for a teacher to always have an iPad that's handy; I would think especially teaching a child who's just learning English. I think putting in the visual aspect into it; it brings just that much culture to the child for understanding. (interview, Nancy, June 22, 2015)

Although it is clear that Nancy values the use of technology to engage and support CALD within the classroom and shows a connection to multiliteracy pedagogies, her unfamiliarity, assumptions or theoretical viewpoint group CALD into special education. This section provided examples and quotations from the interview transcripts in response to Research Question 6 addressing the challenges student teachers feel they continue to face in integrating technology and multicultural strategies.

In response to the second part of Research Question 7, within the interviews, student teachers listed a variety of different ways they integrate technologies in their classes. As shown in Table 9 below there is a list divided into four separate sections of Digital Technologies, Software and/or Web Applications, Websites, and Learning Management Systems. Each of these types of technologies is represented in both teacher education programs and practicum placements. The first column represents the types of technologies used by the student teachers and the second column shows the types of technologies used by the faculty or mentor teachers. In a case where the technologies

appear in both sections by student teachers and faculty/teacher mentors, this indicates the faculty/teacher mentors introduced this type of technology to the students.

Results indicate that the most commonly used technologies in both teacher education courses and practicum placements are: data projectors with desktop or laptop computer (e.g. digital technologies), Microsoft Word and PowerPoint (e.g. software applications), and YouTube (e.g. web applications). Two students only occasionally used all other devices and programs listed in Table 9. These findings could also indicate a disconnect between what technologies student teachers are learning about or using in their teacher education courses and technologies that are being used in practicum placements. In many cases student teachers that were taught how to use different types of technologies in their teacher education classes (if any at all) were the same technologies that were utilized within the practicum placement within these contexts. Only in rare occasions did students integrate technologies that were not used in their bachelor of education courses. Students did use varied technologies and all had a personal vested interest in technology or other personal or professional experience in integrating technology effectively.

Table 9

Types of Technologies being used in Teacher Education and Practicum Placements

Teacher Education Programs		Practicum Placements	
Student Teacher	Faculty	Student Teacher	Mentor Teacher
Digital Technologies		Digital Technologies	
data	data	data	data
projector/computer	projector/computer	projector/computer	projector/computers
		document camera	document camera
personal laptop		personal laptop	overhead projector
iPads (occasional)		iPad/tablet	iPad/tablet
		Smartboards/Bright Links	Smartboards/Bright Links
mobile phone		mobile phone	
iclicker	iclicker	iphoto (camera)	iphoto (camera)
Software/Web Applications		Software/ Web Applications	
Smart Notebook			
Movie Maker			
Microsoft Office (Word, Powerpoint, Publisher)	Microsoft Office (Word, Powerpoint)	Microsoft Office (Word, Powerpoint)	Microsoft Office (Word, Powerpoint)
Google Drive			
Prezi			
YouTube	YouTube	YouTube	YouTube
Kobo			
ebooks			
Poll Everywhere	Kahoot!		
PowToon			
Bitstrips	Bitstrips		
Storybird	Storybird		
wiki	wiki		
Canva			
Tackk			
Edmodo			
Websites		Websites	
wordreference.com		wordreference.com	
		Linggui.fr	
		jaccorde.com	

	projet-voltaire.fr tvokids.com Daily Physical Activity (DPA) videos

Learning Management Systems

Blackboard Learn	Blackboard Learn
Sakai (OWL)	Sakai (OWL)

In this chapter, I outlined the qualitative data analysis procedures, and reported on the qualitative findings from the interview transcripts addressing Research Questions 4, 5, 6, and 7. This included student teachers' beliefs and perceptions of their knowledge, skills and abilities to integrate technologies and multicultural strategies, how they learn about these strategies, and which of those they are employing. The results highlighted challenges student teachers face and a description of the importance of beliefs, attitudes, and self-efficacy towards technology and multicultural education, the influence of multicultural theoretical perspectives, and the impact of mentoring. The results also touched upon ways student teachers integrate technology, and their perceptions of and strategies for teaching and working with CALD students. These results would also inform the need to make connections to the multiliteracies and technological frameworks for sustainable practices in teacher education to increase self-efficacy and reduce the challenges in transitioning into professional practice. In the next chapter, I have merged the results from the quantitative and qualitative results and organized them into six main findings for educational institutions within faculties of education in Canadian contexts facing similar demands of integrating technology within a culturally and linguistically diverse student body.

Chapter 6

6 Merged Mixed Methods Results

In this chapter, I have merged the results from the quantitative and qualitative data in support of six main findings for potential implications for educational institutions with faculties of education in Canadian contexts facing similar demands. The six main findings are: Connection to Multiliteracies Pedagogies, Mentoring, Attitudes/Willingness, Theoretical Perspectives, Access to Technology, and Additional Resources & Support. These findings could provide valuable insight and recommendations to further support student teachers by increasing their knowledge, skills, and self-efficacy to integrate technology and multicultural strategies effectively. As a result, this could better prepare student teachers to transition into professional practice. This chapter also discusses implications based on mentoring by faculty and/or instructors, attitudes towards technology and multiculturalism, and willingness to include these strategies in their teaching practices. It includes potential challenges such as access to technology and provides suggestions based on student interview data on external resources and support.

6.1 Implications for Practice

Connection to Multiliteracies. Since student teachers were overall unfamiliar with this term, the notion of multiliteracies pedagogies was represented as ways in which technologies and strategies for teaching culturally and linguistically diverse students were being integrated into bachelor of education courses and practicum placements. Unfortunately, these terms combined do not fully encompass the foundational principles of the theoretical framework of multiliteracies theory, however this does provide insight into what is currently being practiced within these three faculties of education in Ontario. As reported in Chapters 4 and 5, there was little to no discussion or data findings that related directly to the term multiliteracies as a method for student teachers to conceptualize pedagogies that include meaning making in different cultural, social, or domain-specific contexts and also multimodal representations (oral, visual, gestural, tactile, and spatial patterns) (Kalantzis & Cope, 2012). This aligns with the review of the

literature in that many faculties of education are not yet prepared to integrate a multiliteracies approach and, "…bridge the gap between traditional literacy and multiliteracies" (Biswas, 2014). Rowsell, Kosnik and Beck, (2008) suggest going into greater depth on key ideas and ensuring clear explanations through modeling and quality practicum experiences. As a result of these findings, integrating multiliteracies approaches within bachelor of education classes may assist student teachers in conceptualizing ways in which they can integrate technology to meet the diverse needs of their students. This is where integrating multiliteracy approaches through modeling and or mentoring would be beneficial within teacher education courses.

Mentoring in Multicultural Education. From the quantitative data results, students reported an average attitude score towards multiculturalism, and average self-efficacy in teaching a diverse student body. This aligns well with the qualitative interview data, where it was found that some students felt unprepared to teach in a multicultural classroom, however most exhibited a positive attitude and were willing to put forth a considerable amount of effort to ensure they would be able to meet the needs of their future students. Within the review of the literature, it was revealed teachers also felt unprepared to teach within a multicultural classroom and that further support is required to support teachers in meeting the needs of children who speak neither English or French as a first language (Beacham & Rouse, 2012; Byrd Clark, 2012; Cummins, 2000, 2006; Duff, 2007; Lapkin, MacFarlane, & Vandergrift, 2006; Lapkin, Mady & Arnott, 2009; Salvatori, 2009). Mentoring by faculty and practicum advisors was sparsely mentioned in the interviews. However students who did experience modeling within the education courses described positive experiences with faculty mentors who not only gave specific examples within their own institutional and K-12 classes, but also included strategies, ideas, perspectives, and theories for teaching culturally and linguistically diverse students. Overall the perceptions and theories integrated by the faculty mentors affected students' attitudes, willingness, and self-efficacy to teach in a multicultural classroom. However, the majority of students in the interview did not experience any modeling or strategies for teaching CALD students, and as a result felt unprepared. Some students suggested ways in which they felt they could be further supported in this area. For example, Josh from Central University (interview, June 24, 2015), commented on ways

in which multicultural strategies could be incorporated into subject area classes within the faculties of education through themes, "if we spent time in each class on English Language Learners and what they need, actually practice stuff, look at resources, like in the depth that we looked at the curriculum documents." According to Biswas (2014), there are a number of ways faculty could employ a multiliteracy approach and provide student teachers with examples to integrate multiliteracies pedagogies. Through mentoring, the results could be two-fold in that: (1) Student teachers experience a multiliteracies approach as a learner to facilitate their own learning; (2) Use this knowledge to integrate these same practices into their teaching. Examples include online writing spaces (e.g. Blogs, Wikis) to share ideas and collaborate (situated practice), student created/teacher-assisted concept mapping (e.g. Inspiration) to think through new concepts and ideas to clarify the learning process (overt instruction), examination of pop culture texts as a means to recognize, interpret, and understand biases in multimodal texts (critical framing), and student created multimodal texts (e.g. combining videos, music, art, etc.) as a form of using technology to show their learning (transformed practice) (Biswas, 2014).

