LINGUISTICALLY AND CULTURALLY RESPONSIVE TEACHING:

EMPOWERING INTERNATIONAL ENGLISH-SPEAKING TEACHERS AT

INTERNATIONAL SCHOOLS

by
Weijia Lu

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Abstract

The research study presented in this dissertation examines the problem of what contributes to the discrepancy between schools' aspirations for their students and their students' performance and how schools can support English language learners (ELLs). Chapter one of this dissertation examined factors contributing to ELLs' development using Bronfenbrenner's (1979, 1994) ecological systems theory. Chapter two examines three factors that surfaced from the literature review in chapter one: culturally responsive teaching, inquiry science instruction, and instruction to support English language development. The needs assessment in chapter two revealed that international English-speaking teachers prioritized different strategies for teaching inquiry science to elementary ELLs despite their self-reported perceptions that they adhered to research-suggested practices. The assessment also foregrounded multiple areas to rectify the teachers' priorities, including using culturally responsive teaching strategies to support ELLs' social and emotional development. After delving into empirical studies about interventions that developed teachers' culturally responsive teaching strategies and their intercultural teaching competence, the researcher followed Bandura's (1978, 1986) social cognitive theory and Hargreaves and Fullan's (2012) professional capital theory to guide a design of professional learning program. Furthermore, the researcher evaluated the process and outcome of the professional learning program with a quasi-experimental pretest-posttest exploratory mixed methods design. The 13-hour intervention significantly increased teachers' self-efficacy about culturally responsive teaching. The study's findings shed light on schools' support for enhancing their teachers' linguistic and cultural responsiveness in interacting with English language learners.

Keywords: English language learners, international education, culturally responsive teaching, intercultural teaching competence

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Dr. Laura Quaynor	*Laura Quaynor*	8/22/2022
Adviser	Signature	Date
Dr. Karen Karp	*Karen Karp*	8/20/2022
Committee Member	Signature	Date
Dr. Eric Jabal		8/21/2022
Committee Member	Signature	Date
Committee Member	Signature	Date

Dedication

This dissertation is dedicated to young people who experience differences in their everyday interactions with the world. May our education give them the strength to believe their differences are their superpowers and open their minds, hearts, and souls to make this world better for all.

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Executive Summary

Language and culture are integral to any student's learning, especially for English language learners (ELLs). Language acquisition and acculturation are not only the ends educators aspire for ELLs to reach but also how they learn and live their schooling experience. Consequently, the linguistic and cultural mismatch between students and the majority of their teachers became a universal reason for schools' less-than-satisfactory level of meeting the needs of ELL students (Atwater, Freeman, Butler, & Draper-Morris, 2010; Callaway, 2017; Oyerinde, 2008; Settlage, Madsen, & Rustad, 2005). The dissertation study depicted in this executive summary explored the factors contributing to the discrepancy between the aspired and the achieved development of ELLs in their English language development and subject areas. It focused on an international context, a group of international schools in Asia. I devised an intervention through a professional learning program to enhance international English-speaking teachers' efficacy beliefs about using culturally responsive teaching (CRT) strategies.

Problem of Practice

Across local and international contexts, science achievement gaps converge with students' ethnic, cultural, linguistic, and social and economic diversity (Lee & Luykx, 2006). The mismatch between students' home language and school language seems to contribute to ELLs' lower scores on science, reading, and mathematics assessments (Abedi, 2004; Lee, 2005; National Center for Education Statistics, 2020; Schleicher, 2019). Therefore, the problem of practice (POP) focuses on why schools' aspirations for their students exceed student performance across three international bilingual schools. Furthermore, it focuses on how the schools' environment can support Chinese students in their learning of science through linguistically and CRT and the Western pedagogy of inquiry science.