Multicultural Perspectives. Within the interview data theme of Perspectives related to Theoretical Viewpoint, results indicated the importance of student teachers being exposed to a variety of viewpoints and literature within their courses so they have an informed opinion of ways students learn to adjust their methods appropriately. With increased familiarity and exposure to multicultural perspectives and teaching practices that value CALD, student teachers can begin to characterize ways in which CALD can be a powerful and resourceful classroom tool for teaching and learning. They can then begin to employ a broad repertoire of multiliteracy practices in an attempt to reshape pedagogies that reflect the complex linguistic repertoires and social practices of youth with multiple, heterogeneous identities in today's classrooms (Byrd Clark, 2012). This is the beginning of the integration of multiliteracies theory and pedagogies and the ways in which they are being represented within the contexts of this research study. This is where a multiliteracies approach could be useful in exposing student teachers to varying perspectives about CALD as a valuable resource and multicultural strategies that involve a combination of technology integration and teaching for student diversity. These

elements of the multiliteracy framework naturally allow for multilinguals with multiple identities to engage in their learning through meaningful authentic experiences and can be beneficial to all students irrespective of culture, language, or ability. For example, Biswas (2014) provides an example of situated practice using several different web technologies (See Table 9):

> Online writing space helps both students and teachers promote online and offline collaboration…Their informal and formal learning practices with classmates, friends, and families allow them to practice and understand the value of classroom activities within a community of learners. Teachers can potentially help students understand and learn multiple perspectives of their classmates and teachers. (p. 39-40)

The idea of a digital space to share experiences, thoughts, and perspectives could help student teachers conceptualize the value of student linguistic and cultural diversity. The fostering of these ideas links back to the four main viewpoints of multicultural education and may provide a medium to facilitate a more progressive approach: Assimilation, Pluralism, Multicultural Education, and Social Reconstructionist (Guyton & Welche, 2005; Healey & O'Brien, 2014; Nel, 1993). The most progressive approach is Social Reconstructionist. Those who relate closely to this viewpoint have a strong focus on equity and justice and work activity towards social structural equality and equal opportunity in schools (Nel, 1993; Guyton & Welche, 2005, Sleeter & Grant, 2006).

Mentoring for Technology Integration. It is encouraging that student teachers reported an overall mid to high level of self-efficacy in their ability to integrate technology effectively as a result of their experience and personal interest, and in some cases as a result of their bachelor of education courses and practicum placements. First, practicum and faculty mentors were shown as a contributing factor to students' acquisition of knowledge, skills, and abilities to integrate technology effectively. As identified in the interview excerpts the majority of students only used technologies that they had been taught how to use by their faculty or practicum mentors. There were very few students who felt confident enough to research and employ strategies or different technologies on their own that they had not seen before or practiced in their courses or classes. What's more is that the majority of technologies being used for teaching and learning within their

bachelor of education courses was deemed a low level and infrequent. This aligns with the studies outlined within the review of the literature indicating student teachers feel as though the modeling of appropriate ways to integrate technology effectively are limited or 'subpar' (Fu, 2013) or that too few teacher educators or practicum mentor teachers regularly provide examples of how to incorporate technology effectively (Redmond, Albion, & Maroulis, 2005). As also previously stated, this could also be due to the mentors' choice of types of technologies used, availability of technologies and professional development for technology within the locations, the frequency and level of use, time, and willingness to integrate technologies for teaching and learning (Fu, 2013; Laronde, 2010; Redmond, Albion, Maroulis, 2005).

This study's results also indicated a disconnect between what types technologies student teachers are using in their bachelor of education courses and those that are being utilized in K-12 classrooms. These results mimics the challenges identified in the literature review of student teachers' difficulties integrating technology due to the disconnect between what technologies are used in university courses for teaching and learning and the reality of what technologies are used in K-12 classrooms (Fu, 2013; Laronde, 2010; Redmond, Albion, & Maroulis, 2005). It is possible that if this perceived trend continues and student teachers are not exposed to the various technologies effective for teaching and learning that self-efficacy may continue to be affected, thus resulting in continued teacher unpreparedness. Based on these findings, potential applications for this research would be to ensure faculty are encouraged, supported, and appropriately educated in the types of technologies that are being used in the practical placements. In order to do their jobs effectively, student teachers need to cope with societal and technological changes once they transition into professional practice (Van Nuland, 2011).

Attitudes/Willingness Towards Technology. In some cases within the interviews, beliefs, attitudes, and willingness are other apparent factors that are associated with student teachers' capacity to integrate technology effectively. This aligns with the research studies discussed in the review of the literature about the impact that beliefs, attitudes and willingness have on teachers' abilities to integrate technology or multicultural strategies effectively (Anderson, Groulx & Maninger, 2011; Cogan, 2007; Dawes, 2001; Fu, 2013;

Kim et al., 2013; Lapkin, MacFarlane, & Vandergrift, 2006; Lapkin, Mady & Arnott, 2009; Salvatori, 2009; Ertmer, 2012). Faculty and mentor teachers who perceived by student teachers as having a positive attitude towards technology and integrated it within their classes were more likely to integrate the technologies that were used. Therefore since the attitudes of the faculty could be projected on student teachers, it is important for faculty members to be aware that their perceptions towards technology can potentially affect the level of which and frequency of use of technology that student teachers employ. In turn, it has been shown in previous research studies that attitudes towards technology for teaching and learning influence the amount of technology used and level of use (Anderson, Groulx & Maninger, 2011, Cogan, 2007; Dawes, 2001; Fu, 2013; Hall et al., 2006; Kim et al., 2013; Ertmer, 2012; Sandholtz, Ringstaff, & Dwyer, 1997). Implications for this study include the notion of presenting a positive attitude towards the integration of technologies accompanied by its benefits and limitations. This could prove to be beneficial in improving student teachers' attitudes towards technology, but also their capabilities (self-efficacy) to include technology in their own classrooms. For example, if faculty or mentor teachers chose a specific technology (either a website, application, or device) that suited the specific lesson or theme taught, they could provide a brief demonstration on how it's used, and why this choice may be better than others. Alternatively, if a technological approach was not appropriate, this could also be a good occasion to share ideas about the limitations technology would have in a given instance, thus presenting both the pros, cons, and educating student teachers on ways in which technology can enhance student learning.