Factors Affecting English Language Learners' Development

This study followed Bronfenbrenner's (1979, 1994) ecological systems theory (EST) to examine factors that affect ELLs, as EST considers any individual's development a result of their direct and indirect interactions with the world around them. Accordingly, this study reviewed the literature about factors in each of the above systems. The most direct impacts in the microsystem derive from teacher-student interactions, for example, inquiry instruction, teachers' knowledge and beliefs about blending inquiry science instruction and English language development, assessing ELLs' progress contexts, the cultural mismatch between teachers and students, teachers' awareness of the impacts of culture, teachers' experience with technology, and teacher efficacy. The factors in the mesosystem include the interactions between parents and their child's schooling experience, such as parental involvement among ELL families and parents' expectations for high-quality international teachers. The exosystem includes school culture and school climate. The macrosystem covers the market forces and competition between international schools, two systems inclusive of elements of the least direct impacts on ELLs' development and outcomes. Furthermore, the literature review explored the role of time on ELLs' development through the critical period hypothesis.

The literature review supported a conceptual framework as the following factors emerged as crucial contributors to ELLs' science and English outcomes. CRT strategies can benefit inquiry-based science instruction and the instruction to support English language development. These two elements impact ELLs' engagement and social and emotional development. ELLs' science and English outcomes ultimately benefit from their engagement and social and emotional development.

Context and Findings of the Needs Assessment

The needs assessment occurred in three international bilingual schools located in three cities in China. The schools served 620 elementary students in the first, second, third, fourth, and fifth grades, who experience a 50%-to-50% split between their Chinese-medium and English-medium subjects before the tenth grade when a full-English medium program started. All students were Chinese nationals and native Chinese speakers. A purposive sampling of 14 international English-speaking teachers led to eight participants who participated in a 27-question survey and an interview, following a concurrent triangulation design of mixed-methods.

The needs assessment study measured the participants' self-reported and conceived inquiry science teaching with ELLs, with the survey focusing on their reported practices and the interview on their conceived practices. The interview revealed that the participants held a social constructivist approach to teaching and learning and described an overemphasis on vocabulary development and the impacts of scientific inquiry on students' English language development. Furthermore, the international English-speaking teachers' conceptions featured the research-supported strategies to different degrees. They emphasized their strategies more than ELLs' engagement and social and emotional development, as indicated by the evidence of an underwhelming reference to students' engagement and social-emotional development. Lastly, the international English-speaking teachers revealed that they associated the ELLs' social and emotional development with linguistic and cultural challenges as they referred to the linguistic and cultural difference between teachers and students as a barrier to engaging students at school.

The survey results disclosed that the international English-speaking teachers reported positive practices such as promoting students' scientific understanding, promoting scientific inquiry, supporting English language development, and using culturally responsive teaching

techniques. However, the quantitative and qualitative data together suggested a lack of association between the teachers' self-reported practices of research-suggested strategies and their conceived effective inquiry science practices with ELLs, indicating that that international English-speaking teachers prioritized different strategies to teaching inquiry science with elementary ELLs despite their self-reported perceptions of their adherence to research-suggested practices.

Theoretical Framework

Addressing the above gaps that emerged from the needs assessment, this study reviewed the intervention literature through Bandura's (1978, 1986) social cognitive theory and Hargreaves and Fullan's (2012) professional capital theory. The two theory sets focus on changing teachers' teaching strategies when interacting with ELLs. On the one hand, Bandura's (1978, 1986) social cognitive theory posits triadic reciprocal determinism to explain the bidirectional relations between person, behavior, and environment. On the other hand, Hargreaves and Fullan's (2012) professional capital theory considers teachers' decisional capital as a result of the combined impacts of human and social capital. Consequently, the two theories view teachers' behavior and instructional decisions as intervenable through their beliefs, which are subject to the impacts of the teachers' environment.

Interventions in the Literature

The literature review explored interventions that enhanced teachers' human capital, including professional development for intercultural competence and professional development for CRT, and those improving teachers' social capital through professional learning. It surfaced the following features crucial to an effective intervention: inclusion of participants' affection and attitudes, reflection, a broad scope of CRT strategies, collaborative learning, and web

technologies. Furthermore, I designed a professional learning program that adhered to Kolb's (1984) experiential learning framework and Tschannen-Moran and McMaster's (2009) advocated mastery experiences followed by coaching, with the focus on intercultural teaching competence and CRT.

Intervention Study

The intervention included four 1.5-hour reflective professional development sessions on Zoom, each following a small-group coaching discussion, each lasting one to one and half hours. Besides the 13 interactive hours, teachers also used Microsoft Teams to share materials and connect. The evaluation of this intervention followed an explanatory sequential design, a mixed-methods design that adheres to a pragmatic paradigm, with the quantitative data collected and analyzed before the qualitative data. The process evaluation focused on the fidelity of implementation, reach, and participant responsiveness, and the outcome evaluation focused on how the intervention impacted teachers' efficacy beliefs about CRT strategies. The outcome evaluation integrated a pre-intervention and post-intervention quasi-experimental design and qualitative data collection and analysis. Nine participants from six schools that served approximately 6501 students participated in the intervention program. I measured their efficacy beliefs about CRT before and after the intervention with a survey followed by focus group interviews in which the participants described their planning and teaching practices with ELLs after participating in the intervention.

Findings

Firstly, the quantitative data revealed a significant increase in five participants' self-efficacy after the intervention. The qualitative data confirmed that the participants were particularly confident about identifying students' home-school cultural differences and taking a

sociocultural constructivist approach to building a community of learners through intercultural communication. Secondly, quantitative data failed to show a significant increase in the participants' outcome expectancy, indicating that the intervention could not change the participants' certainty level about how CRT strategies can be effective in classrooms generally. The qualitative data explained this lack of impact as the participants' increasingly nuanced understandings of the survey statements and the contextualization of each statement in varied educational setups. Thirdly, the qualitative data revealed that the intervention enhanced the participants' confidence about identifying students' home-school cultural differences, helped the participants develop a sociocultural constructivist approach to building a community of learners via communication, and improved their responsiveness to individual traits beyond culture. Furthermore, the PL program was unable to boost the participants' confidence about using varied strategies for unbiased assessment because the participants felt different school-level decisions can limit their autonomy to do so.

Chapter 1

Introduction

In the context of globalization and immigration, English language learners (ELLs) have become a fast-growing population in many schools around the globe (British Council, 2006). According to John Knagg, the Head Research and Consultancy at the British Council, the estimation is that there are 1.2 billion English learners worldwide (Sheehan, 2013). The China market is booming, with an estimation of around 400 million ELLs across the country (Li, 2020, April 27). In the United States, from fall 2000 to fall 2017, the percentage of ELLs in public schools increased from 8.1% (3.8 million students) to 10.1% (five million students) (National Center for Education Statistics, 2020; Sanchez, 2017, February 23). Furthermore, according to the Bell Foundation (2020), ELLs' percentage is more than 21% in primary schools and nearly 17% in secondary schools in the United Kingdom.

In addition to the growing ELL population in English-speaking countries, many families send their children to international English-medium schools in many non-English speaking countries like China, where students participate in part, if not all, of their school life through classes in English. While expatriate children remain a majority of the student population in these international schools, more and more students in their home country choose an international education over local public or private schools that are linguistically and culturally homogeneous. According to International School Consultancy (ISC), the number of international schools increased by 343% globally, and the number of students enrolled in international schools increased by 501% in the last 20 years (ISC, 2020). China alone enrolled 389,100 students in 2020, following the United Arab Emirates, which topped all other countries with 678,100 student enrollments.

Despite the fast-growing ELL population, many schools are underserving ELLs across these diverse settings (Kim & García, 2014). Factors contributing to this less-than-satisfactory level of meeting ELLs' needs vary between contexts, including teachers' training background (Hutchinson, 2013), the proportion of the ELL population (Roekel, 2008), the school's social language (Cummins, 1999), and resources allocated to meet ELLs' needs (Karabenick &Noda, 2010). However, some elements are universal across contexts, including the need for accurate assessment of ELLs (Abedi, 2004; Abedi, Hofstetter, & Lord, 2004; Ebe, 2010; Szecsi, Lashley, Nelson, & Sherman, 2017), the mismatched linguistic and cultural backgrounds of majority teachers and students (Atwater, Freeman, Butler, & Draper-Morris, 2010; Callaway, 2017; Oyerinde,2008; Settlage, Madsen, & Rustad, 2005), and ELLs' amount and type of experience learning English (Cenoz, 2003; Johnstone, 2002; Lenneberg, 1967; MacSwan & Pray, 2005; Scovel, 2000).