Access to Technology. Access to technologies was a recurring subtheme within the interview data for student teachers, faculty, and practicum mentors. Although faculties of education cannot control the level of or access to emerging technologies in practicum placements, there is some degree of control over this in their own institutions. Providing access and professional development on new and emerging technologies (including digital, web applications, etc.) would be beneficial as would equipping the faculty with appropriate technologies in their institutional classrooms. As discussed in the review of the literature, Redmond, Albion, and Maroulis (2005) assert that:

> Faculties of Education have an important role in assisting in-service teachers to adapt and take advantage of ICTs to transform teaching and learning, but the primary role of a Faculty of Education is to ensure that teachers enter the profession adequately prepared to use emerging technologies. (p. 1)

In addition to providing better technology access to faculty members and students, it would be beneficial to include types of technologies that are being used in the surrounding school boards or districts to provide a link between what is happening in faculties of education and K-12 schools. Josh from Central University (interview, June 24, 2015), was discouraged by the disconnect between technologies that were used in faculty of education classes and those he experienced in his practicum, "It would be cool if we had some kind of class about the technology used in classroom, like in the school boards". He continued on suggesting that a survey be done on the schools within the boards to see what technologies are being used, then in turn, "teach us how to use it and get us to practice". Furthermore, he discussed his learning experiences in practicums, "I learned about Smartboards and stuff because they're at my practicum schools, but there's not a Smartboard here [at Central University]. It would be helpful because then you know what you're doing when you go to practicums." In addition, Andrea, from Southern University (interview, June 22, 2015), agreed that she required more support with the use of technologies within the faculty of education that would be available within her practicum placements:

> I just thought that a lot of the things that are becoming popular are already popular in education. So technology like using tablets and personal devices, dopple cameras and that sort of thing we didn't have access to at the faculty.

It is crucial that the roles of faculty members include exposing student teachers to new and emerging technologies to support teaching and learning so they are able to put these practices into place in their practicum placements. These results also align with the review of the literature that through increased access to educational technologies, opportunities for professional development and support may assist faculty and student teachers with the resources and sustainable practices they require to increase their self-efficacy to integrate technology and multicultural strategies effectively. The integration of information communication technologies (ICTs) and pedagogies that reflect the complex linguistic repertories of Canada's youth may assist in supporting teachers with

the challenges associated with the transition into professional practice (Byrd Clark, 2012; Karsenti & Collin, 2012).

External Resources & Support. Some student teachers from the interviews also described situations where they received resources for further support in integrating technology. Due to the condensed nature of the bachelor of education programs where there is often a limited amount of instructional time before practical experience begins, student teachers were shown how to integrate a limited number of technologies. Due to the time constraints, some faculty members provided additional support with external resources of other ideas about how technology could be used in a specific subject area. This way, student teachers were able to access these resources on their own time as a method of professional development, or review the use of different types of technologies for ideas during their practicum placements. Sadie from Central University, (interview, August 8, 2015) expressed an interest for additional resources or support outside of the classroom but was unclear as to how she might do this, "There are obviously many ways to get that opportunity, but I wouldn't know any… a workshop isn't enough because you're to do that one time but you're not actually getting lots of practice with it." Naomi, from Southern University, (interview, July 21, 2015), reiterated the importance of having access to additional resources:

> …the only thing I want to stress again that I've said once already is –it sounds so basic- but for instructors in these education programs to invite students or even other instructors to compile a list of resources. Not so much resources necessarily even but applications and technologies that are exceptionally useful, resources as well of course….I cannot be aware of all the new technologies that's out there.

It is not expected that faculty, instructors or mentors within these institutions be experts in the use or awareness of emerging technologies. As per the discussion in the review of the literature on societal changes, there is a shift from traditional approaches to teaching to a pedagogy that provides sustainability for teaching and learning (Kalantzis & Cope, 2012). Providing access to external resources, or a means of collaborative learning spaces for all members of the learning community (e.g. faculty, instructors, students) to build on strategies and ideas, facilitates the process for student teachers to become aware of new

and emerging technologies, techniques, and strategies for teaching culturally and linguistically diverse students. This aligns with the definition of generation P and how they learn outlined in Chapter 2 (Literature Review) that is, that Generation P learn better in informal settings and from a variety of sources- in the self-directed electronic devices and software applications, and in social media interactions, such as online gaming and interest communities on the web. They continue learning outside the classroom through social media in a variety of contexts throughout the day. "Teacher preparation programs need to create intentional learning environments, where pre-service teachers can explore issues that are relevant and develop pedagogies that are effective for a knowledge era" (Clifford, Friesen, & Lock, 2004, p. 19).

In this mixed methods chapter, I have highlighted six main findings that could potentially assist faculties of education in their programming and education of future language teachers to be better prepared to integrate technologies and strategies for teaching culturally and linguistically diverse students. The findings have demonstrated the need to more explicitly integrate multiliteracies pedagogies into language teacher education programs since most participants were unfamiliar with this concept. It was noted that this could be achieved through increased mentoring, multicultural coursework, and experiences in working with diverse learners. The next and final chapter will provide acknowledgement of the limitations of this study as well as future research directions.

Chapter 7

7 Conclusions

In this final chapter, I will reiterate the purpose of this research study and revisit the six main findings and relate them to the research problem of language teacher unpreparedness. Finally, I present the limitations of this study and recommendations for future research directions are explored using a mixed methods design to further investigate these implications for practice.

7.1 Purpose

The purpose of this research study was to investigate the ways in which three teacher education programs in Ontario are integrating sustainable practices for student teachers in the form of multiliteracies pedagogies in response to the research problem of language teacher attrition for FSL and ESL teachers. The quantitative and qualitative research findings aligned with many of themes in the review of the literature resulting in some student teachers continuing to feel unprepared to teach within a technology-rich multicultural classroom.

7.2 Significance of Study

First, the results indicated a limited connection to multiliteracies pedagogies, as most student teachers who participated in this study were unfamiliar with this term. This shows that teacher education programming requires a more explicit teaching of these strategies and perspectives as a means of bridging the gap of cultural, racial, and/or linguistic divide between teachers and students. From the findings of this research study, it appears that transitioning from traditional notions of literacies into a multimodal approach which provides authentic learning experiences taking into consideration students' prior knowledge may be a factor in increasing future language teachers knowledge, skills, attitudes and self-efficacy of integrating technology and teaching for student cultural and linguistic diversity.

Other main themes that emerged from the mixed methods data included the varied access to technology amongst the faculties of education and practicum placements, the importance of the role of mentoring, and associated implications. The results showed a connection between mentoring (either academic or professional) on the attitudes, beliefs, and self-efficacy of student teachers' abilities to integrate technology and teach for cultural and linguistic diversity. Statistical significance revealed low and infrequent use of technologies for teaching and learning, as well as multicultural strategies by mentors, thus potentially indicating areas in which faculties of education need to better prepare their teacher candidates. For example, a further investigation of the ways in which teacher educators and/or mentors have the potential to increase their level and frequency of technology integration and multicultural strategies would be a direction for further research to be explored (e.g. external resources for support, increased access to technology, attitudes and beliefs). This further investigation may elicit findings to build upon the current teacher education programs resulting in greater teacher preparedness through increased self-efficacy, knowledge, skills, attitudes, and beliefs of the two main challenges of integrating technology and teaching for cultural and linguistic diversity that were explored in this research study.

7.3 Limitations

According to Lund (2012), the purpose of acknowledging the research limitations in a study is to assist the researcher and readers to understand the types of limitations experienced in the research process, explain the nature of these limitations, and provide a critical pragmatic analysis of suggestions to overcome such limitations for future directions for research studies in a similar area. I identified three main limitations upon completion of this research study.

Convenience Sampling (generalization). The goal of the online survey was to reach a cross-sectional, randomized sample size of at least 100 students within three different teacher education programs in Ontario. I wanted to have a balanced sample size from each location in an effort to provide more generalizable results. Although I did achieve a sample size of 145 with a 95% completion rate, the sample was unbalanced with 61%

from Southern University, 25% from Central University, and 14% from Northern University. The reason for this I believe is the method of participant recruitment. Upon ethics approval, when I contacted faculty members to ask for permission to attend five to 10 minutes of their classes to recruit student teachers for participation, I was invited into four classes from Southern University, and one from Central University. University policies from Northern University did not allow for class time to be allocated to recruiting research participants. Therefore a convenience sampling of students was the only foreseeable solution to gather enough research participants and consequently the study's quantitative results may not be generalizable. Despite this, the study did not yield statistical significance in terms of geographical location, and many of the statistical findings did align with previous research studies discussed in the review of the literature.