Researchers use different terminologies for English learners in K-12 settings. The term English Language Learner (ELL), referring to a student who needs support for English language and literacy development in their academic learning in subject areas (TESOL; Teachers of English to Speakers of Other Languages, 2006), is the most frequently used definition in the literature among a group of similar terms (Webster & Lu, 2012). The nuanced terms such as English as a Second Language (ESL) and English as an Additional Language (EAL) vary in their slightly different framing of the focus and usage context. ELL focuses on students who learn English as a new language for academic purposes, "represents a neutral position with a focus on the student and learning context" (Webster & Lu, 2012, p. 89). By comparison, ESL emphasizes students' language proficiency, and EAL, primarily used in the United Kingdom and Europe, aims to promote respect, inclusivity, and sensitivity around language- and culture-related issues

(Webster & Lu, 2012). Furthermore, without negating the emphasis on developing English for academic purposes, researchers like Martínez (2018) challenged the monolingual framing of these terms and potentially deficit connotation of the above terms and proposed using the term bi/multilingual students to embrace bi/multilingual development. As the most frequently used term, I will be using ELL throughout the rest of this paper for consistency.

Statement of Problem

There is a convergence between science achievement gaps and diverse students' ethnic, cultural, linguistic, and social and economic backgrounds (Lee & Luykx, 2006). For example, ELLs seem to have lower scores on science assessments than non-ELLs across international and local contexts (Abedi, 2004; Schleicher, 2019). Internationally, the 2018 Program for International Student Assessment (PISA) reflected this achievement trend across 600,000 students from 79 countries. The results in science, reading, and mathematics revealed that "a large population of children who cannot speak or understand the language of instruction" significantly contributed to the underperformance of schools and lowered the schools' performance when benchmarked against those schools with native-born students (Schleicher, 2019, p. 31). In the U.S. National Assessment of Educational Progress (NAEP) report on the 2015 science test data of 115,400 students in grade 4 across the nation, the ELLs' average score was lower by 37 points on a 0-300 scale than the non-ELLs' score (National Center for Education Statistics, 2020). Confirming these international and U.S. trends, in a synthesis of research on the science achievement gaps between ELL and non-ELL students, Lee (2005) concluded that science learning is more demanding for students from nonmainstream linguistic and cultural backgrounds than their mainstream peers. Similar challenges exist in international schools as leaders and teachers tend to bring entrenched beliefs and practices from their national

systems into any international employment, including their nationally politicized attitudes towards linguistic and cultural diversity and their practices and qualifications working with English language learners (Carder, 2014). Therefore, the problem of practice (POP) focuses on why schools' aspirations for their students exceed student performance across three international bilingual schools and how the schools' environment can support Chinese students in their learning of science through linguistically and culturally responsive teaching and the Western pedagogy of inquiry-based science.

Theoretical Framework

This study uses Bronfenbrenner's (1979, 1994) ecological systems theory (EST) as its theoretical framework. The EST considers the reciprocal influences between any individual or group of individuals and events and conditions in their environment. This reciprocal interaction between an individual and an environment, persons, objects, and symbols is a proximal process (Bronfenbrenner & Morris, 2006). Therefore, the development of students is "the phenomenon of continuity and change in the biopsychological characteristics of human beings" that is contingent on a series of nested systems (Bronfenbrenner & Morris, 2006, p. 793). The EST considers how the context that interacts with an individual in a structure of five systems: 1) microsystem, referring to the immediate environment of the developing person; 2) mesosystem, referring to the connections and processes between two microsystems that involves the developing person; 3) exosystem, referring to the connections and processes between two systems, one/neither of which involves the developing person; 4) macrosystem, referring to the cultural or political ideologies and economic forces; and 5) chronosystem, referring to the dis/continuity of the developing person and the environment.

This dissertation considers ELL students through the lens of the EST using the micro-, meso-, exo-, macro-, and chronosystems indicated by Figure 1. All levels of systems consist of factors that focus on a student's learning. The following review of the literature will detail the ways these factors impact a focal student.

Theoretical framework: Ecological systems theory (EST; Bronfenbrenner, 1994)

- Market forces
- Competition

- School culture and school climate

- Inquiry-based instruction
- The impacts of inquiry instruction on ELL students' science outcomes
- The impacts of inquiry instruction on ELL students' ELD
- Teachers' knowledge of and beliefs about blending inquiry science instruction and ELD
- Assessing ELL students
- Mismatched cultural backgrounds between teachers and students
- Teachers' awareness of the impacts of culture
- Teachers' experience with technology
- Teacher efficacy

Macrosystem
Exosystem
Mesosytem
Microsystem

ELL students' science and English learning outcomes

- Parental involvement among ELL families
- Parents' expectations for high-quality international teachers

Chronosystem

- Critical Period Hypothesis

Figure 1. Nested model of ecological systems. The nested levels reflect the systems focused on an ELL student. The chronosystem includes factors that change over time. Adapted from "The Ecology of Human Development: Experiments by Nature and Design," by U. Bronfenbrenner, 1979.

Review of the Literature

This section reviews scholarly literature relating to factors that contribute to ELLs' learning outcomes. The review uses the EST (Bronfenbrenner, 1979; 1994; Bronfenbrenner & Morris, 2006) as the framework of the layers of contributing factors. This review begins with factors from the chronosystem, followed by the macrosystem, the exosystem, the mesosystem, and the microsystem.

Chronosystem

Although the chronosystem can relate to historical, societal, and individual trends, this work focuses on considering factors related to the individual chronosystem of a child's development. Researchers discussed ELL students' English language proficiency as correlated with their age and years of learning. Studies testing the Critical Period Hypothesis (CPH; Lenneberg, 1967) have generated contradictory evidence for the association between early-/late-starting L2 learners and L2 learning (Johnstone, 2002). Those holding the view that the CPH ends at the age of six believe that students have acquired the essential mechanisms of their native language before they start schooling. When students begin learning an additional language at this time, they have partial knowledge of the structure of the target language and exhibit substantial errors (Scovel, 2000). Others indicate that CPH ends later, like Cenoz (2003), whose work indicated that L2 learners who began at 11 through formal schooling were better at both grammar and oral proficiency after six years and 564 hours of instruction in English than their peers who started at four or eight after six years and 564 hours of instruction in English.

Age is never the only factor at play in L2 acquisition as the process is complex and sensitive to contextual factors such as educational setup. In their study of 89 Spanish-speaking ELLs in the third to the twelfth grade enrolled across six schools in a well-established bilingual education program in Central Arizona, MacSwan and Pray (2005) tested the CPH in a context similar to that of the present study. They concluded that students in bilingual education acquire English "as fast as or faster than children in all-English programs" (p. 669) and that the starting age of language acquisition is irrelevant to the learning speed. Therefore, the English language outcomes of ELLs in the context of the assessment need to view CPH within contextual elements such as language provision and educational setup.

Macrosystem

The macrosystem, the outside circle furthest away from the focal center of a developing student, contains cultural or political ideologies and economic forces that affect the ecosystem of schools and eventually students' outcomes in science and English language learning. International schools are economically different from their mainstream counterparts in many ways. Their nature as business ventures creates a unique ecological macrosystem for the expatriate teachers; for example, the schools are adaptive to market forces, strive for unique niches of the market, and respond to parents' influences over recruitments (Canterford, 2009).

Market forces. Multiple forces drive the international schools market. On the market, an increasing number of families reach the threshold to afford a prestigious private international education for their child; however, the number of private international schools is still catching up with the market demands. When facing the option of sending their child to an international school, parents must consider the one-way switch as the curricula and assessments between the local and international systems differ enormously. As Machin (2017) posited, driven by globalization and neoliberalism, factors such as "low buyer power, low supplier power, high parental switching costs, limited advantages of scale" reduce the pressures and lowers the entry threshold, which brought the initial expansion of international schools around the world, especially in Great Asia (p. 142). The number of international schools, therefore, determines that the demand exceeds supply. Naturally, the emergence of more international schools is a result of market forces. Thus, the management of international schools differs from that of local schools in their attention to the market. Compared to mainstream schools, international schools "must orient themselves to the market" by paying attention to the "changing demographic and economic forces" (Yamato & Bray, 2006, p. 60), as the fees for a student to enter an international

school, for example, was 50 times those to enter a local school, which reflects the gaps of tuition fees between schools in this current study and those in the local context. Therefore, the nature of international schools as business ventures predisposes them to be responsive to market forces.