In addition, although results indicated high content and construct validity and reliability, a more recently created and updated instrument may yield results more pertinent to this study. For example, the Diversity Awareness Survey measures preservice teachers' awareness, willingness, and comfort to teach in a multicultural environment (Fehr, & Agnello, 2012). It includes a demographic section for potential comparative analysis of responses of the following constructs: social action in education (equity), awareness of the realities of teaching about diversity and multiculturalism, and desire for isolation (isolation of diverse learners) (Fehr, & Agnello, 2012). Despite the consideration of potentially using a different survey, the use of a mixed methodology greatly complemented this study, by providing triangulation of data. According to O'Donoghue and Punch (2003) "triangulation is a method of cross-checking data from multiple sources to search for regularities in the research data" (p.117). The interview data in this study did align with the areas of statistical significance found, and the participants from the interviews were a balanced sample size.

Faculty Perspectives. Due to the scope and time restrictions in completing the data collection, faculty members were not included the in sample size. This could influence a balanced view of the data. For example, only the students' perspectives were examined in this study. My original assumptions stated in my introductory section of researcher positionality were that I acknowledged the subjective and multiple meanings of the

experiences of the participants. In addition, the discussion of my results was based upon an interpretive, theoretical approach to increase readability and coherence in the qualitative data (Schwandt, 2000). Where possible, I provided direct excerpts from the interview transcripts to represent students' thoughts, perceptions, and beliefs as accurately as possible. As discussed in the future research directions, the addition of faculty members' perspectives, beliefs, and perceptions may have provided further insight into the ways in which multiliteracies pedagogies are being employed in teacher education programs.

Connecting to Multiliteracies Pedagogies. Based on the examination of the contexts chosen for this study (i.e. geographical location, courses that suggested a multiliterate approach), the results of this study yielded unfamiliarity with the term multiliteracies pedagogies. The investigation of student teachers' knowledge of this term was unknown, as previously mentioned in both the qualitative and quantitative results. However, as discussed in the review of the literature, this was recognized as one of the challenges of the study – if or how multiliteracies pedagogies are being employed in teacher education programs? What (if any) are student teachers' understandings of multiliteracies? These challenges included a lack of clarity about the nature of multiliteracy pedagogy, an inadequate range of literacy forms, and the relationship of multiliteracies pedagogies to cultural and linguistic diversity (Rowsell, Kosnik & Beck, 2008). Despite the challenges, the realization of the impact of the notion of multiliteracy theories in teacher education could prove to be beneficial in programming for bachelor of education students. Perhaps as an emerging phenomenon, increased exposure to multiliteracies pedagogies and theories would assist in increasing student teachers' self-efficacy.

7.4 Future Research Directions

Additional studies are needed to learn more about the amount of influence that faculty and practicum mentors have on the level of technology integration that student teachers acquire and the frequency of use. It would be beneficial to learn about how faculty members perceive technology and multicultural integration (beliefs and attitudes) as well as their perceived knowledge and abilities to integrate technology and strategies for

teaching culturally and linguistically diverse students (self-efficacy). Using a mixed methods design, a similar survey could be used on a larger sample size of faculty and instructors within faculties of education. Follow up interviews with a smaller sample of those who completed the survey about a discussion of their current practices, access to technology, and supports may provide further insight into how they could be further supported in teaching student teachers how to integrate technology and multicultural strategies effectively. In addition, classroom observations with faculty who are familiar with multiliteracies pedagogies and employ these strategies regularly would be beneficial in documenting different examples of how these strategies are being used to facilitate student learning. For a repeated study on student teachers, since mentoring was a significant finding, adding in a subscale for professional and academic mentoring within the *MES* (similar to that in the TPACK survey) may also be helpful in collecting further statistical evidence in this area.

An investigation of the technologies used in practicum placements would also be a valuable study worth exploring. Although potentially overwhelming on a larger scale due to the vast amount of geographical locations, funding, and digital divide, it would be beneficial for faculties of education to examine the types of technologies used in their K-12 partner schools, and the ways in which said technologies are being used. Redmond, Albion, and Maroulis (2005) agree that:

> It is time for a more carefully coordinated approach, in which the Faculty of Education and the cooperating schools begin to share responsibility for providing opportunities for pre service teachers to observe and develop skills, knowledge and positive attitudes towards ICT integration within the classroom (p. 5).

In this final chapter, I have reviewed the purpose of this research study and the six main findings from the quantitative, qualitative, and merged data results. I have acknowledged three associated limitations of this study and as a result, have made recommendations for future research directions of using a mixed methods design to further investigate the role of faculty perspectives, as well as the need for an increased connection to multiliteracies pedagogies in language teacher education programs.

Concluding Remarks

With continued immigration and globalization, Canadian teachers encounter multiculturalism and multilingualism on the rise, therefore resulting in an increased need to educate future teachers on how to teach for student cultural and linguistic diversity. In addition, the role that technology plays for K-12 students in their home and school literacy practices calls for a pedagogical approach where diversity is seen as a resource, and technology as a means to enhance, engage, and equip students to be successful learners. Since multiliteracies pedagogies involve a wide repertoire of strategies (i.e. overt instruction, situated practice, critical framing, and transformed practice) and include multimodal representations (oral, visual, gestural, tactile, and spatial patterns) (Kalantzis & Cope, 2012), this could offer sustainable ways for faculties of education in Canada facing similar demands to better meet the needs of their student teachers. This study demonstrates a need for more explicit instruction of multiliteracies pedagogies and the integration of technologies for teacher education programs in Ontario. Such instruction could potentially enhance the development of critical thinking and reflexive engagement of future teachers (and their students) and may result in better-prepared teachers as they transition into professional practice.

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Appendices

Appendix A: Email to Faculty of Education for Research Participant Recruitment

AN INVESTIGATION OF MULTILITERACIES PEDAGOGIES IN LANGUAGE TEACHER EDUCATION IN ONTARIO: A MIXED METHODS STUDY

Subject Line: Invitation for Student Teachers to participate in a French or English as a Second Language teaching research study

You are being invited to participate in a study that we, Adrienne Vanthuyne and Dr. Julie Byrd Clark are conducting. The aims of this study are to examine the ways in which student teachers of French learn about or teach culturally and linguistically diverse students and integrate technology in their classes.

I would like permission to attend one of your classes to briefly speak to your students about this study and invite them to participate. Briefly, the study involves an online survey designed for student teachers that takes approximately 20 minutes to complete and the choice of a 30 minute follow up interview with the researcher at a time and location of their choice at your institution.

If you would like more information on this study please see the letter of information attached to this email or contact the researchers at the contact information below.

Sincerely,
Adrienne Vanthuyne
Phd Candidate
Faculty of Education
Western University
[redacted]

Dr. Julie Byrd Clark
Principal Investigator
Faculty of Education
Western University
[redacted]

Appendix B: Participant Letter of Information

AN INVESTIGATION OF MULTILITERACIES PEDAGOGIES IN LANGUAGE TEACHER EDUCATION IN ONTARIO: A MIXED METHODS STUDY

LETTER OF INFORMATION

Introduction
My name is Adrienne Vanthuyne and I am PhD student at the Faculty of Education at Western University. I am currently conducting research on the experiences of bi/multilingual student teachers of French and/or English as a Second Language in Ontario and their experiences with technology integration and multicultural education and would like to invite you to participate in this study.

Purpose of the study
The aims of this study are to examine the ways in which student teachers of languages learn about how to teach culturally and linguistically diverse students and integrate technology in their classes. If you agree to participate in this study you will be asked to:

1. Fill out this electronic survey indicating your previous experience (if any) in language teaching and how (if you do) integrate technology in your classes. This survey will take approximately 20 minutes to complete and it will be accessible for three months. It can be accessed here: https://www.surveymonkey.com/s/student-teachersurvey

2. By providing your email address at the beginning of the online survey, you can self-select to participate in an interview in the later part of this study towards the end of the academic school year. However, your participation in the first part of the study does not obligate you to participate in the second part of the study. Should you choose to participate, you will have the option to interview remotely through virtual communication (e.g. Skype) or meet with the researcher face to face in your area. The interview will be approximately 30 minutes and will be audio recorded, however you may request not to be recorded and the researcher will take field notes instead.