Competition. International schools' goal to attract customers determines the way international schools supply the commodity of education. Despite the "gold rush conditions" in the market, international schools strive for niches to stand out rather than to survive (Machin, 2017, p. 131). They compete against each other "for legitimacy, for the primacy of educational might and the benefits of prestige" as a result of parents' expectations (Machin, 2017, p. 143). Therefore, the nature of the competition is to develop unique qualities to attract customers by developing unique features such as curriculum, price, language programs, location, and quality (Machin, 2017; Yamato & Bray, 2006). Although this competition for uniqueness is on an institutional level, schools will undoubtedly transfer the pressure to stand out to their expectations for all their teachers.

Exosystem

The exosystem comprises links and processes between two systems, at least one of which does not directly involve the ELLs. The school culture and school climate are factors located in the exosystem in this problem of practice as they describe the immediate environment for the international English-speaking teachers, who belong to the microsystem and directly affect students' learning of science and the English language. Therefore, the school culture and school climate contribute to teachers' professional performance and, ultimately, students' academic performance.

School culture and school climate. Researchers agree on the importance of school culture and school climate in affecting students' academic achievement in reading, writing, and

mathematics (MacNeil, Prater, & Busch, 2009) and mathematics, language arts, science, or English as a foreign language (Berkowitz, Moore, Astor, & Benbenishty, 2017). A strong positive school climate and school culture can weaken the negative effects of low SES on student achievement (Berkowitz et al., 2017). However, researchers disagree about the sources of school culture and school climate. Leadership researchers emphasize that leadership is essential in establishing a school culture and school climate conducive to enhancing teacher efficacy, e.g., enabling school structure (Drago-Severson, 2012; Dumay & Galand, 2012; Goddard & Skrla, 2006; Mitchell et al., 2016; Price, 2012). Drago-Severson (2012), for example, in a study of 25 principals across Catholic, independent, and public schools in the United States, found that most of the principals, regardless of their leadership style, prioritize shaping school climates to promote adult learning using strategies such as building enabling structures and allocating time for adult collaboration.

Researchers disagree as to whether formal or informal professional learning is more important to teachers' growth. For example, in comparison to Drago-Severson's (2012) emphasis on school leaders' role in building school culture and school climate for formal adult learning, Jungert et al. (2019) and Jurasaite-Harbison and Rex (2010) investigated the forces behind the school cultures as environments for teachers' informal professional learning in one elementary school in the United States and two schools in Lithuania, including school mission, traditions, architectural features, organizational arrangement, and professional relationships. Through observations and interviews, their two-year ethnographic study indicated that competence support from co-workers and school culture conducive to informal professional learning is more important than school management in enhancing teachers' self-efficacy. One possible reason for this disagreement in whether leadership or colleagues are the more crucial driving force behind a

school culture instrumental in teachers' professional learning is the teachers' perception of professional learning initiatives: when teachers conceive a professional learning directive from the management as a top-down effort, they may defend and resist the learning (Jurasaite-Harbison & Rex, 2010). Therefore, school cultures and climates that benefit formal teachers learning may rely on leaders' effort to allocate resources, while school cultures and climates that generate teachers' informal learning stems from their social relationships with their colleagues.

Mesosystem

The mesosystem involves connections and processes between two microsystems, both of which are inclusive of the developing person. In this needs assessment, the mesosystem refers to the links between schools and families. Below are two major factors in the mesosystem that influence ELL science outcomes: parental involvement and parental expectations.

Parental involvement among ELL families. Apart from the obvious linguistic barriers, Good, Masewicz, and Vogel (2010), Niehaus and Adelson (2014), and Panferov (2010) indicate that cultural differences are another barrier for ELL parents' involvement with the school, especially regarding communication with English-speaking teachers. In Panferov's (2010) case studies of two families to the United States. from Russia and Somalia, the researcher identified parents' formal learning experiences and their understanding of literacy activities at home as factors impacting the partnerships between educators and parents. The study found out that the more culturally relevant these literacy activities were to parents, the more capable parents were to "advocate for their children's schooling and literacy development" (p. 111).

In addition to the possible challenges to support their children's academic development due to the misaligned cultures between ELLs' parents and schools, ELL families also face barriers to support their children's social-emotional development because of constraints to

playing an active role in their children's school life. Niehaus and Adelson (2014) conducted a mixed-method investigation of 1,020 third-grade ELLs and concluded that parental involvement reduced social-emotional issues, operationalized as students' self-reported externalizing behaviors, which ultimately led to improved academic results.

Despite the linguistic and cultural barriers to parental involvement that may impede students' development of social-emotional skills (Niehaus & Adelson, 2014), parents of ELL students have "consistently high aspirations for their children's education throughout elementary school and believe that education is highly important" (p. 815). In Butler's (2015) study of 198 fourth-, 191 sixth- and 183 eighth-grade students and their parents in an eastern city in Mainland China, the researcher measured the students' motivations (intrinsic, extrinsic, and parent-oriented motivations) to learn English, their self-perceived competence, the parents' SES backgrounds, behaviors and beliefs related to their children's English language education, and the student perception of their parents' influence over their motivation and English language learning. The study recognized the critical role of Chinese parents in their children's motivation in learning English. In its summary of the parents' "controlling behaviors," such as using pragmatic goals to motivate their children and comparing their children's performance with others, the study revealed the universality of such behaviors across SES backgrounds (p. 187). Butler (2015) also concluded that these behaviors impeded students' self-regulation and ELD if they perceived themselves as incompetent.

Parents' expectations for high-quality international teachers. High parental expectations in international schools, together with strong demand for high-quality resources, can promote the creation of a well-resourced environment conducive to desired learning outcomes. In international schools, parents expect much more than their counterparts whose

children go to a local public/private school and, therefore, demand "huge investments for the schools" (Yamato & Bray, 2006, p. 73). In addition to the extraordinary fees, which are sometimes 50 times higher than parents pay to attend a local school, parents and students also invest emotionally in the decision to attend an international school, which almost certainly implies no return to state education because of the differences between the curricula across the two pathways. Parents and students may also expect that entry into an international school's social and economic status is part of an elitist lifestyle (Yamato and Bray, 2006). In return, they may cast customer discrimination in their choice and preference. For example, they might prefer expatriate teachers, especially those from the United States and the United Kingdom, meeting the families' aspirations for their child to attend a university in Europe or North America when graduating (Canterford, 2009). Therefore, parents as customers in the industry of international schools drive the market needs and impact international schools' recruitment.

Microsystem

Whereas the chronosystem relates to a child's development, the microsystem includes a series of factors in school that directly impact a student's development (Bronfenbrenner, 1994). This review focuses on factors relating to pedagogy, assessment, and teachers. Additionally, the review explores the effects of these factors on ELLs' language development and science learning in English-medium inquiry science classrooms.

Inquiry-based instruction. Many international schools mandate that international English-speaking teachers teach elementary science through an inquiry-based approach. Inquiry-based instruction is an umbrella term that includes a variety of strategies and skills. Menmuir and Adams (1997) define inquiry as both the "strategies and skills used to learn" (p. 34) and discipline-specific skills. Therefore, inquiry-based science instruction includes strategies that

support learning through inquiry and the development of scientific inquiry skills and understanding. As Jiang and McComas (2015) summarize, inquiry science instruction plays two roles: a pedagogy to engage students and a scientific method that students learn. The following sections synthesize how these two roles interact in the classroom and provide evidence regarding the outcomes of inquiry-based science instruction.

Inquiry-based science instruction embraces a variety of pedagogical practices. Supovitz, Mayer, and Kahle (2000), for example, use the term to refer to a pedagogy that allows for students' exploration into real-life issues with purpose, that develops their independence, and makes visible their cognitive processes. Inquiry-based science teaching practice reflects the principles of the sociocultural and constructivist perspective of learning, i.e., learning is a social and cultural process in which learners co-construct what and how they learn with each other (Vygotsky, 1978; Gee, 2008). The sociocultural perspective considers learning to require the following key features: the high motivation of learners and personalized experience. Research indicates that these two features positively contribute to student outcomes in an inquiry-based science program (Duran, Ballone-Duran, Haney, & Beltyukova, 2009; Jiang & McComas, 2015; Tuan, Chin, Tsai, & Cheng, 2005). Several features of inquiry science add to student understandings.