Confidentiality
The information collected will be used for research purposes only, and neither your name nor information that could identify you, will be used in any publication or presentation of the study results. All information collected for the study will be kept confidential. All names will be removed and pseudonyms (an alias) will be used through all interactions to ensure privacy and confidentiality. No real names or names of locations/institutions will be used or identifiable in the report or future publications. No information about the program in which you are/were enrolled will be disclosed.
To protect your privacy, all digital data will be stored on a password protected USB in the researcher's office. The data will be stored in a locked cabinet with all names removed from the data. All electronic interaction data will be destroyed by shredding

upon completion of the study while all other data will be stored in a locked filing cabinet for a period of five years after the completion of the study.

Risks & Benefits/Voluntary Participation
Participation in this study is voluntary. The researcher will remain diligent throughout the research study to ensure confidentiality for participants and you will not be required to disclose your name on the online survey and pseudonyms will be used during the interviews. You will be given the opportunity not to answer any questions on the online survey by choosing non-applicable (N/A). In addition, should you be concerned about loss of confidentiality or feel any discomfort during the research study you may opt at any time to withdrawal consent and no longer participate with no effect on your academic or employment status.

Questions
If you have any questions about the conduct of this study or your rights as a research participant you may contact the Office of Research Ethics, Western University at [redacted] If you have any questions about this study, please contact Dr. Julie Byrd Clark (Principal Investigator) [redacted] or by e-mail: [redacted] or Adrienne Vanthuyne at [redacted]

Sincerely,

Adrienne Vanthuyne

Appendix C: Recruitment Poster

Invitation to participate in research study

Researchers at Western University are looking for student teachers who intend on teaching **French or English as a Second Language** to participate in a 30 min online survey about their experiences and opinions about teaching with technology and teaching for student cultural and linguistic diversity. No experience necessary.

ALL students who complete the online survey will receive a Starbucks, Tim Hortons, or Subway gift card.

For more information contact:
Adrienne Vanthuyne at [redacted]
Dr. Julie Byrd Clark (Principal Investigator) at [redacted]

Research Study Survey Adrienne Vanthuyne avanthuy@uwo.ca Dr. Julie Byrd Clark jbyrdcla@uwo.ca https://www.surveymonkey.com/s/student-teachersurvey	Research Study Survey Adrienne Vanthuyne avanthuy@uwo.ca Dr. Julie Byrd Clark jbyrdcla@uwo.ca https://www.surveymonkey.com/s/student-teachersurvey	Research Study Survey Adrienne Vanthuyne avanthuy@uwo.ca Dr. Julie Byrd Clark jbyrdcla@uwo.ca https://www.surveymonkey.com/s/student-teachersurvey	Research Study Survey Adrienne Vanthuyne avanthuy@uwo.ca Dr. Julie Byrd Clark jbyrdcla@uwo.ca https://www.surveymonkey.com/s/student-teachersurvey	Research Study Survey Adrienne Vanthuyne avanthuy@uwo.ca Dr. Julie Byrd Clark jbyrdcla@uwo.ca https://www.surveymonkey.com/s/student-teachersurvey	Research Study Survey Adrienne Vanthuyne avanthuy@uwo.ca Dr. Julie Byrd Clark jbyrdcla@uwo.ca https://www.surveymonkey.com/s/student-teachersurvey	Research Study Survey Adrienne Vanthuyne avanthuy@uwo.ca Dr. Julie Byrd Clark jbyrdcla@uwo.ca https://www.surveymonkey.com/s/student-teachersurvey

Appendix D: Student Teacher Online Survey (TPACK & MES)

AN INVESTIGATION OF MULTILITERACIES PEDAGOGIES IN LANGUAGE TEACHER EDUCATION IN ONTARIO: A MIXED METHODS STUDY

LETTER OF INFORMATION

Introduction

My name is Adrienne Vanthuyne and I am PhD student at the Faculty of Education at Western University. I am currently conducting research on the experiences of bi/multilingual student teachers of languages in Ontario and their experiences with technology integration and multicultural education and would like to invite you to participate.

Purpose of the study

The aims of this study are to examine the ways in which student teachers of languages learn about how to teach culturally and linguistically diverse students and integrate technology in their classes. If you agree to participate in this study you will be asked to:

1. Fill out this electronic survey indicating your previous experience (if any) in language teaching and how (if you do) integrate technology in your classes. This survey will take approximately 15 minutes to complete and it will be accessible for three months.
2. By providing your email address at the beginning of the online survey, you can self-select to participate in an interview in the later part of this study towards the end of the academic school year. However, your participation in the first part of the study does not obligate you to participate in the second part of the study. Should you choose to participate, you will have the option to interview remotely through virtual communication (e.g. Skype) or meet with the researcher face to face in your area. The interview will be approximately 30 minutes and will be audio recorded, however you may request not to be recorded and the researcher will take field notes instead.

Confidentiality

The information collected will be used for research purposes only, and neither your name nor information that could identify you, will be used in any publication or presentation of the study results. All information collected for the study will be kept confidential. All names will be removed and pseudonyms (an alias) will be used through all interactions to ensure privacy and confidentiality. No real names or names of locations/institutions will be used or identifiable in the report or future publications. No information about the program in which you are/were enrolled will be disclosed.

To protect your privacy, all digital data will be stored on a password protected

USB in the researcher's office. The data will be stored in a locked cabinet with all names removed from the data. All electronic interaction data will be destroyed by shredding upon completion of the study while all other data will be stored in a locked filing cabinet for a period of five years after the completion of the study.

Risks & Benefits/Voluntary Participation

Participation in this study is voluntary. The researcher will remain diligent throughout the research study to ensure confidentiality for participants and you will not be required to disclose your name on the online survey and pseudonyms will be used during the interviews. You will be given the opportunity not to answer any questions on the online survey by choosing non-applicable (N/A). In addition, should you be concerned about loss of confidentiality or feel any discomfort during the research study you may opt at any time to withdrawal consent and no longer participate with no effect on your academic status.

Questions

If you have any questions about the conduct of this study or your rights as a research participant you may contact the Office of Research Ethics, Western University at 519- 661-3036 or ethics@uwo.ca. If you have any questions about this study, please contact Dr. Julie Byrd Clark (Principal Investigator) at 519-661-2111, extension 88656 or by e-mail: jbyrdcla@uwo.ca or Adrienne Vanthuyne at avanthuy@uwo.ca.

PART 1: Demographic Information

1. Gender: _____
2. Age: _____
3. Racial/Ethnic Background: _____
4. What languages do you speak, read, or write? _____
5. I currently attend university in:
    a. Southern University
    b. Central University
    c. Northern University
6. I am currently enrolled in:
    a. Secondary Education (Please specify teachable areas):
    _____
    b. Elementary Education
    c. Other: _____
7. How many years have you been enrolled in your current degree?
    _____
8. If you completed a previous degree (e.g. undergraduate) before entering studies in Education what was your major?
    a. _____
    b. I do not have a previous degree
9. Have you taken a course that teaches you how to integrate technology in your classroom? If so please list the name
    _____
10. Are you currently or have you completed a practicum?
    a. I have completed a practicum
    b. I am currently completing a practicum
    c. I have not completed a practicum
11. Do you intend on teaching language(s) once you finish your degree?
    a. Yes, FSL
    b. Yes, ESL
    c. Yes, ESL and FSL
    d. No
    e. Other
12. I would like to participate in a short follow up interview

a. Yes, please provide email:
b. No

13. I would like follow up information about this study in the future.
    a. Yes, please provide email:

Technology is a broad concept that can mean a lot of different things. For the purpose of this questionnaire, technology is referring to digital technology/technologies. That is, the digital tools we use such as computers, laptops, iPods, handhelds, interactive whiteboards, software programs, etc. Please answer all of the questions and if you are uncertain of or neutral about your response you may always select "Neither Agree or Disagree". If the question does not apply to you, please select “Non Applicable”.

PART 2: Survey of Preservice Teachers' Knowledge of Teaching and Technology

	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	Non Applicable
TK (Technology Knowledge)						
I know how to solve my own technical problems.						
I can learn technology easily.						
I keep up with important new technologies.						
I frequently play around the technology.						
I know about a lot of different technologies.						
I have the technical skills I need to use technology.						
I have had sufficient opportunities to work with different technologies.						
PK (Pedagogical Knowledge)						
I know how to						

assess student performance in a classroom.						
I can adapt my teaching based-upon what students currently understand or do not understand.						
I can adapt my teaching style to different learners.						
I can assess student learning in multiple ways.						
I can use a wide range of teaching approaches in a classroom setting.						
I am familiar with common student understandings and misconceptions.						
I know how to organize and maintain classroom management.						
Content Knowledge (CK), Pedagogical Content Knowledge (PCK) & Technological Content Knowledge TCK): Languages and Literacy						
I have sufficient knowledge about language/ literacy.						
I can use a literary way of thinking.						
I have various ways and strategies of developing my understanding of						

languages and literacy.						
I know how to select effective teaching approaches to guide student thinking and learning in language and literacy.						
I know about technologies that I can use for understanding languages/literacy.						
TPK (Technological Pedagogical Knowledge)						
I can choose technologies that enhance the teaching approaches for a lesson.						
I can choose technologies that enhance students' learning for a lesson.						
My teacher education program has caused me to think more deeply about how technology could influence the teaching approaches I use in my classroom.						
I am thinking critically about how to use technology in my classroom.						

I can adapt the use of the technologies that I am learning about to different teaching activities.						
TPACK (Technology Pedagogy and Content Knowledge)						
I can teach lessons that appropriately combine language, literacy, technologies and teaching approaches.						
I can select technologies to use in my classroom that enhance what I teach, how I teach and what students learn.						
I can use strategies that combine content, technologies and teaching approaches that I learned about in my coursework in my classroom.						
I can provide leadership in helping others to coordinate the use of content, technologies and teaching approaches at my school and/or district.						
I can choose technologies that enhance the						

content for a lesson.						
Models of TPACK (Faculty/Instructors, Practicum Mentor Teachers)						
My languages/literacy education professors appropriately model combining content, technologies and teaching approaches in their teaching.						
My instructional technology professors appropriately model combining content, technologies and teaching approaches in their teaching.						
My educational foundation professors appropriately model combining content, technologies and teaching approaches in their teaching.						
My professors outside of education appropriately model combining content, technologies and teaching						

approaches in their teaching.						
My practicum mentor teachers appropriately model combining content, technologies and teaching approaches in their teaching.						
Models of TPCK	**25% or Less**	**26%-50%**	**51%-75%**	**76%-100%**		
In general, approximately what percentage of your teacher education professors have provided an effective model of combining content, technologies and teaching approaches in their teaching?						
In general, approximately what percentage of your professors outside of teacher education have provided an effective model of combining content, technologies and teaching approaches in their teaching?						
In general, approximately what percentage of Practicum Mentor Teachers have provided an						

effective model of combining content, technologies, and teaching approaches in their teaching?					

PART 3: Multicultural Efficacy Scale

Section A

Definition: The authors intend the terms "diversity" and "people different from me" to include people of different races, ethnic groups, cultures, religions, socio-economic classes, sexual orientations, and physical abilities.

Directions: Please choose the word that best describes your experience with people different from you.

	Never	Rarely	Occasionally	Frequently
As a child, I played with people different from me.				
I went to school with diverse students as a teenager.				
Diverse people lived in my neighborhood when I was a child growing up.				
In the past I chose to read books about people different from me.				
A diverse person was one of my role models when I was younger.				
In the past I chose to watch TV shows and movies about people different from me.				

As a teenager, I was on the same team and/or club with diverse students.				

Section B

Directions: Respond to each statement by choosing one answer that best describes your reaction to it. Since we are simply trying to get an accurate sense of your opinions on these matters, there are no right or wrong answers.

	Agree Strongly	Agree Somewhat	Disagree Somewhat	Strongly Disagree
Teachers should adapt lesson plans to reflect the different cultures represented in the classroom.				
Teachers should provide opportunities for children to share cultural differences in foods, dress, family life, and beliefs.				
Discussing ethnic traditions and beliefs in school leads to disunity and arguments between students from different cultures.				
Children should be taught mostly by teachers of their own ethnic and cultural background.				
It is essential to include the perspectives of diverse groups while teaching things about Canadian history				

Curricula and textbooks should include the contributions of most, if not all, cultural groups in Canadian society.				
The classroom library should reflect the racial and cultural elements of the classroom members.				

Section C

Directions: To the best of your knowledge, self-assess your own ability to do the various items listed below.

	A = I do not believe I could do this very well.	**B = I could probably do this if I had to, but it would be difficult for me.**	**C = I believe that I could do this reasonably well, if I had time to prepare.**	**D = I am quite confident that this would be easy for me to do.**
I can provide instructional activities to help students to develop strategies for dealing with confrontations about diversity or diverse groups.				
I can adapt instructional methods to meet the needs of learners from diverse groups.				
I can develop materials appropriate for the multicultural classroom.				

I can develop instructional methods that dispel myths about diverse groups.				
I can analyze instructional materials for potential stereotypical and/or prejudicial content.				
I can help students to examine their own prejudices.				
I can develop activities that increase the self-confidence of diverse students.				
I can provide instruction showing how prejudice affects individuals.				
I can plan instructional activities to reduce prejudice toward diverse groups.				
I can identify cultural biases in commercial materials used in teaching.				
I can help students work through problem situations caused by stereotypical and/or prejudicial				

attitudes.				
I can get students from diverse groups to work together.				
I can help students view history and current events from diverse perspectives.				
I can involve students in making decisions and clarifying their values regarding multicultural issues.				

35) Choose the position which most closely reflects your strongest beliefs about teaching:	
A = If every individual learned to accept and work with every other person, then there would be no intercultural problems.	
B = If all groups could be helped to contribute to the general good and not seek special recognition, we could create a unified Canada	
C = All cultural groups are entitled to maintain their own identity.	
D = All cultural groups should be recognized for their strengths and contributions.	
E = Some groups need to be helped to achieve equal treatment before we can reach the goals of a democratic society.	

Appendix E: Student Teacher Interview Questions

You may request to not have your interview digitally recorded and opt for the researcher to take field notes instead.

1. Which year/program are you enrolled in? Which university do you attend?
2. If you intended on teaching French, where did you learn French? (if applicable)
3. What kind of technologies do you use in your courses?
4. What kind of technologies do your instructors use in your courses?
5. Have you had the opportunity to practice teach in a classroom? If so, did you use any technology in your teaching or for student learning? Can you provide an example?
6. Have you taken any multicultural education, or diversity training courses thus far in your program? If not will you take one? Is it mandatory in your program?
7. Do you think a course in multicultural education is necessary for your future teaching? Why/why not?
8. Have your instructors used any specific strategies to assist you in teaching culturally and linguistically diverse students? Can you provide an example?
9. At this time do you feel prepared to use technology for teaching and learning in your future classroom? If so, what do you think has prepared you? If not, what more do you think would assist you?
10. At this time do you feel you'd be able to teach culturally and linguistically diverse students? If so, what do you think has prepared you? If not, what more do you think would assist you?

ADRIENNE VANTHUYNE

LANGUAGES:

Fluent in English and French (written and oral)

EDUCATION

- 2016, Doctor of Philosophy Education Studies Curriculum & Pedagogy (Applied Linguistics), University of Western Ontario
  Educational Technology, Language Teacher Education (ESL/FSL), Multicultural Education

- Master of Education
  2010, University of Southern Queensland, Australia
  Educational Technology, Language & Literacy (ESL)

- Postgraduate Certificate Educational Technology
  2009, University of Southern Queensland, Australia
  Educational Technology

- Bachelor of Education
  2003, Acadia University, Canada
  Primary-Junior Education

- Bachelor of French
  2001, Dalhousie University, Canada

AWARDS

- 2012-2016 Western Graduate Research Scholarship, Doctor of Philosophy, University of Western Ontario
- 2015-2016 Ontario Graduate Student Scholarship (OGS) $15,000
- 2014-2015 Ontario Graduate Student Scholarship (OGS) $15,000
- 2016 Nomination for SSHRC Doctoral Award
- 2014 Nomination for SSHRC Doctoral Award
- 2012 Nomination for SSHRC Doctoral Award
- 2010 Dean's Award for Academic Excellence, Master of Education, University of Southern Queensland

SERVICE WORK

- 2016 Peer Reviewer- Canadian Society for the Study of Education (CSSE)
- 2015 Peer Reviewer- Canadian Society for the Study of Education (CSSE)

- 2014 Peer Reviewer- Canadian Society for the Study of Education (CSSE)
- 2014 Peer Reviewer- Canadian Committee of Graduate Students in Education (CCGSE)
- 2013-2014 Knowledge Dissemination, Education Graduate Student Association
- 2013 Peer Reviewer- Canadian Committee of Graduate Students in Education (CCGSE)

PROFESSIONAL MEMBERSHIPS

- Teaching Registrations & Licenses, Nova Scotia Teacher's Certificate, Ontario College of Teachers (OCT # 607590), Alberta Teacher's Association
- 2012-2016 Canadian Association of Teacher Education (CATE)
- 2011-2015 Canadian Association of Applied Linguistics (CAAL)

ADDITIONAL QUALIFICATIONS & COURSES TAKEN

- ESL Part 1 AQ equivalent, Master of Education, USQ
- FSL Part 1 AQ course, Continuing Teacher Education, Western University
- TESOL/TEFL, Acadia University, Language Link
- TCPS Core 2 Tutorial, Panel on Research Ethics, Government of Canada
- Religious Education, Calgary Catholic School Board
- Certificate in Coaching, Badminton Canada
- Certificate in Swimming Instruction, National Lifesaving Instruction: Canadian Red Cross and Lifesaving Society
- Western Employee Health and Safety Orientation, Western University
- Accessibility in Teaching (AODA), Western University
- Safe Campus Community, Western University
- Basic WHMIS, Western University
- Western University
    - PhD Seminar (9715)
    - Mixed Research Methods (9675)
    - Qualitative Research Methods (9711)
    - Quantitative Research Methods (9705)
    - Issues in Second Language Teaching and Learning (9578)
    - Independent Reading & Research (9710)
- University of Southern Queensland
    - Theories for Learning Futures (5602)
    - Introduction to Web Publishing (5261)
    - Computer Based Resources in Education (5471)
    - Computing in Education (5472)
    - Multimodal Texts & New Literacies (8415)
    - Foundations of Contemporary Educational Research Methods (8000)

- Masters Project I (8060)
- Masters Project II (8061)

- Independent Coursework
  - Principals of Project Management

EMPLOYMENT HISTORY

2011-2016 University of Western Ontario, London, Ontario

Educator, Researcher

-Responsible for composing literature reviews, judging the relevance of research articles
-Research Fieldwork: interviewing research participants, recording of detailed field notes
-Research Design: creation and execution of research project including consideration of theories, methodologies, and methods
-Report Writing: summarizing and disseminating data in research meetings
-Writing of federal and provincial grant proposals and applications
-Data Analysis (Qualitative): Thematic coding of interview transcripts, decoding (ethnography) of text transcripts in both English & French
-Data Analysis (Quantitative): Input of research survey instruments into statistical software analysis, performing of several tests including (inferential/descriptive): t-tests, multiple linear regression, principal components analysis, general linear model, etc.
-Ethics Applications: Writing and modifying ethics documentation including board submissions, letters of participant consent and information.
-Presentations of data findings in conferences and workshops
-Research Coordination: collaboration of various online communication platforms such as Google Groups, Adobe Connect, Blackboard Collaborate, working collaboratively with a group of researchers both locally and internationally (French & English)
-Instructor for courses: 5107 French as a Second Language in Elementary, 5462 Second Language Acquisition: Curriculum & Pedagogy (French), 5211 Curriculum & Pedagogy in Intermediate/Senior French.
-Teaching Assistant for courses: 5414Q Initiation to Teaching in a French Immersion Program, 5499Q Supporting English Language Learners in Primary/Junior Classrooms
-Preparation of materials, lectures, and development of assessments
-Responsible for providing assignment feedback for pre-service teacher education and graduate classes for student improvement, uploading,/downloading of assignment submissions, e-learning communication within the Learning Management System.
-Coordination and moderation of all assignments with course conveners and other teaching assistants.

2010-present University of Southern Queensland, Gold Coast, Australia

Online Instructor, Course Coordinator

-Responsible for Course Coordination of EDS4250 Literacies Across the Curriculum including development, modification, and updating of course materials, assessments, and course outline.
-Training/Education of six tutors and markers in online teaching practices within the learning management system (Moodle) and synchronous collaborative programs

(Blackboard), and moderation of assignments for up to 300 students.
-Student Management: Coordination of emails, moderation and responses to approximately 300 students.
-Responsible for online assessment management, and course facilitation for Bachelor of Education & DipEd Pre-Service Teacher Education courses: Middle Phase Curriculum & Pedagogy (EDS2401), Planning for Learning and Teaching (EDS2402), English Curriculum & Pedagogy (EDX2170), Literacies in Education (EDX3270), Literacies Across the Curriculum (EDS4250), Technology Curriculum & Pedagogy (EDP4130)
-Master of Education courses: Online Pedagogy in Practice (EDU8114)
-Responsible for providing assignment feedback for Pre-Service & Master of Education related classes for student improvement.
-Uploading, downloading of assignment submissions, e-learning communication within the Learning Management System.
-Coordination and moderation of all assignments with course convenors and other teaching assistants.
-Preparation, development and editing of course materials, lectures, and development of assessments

2014 (May-October) University of Western Ontario, London, Ontario

E-Learning and Curriculum Support (Graduate Teaching assistantship)
-Responsible for the instructional design of an e-learning course for faculty (Teaching Online 101), which included: development of course outline, creation of curriculum outcomes, readings, online activities and assessments
-Assisting faculty members with the creation of curriculum outcomes for their courses, online support, instructional design and online accessibility, for online and blended courses
-Presenting in a variety of seminars at Western University for e-learning teaching support including: Summer Teaching with Technology Institute, Technology in Teaching Faculty of Engineering, Spring Perspectives in Teaching
-Planning of E-Learning for New Faculty Orientation Day

2010 RACV Member Interests, Healesville, Australia

French as a Second Language Adult Instructor

- Provided classroom instruction for beginner/intermediate FSL adult learners who are members of RACV club.
- Creation of themed engaging curriculum & course materials for 5-week courses.
- Use of ICT technology to present, deliver and support weekly classes.
- Provided outside classroom support with enrichment materials, both print and online.

July-December 2010 Anderson's Creek Primary School, Warrandyte, Australia

Grade 3 Classroom Teacher

- Responsible for grade 3 classroom teaching and planning
- Planned & coordinated grade 3 and 4 mathematics (level 3)

- Responsible for final reporting for grade 3 classroom
- Volunteered for school functions including fundraisers, sporting events, musicals & concerts
- Participated in weekly professional development seminars both internal & external

2009-2010 Swinburne University of Technology, Melbourne, Australia

English Language Instructor & Lecturer

- Courses taught within Swinburne College:
    - English for IT, English for Business, Communication Skills and Academic Writing, Reading and Discussion
- Produced and contributed to new and existing curricula, courses and assessment practices
- Academic counseling of pre-university, undergraduate and graduate students in: program and course selection for graduate and undergraduate programs across various disciplines throughout the university, course requirements within the programs progressing through degree requirements, providing guidance and options for students in academic probation, support for academic research requirements and practices for international and domestic students.
- Teaching requirements included integration of derived curriculum-based outcomes from above tasks.
- Contributed to program meetings, which decided student task-based assignment moderation.

ESL Materials Development & Curriculum Writer

- Responsible for writing curriculum and developing materials for technology integration practices in second language learning. Specific examples include software and learning management systems for academic integrity and referencing workshops for students and staff.

Student Teacher Practicum Advisor

- Responsible for practicum supervision of Bachelor of Education and Diploma of Education Students in second language teacher education
- Supervision duties included classroom observations, formal reporting, student feedback and guidance for lesson planning.

May 2008 – October 2009 **Griffith University, Gold Coast, Australia**

English Language Instructor/Tutor/Lecturer

- Responsible for the teaching and administrative duties required for Postgraduate courses in Information Technology: Communication for IT Professionals (7011CAL)
- Responsible for the teaching and administrative duties required for English Language Courses: Research Preparation and Practice, Critical Thinking, English for Academic Purposes (EAP) and General English programs (Elementary-Advanced)
- Conducting professional development seminars for staff in areas of Educational Technology
- Producing and contributing to new and existing curriculum, courses and assessment practices
- Academic counselling of pre-university, undergraduate and graduate students in: program and course selection for graduate and undergraduate programs across various disciplines throughout the university, course requirements within the programs progressing through degree requirements, providing guidance and options for students in academic probation, support for academic research requirements and practices for international and domestic students.
- Teaching English to adult students from a variety of countries around the world
- Experience teaching core ESL texts: Straightforward, Cutting Edge and Cambridge
- Responsible for teaching electives such as Conversation Power (listening and speaking), Written Communication Skills, Media and Digital Multimedia, Film Studies and Australian Studies
- Teaching requirements included curriculum based outcomes derived from course outlines

February 2008 – August 2008 **Imagine Education Australia, Gold Coast, Australia**

ESL Teacher

- Responsible for the teaching and administrative duties required for Adult Academic and General English programs, Young Learners Program, and High School Preparation.
- Assisted with extra-curricular programs including excursions and weekly activities (both academic and non-academic)
- Counseling students when necessary

September 2005 – November 2007 **Edwards Elementary School, Calgary, Canada**

Grade 1, 2, 3 French Immersion Teacher

- Lead Grade 3 staff educator for Alberta Initiative for School Improvement (AISI), focus on new literacies and technology
- Teaching assignments included grade 1, 2, 3 all core subjects, ELA, FLA, and Physical Education.
- Personal goals included professional development in areas of student engagement and self- assessment and the integration of technology

Additional Teaching Positions

2006 – 2007 Sylvan Learning Centre, Calgary, Canada

2004 – 2005 West Island College, Calgary, Canada, Grade 8, 9 French/Social Studies Teacher

2003 – 2004 St. Luke Catholic School, Calgary, Canada, Grade 5 French Immersion Teacher

Technical Working Knowledge

- Advanced working knowledge of Microsoft Office: Word, Excel, PowerPoint, Outlook, Publisher, FrontPage
- SPSS Statistics (predictive analytics software)
- Survey Software (e.g. Survey Monkey, Qualtrics, etc.)
- Internet Browsers: Internet Explorer, Mozilla Firefox, Safari, Opera, Google Chrome
- Computed Mediated Communication (CMC)- Google Groups, Adobe Connect, Blackboard Collaborate, Wimba Classrooms, Skype/FaceTime
- Operating systems: Windows & MAC
- POS Computerized Sales Systems: Squirrel, Jonas, Micros
- Webpage authoring, publishing, management (e.g. WIX, Cascade)
- Hardware: Visualizer, digital cameras, scanners, LCD projector, iPads
- Webquests: Virtual lesson planning and student blogs
- E-Learning: instructional design, online forums, blogs, RSS, podcasts, Wikis, cloud computing
- Inspiration/Kidspiration, Mindmap (electronic concept mapping)
- Digital Multimedia programs (Photo Story, Movie Maker)
- Software evaluation and integration policies and procedures
- Plagiarism detection software: SafeAssign, Turnitin
- Course/Learning Management Software (LMS): Online Web Learning (OWL) Sakai, Moodle, Blackboard (WebCT), EASE, Studydesk, Open Courseware
- Information Communication Technology (ICT) integration policies and procedures
- Reference and research applications (Endnote) and database information retrieval services

Conference Proceedings & Publications

Vanthuyne, A. (2016). *An investigation of multiliteracies pedagogies in language teacher education: A mixed methods study.* Presentation at the Canadian Society for the Study of Education (CSSE-CATE), May 28-June 3, 2016.

Vanthuyne, A., & Byrd Clark, J. (2015). Teaching for change and diversity. In L. Thomas & M. Hirschkorn, (Eds.), *Change and progress in Canadian teacher education: Research on recent innovations in teacher preparation in Canada (pp. 525-550).* E-book published by the Canadian Association for Teacher Education at *https://drive.google.com/file/d/0B3yy1OPnpomCdVFhal9KaU1KRUk/view*

Byrd Clark, J., Mady, C., & **Vanthuyne, A.** (2014). Exploring reflexivity and multilingualism in three French language teacher education programs**.** *Canadian Journal of Applied Linguistics / Revue Canadienne de linguistique appliquée (CJAL), 17*(1), 129-155.

Danyluk, P., Nahachewsky, J., Sanford, K., Stordy, M., **Vanthuyne, A.** (2014). *It's all about the practicum and other myths of teacher education***.** Presentation at the Canadian Society for the Study of Education (CSSE-CATE), May 24-28, 2014. (alphabetical)

Vanthuyne, A. (2014). Off the bookshelf: Teaching literacies in the middle years: Pedagogies and diversity. *Literacy learning: The middle years*, *22*(1), 81-83.

Arnott, S., Garbati, J., Thomas, R., & **Vanthuyne, A.** (2013). *Canadian perspectives on the knowledge base for second language teaching: Focusing on development in practice.* Symposium presentation at the Canadian Society for the Study of Education (CSSE), June 1-5, 2013.

Byrd Clark, J., & **Vanthuyne, A.** (2013, June). *Developing reflexivity: Multilingual student teachers of French, new technologies and pedagogies for the 21st century.* Paper presented at The Canadian Association of Applied Linguistics (ACLA)

Conference, Victoria, British Columbia, Canada, June 3-5, 2013.

Vanthuyne, A. (2013). *Multiple case study: Technology integration in second language teaching*. Paper presented at The Canadian Association of Applied Linguistics (ACLA) Conference, Victoria, British Columbia, Canada, June 3-5, 2013.

Vanthuyne, A. (2013). *Reshaping the traditional view of French language pedagogy in the digital Age: An investigation of student teachers' perceptions of multilingual and multicultural teaching.* Round table presentation at the Robert Macmillan Research in Education Symposium, London, Ontario, Canada, April 18, 2013.

Vanthuyne, A., & Byrd Clark, J. (2013). *Integration of ICTs in French language pedagogy*. Poster presentation at Western University Research Day, London, Ontario, Canada, March 25, 2013.

Byrd Clark, J., Mady, C., **Vanthuyne, A.** (2012, May). *The voices of multilingual teacher candidates of French as a second language: an investigation of multilingual teacher candidates' beliefs in relation to the development of multilingual repertoires for themselves and in their FSL classes*. Paper presented at The Canadian Association of Applied Linguistics (ACLA) Conference, Waterloo, Ontario, Canada, May 28-30, 2012.

Byrd Clark, J., Mady, C., **Vanthuyne, A**. (2012, July). *An investigation of multilingual teacher candidates' beliefs in relation to multilingualism and to teaching FSL/FFL*, Paper presented at The Association for Language Awareness (ALA) Conference, Montreal, Québec, Canada, July 6-8, 2012.

Vanthuyne, A., Byrd Clark, J. (2013). *Integration of ICTs in French Language Pedagogy*. Poster presented at Research Day, Western University, London, March 25, 2013.

Vanthuyne, A. (2010, September). *Case study: Technology in ESL teaching & learning.* Paper presented at the English Australia Conference, Surfers Paradise, Australia, September 16-18, 2010.

Vanthuyne, A., Byrd Clark, J. (2012). *An International Computer Mediated Communication Research Project Analysis of Multilingual Pre-Service Teacher Educators,* INTED12 Proceedings, pp. 4902-4910.

Vanthuyne, A. (2010). *Technology Integration in ESL Teaching and Learning*, EDULEARN10 Proceedings, pp. 184-193.