First, inquiry-based science instruction creates opportunities for cooperation, modeling, and access to learning for individual learners, which leads to students' strong willingness to learn and positive beliefs that they can learn science and achieve optimal outcomes. In their study of 254 eighth grade students from seven public junior high schools in the United States, Tuan et al. (2005) measured the connection between inquiry-based teaching and students' learning motivation outcomes through four variables: self-efficacy (students' beliefs with their ability to

perform well), active learning strategies (students' active use of strategies to construct new knowledge), science learning value (students' perception that learning science is valuable), performance goal(students' goal to perform better than others), and achievement goal (students' satisfaction when they increase their ability), through students' motivation towards science learning questionnaire (SMTSL). The results of this study indicated a significant increase (p < .001) in students' motivation as a result of inquiry instruction, which facilitated cooperation, the application of multiple ways of thinking, teachers' participation and modeling in inquiry, and the combination of "lecture, group discussion, demonstration, and open laboratory activity" (Tuan et al., 2005, p. 561). They concluded that the sociocultural aspects of inquiry-based science learning allowed increased engagement and motivation.

In addition to creating opportunities for cooperation and social support, inquiry-based science instruction engages the perspective of individual learners and ensures that learning is personalized and relevant. Inquiry-based science instruction allows for student voice in the learning process, which gives students ownership of their learning and enhances their motivation. Jiang and McComas' (2015) examination of students' science outcomes in the Program for International Student Assessment (PISA) 2006 data gathered from 57 countries or regions found that the level of inquiry teaching is positively correlated with students' attitudinal outcomes of students' interest in science and support for scientific inquiry. Students who experienced a Level Zero inquiry science classroom had a mean of 455.85, *SD* = 103.87 for weighted interest in science, whereas students who experienced a Level Four inquiry science classroom had a mean of 492.09, *SD* = 98.25 for weighted interest in science. The mean weighted support for the scientific inquiry was 479.11, *SD* = 99.32 for Level Zero and 510.39, *SD* = 102.36 for Level Four (*p* < .01). One of the key factors contributing to the differences was opportunities for students to

choose their investigation topics. Through inquiry instruction, teachers help students build learning on their prior knowledge and experience, which adheres to the constructivist view that learning stems from the "perceptual and conceptual experience" in individual learners (von Glasersfeld, 2005, p. 6).

The above study on the 2006 PISA science data coincides with Duran et al.'s (2009) study of early childhood teachers' self-efficacy and beliefs about inquiry-based science teaching as Duran et al. (2009) confirmed the significance of student choice. They discovered that all of the participants in their study agreed on the importance for the teachers to learn about students' prior knowledge of the subject matter and believed that "inquiry-based teaching promotes individualized learning, helps students explore topics in-depth, requires journal writing by students, and suits all learning styles" (p. 60). Similar to Duran et al.'s (2009) emphasis on student prior knowledge, Song, Higgins, and Harding-DeKam's (2014) qualitative study observed third-to-fifth graders in elementary schools with high percentages of ELLs. Their examination of an inquiry-science learning experience for ELLs indicated that inquiry science instruction enhanced motivation due to supporting students to bring in their prior experience. Thus, inquiry-based science instruction is useful for ELLs' mathematics, reading, writing, and communicating skills as it involves students' voices and choices.

Inquiry-based science instruction also involves the teaching and learning of the scientific method (Bunch, 2013). According to Hollingsworth and Vandermaas-Peeler (2017), inquiry-based instructional methods involve the steps of inquiry, including observing and questioning, making predictions, and evaluating evidence. The National Research Council (NRC, 2000) identified similar "essential features of classroom inquiry" for teaching science that also include

formulating explanations, evaluating these explanations, and communicating and justifying these explanations (p. 25).

Although not all elements of inquiry science contribute to student outcomes equally, the overall trend in the literature focuses on the positive impacts of inquiry science instruction across student populations, as studies inclusive of diverse student demographics concluded. For instance, Jiang and McComas's (2015) analysis of PISA data revealed that regardless of student backgrounds, the optimal level of inquiry teaching for student outcomes overall involves some aspects of inquiry science instruction, i.e., conducting activities and drawing conclusions from data only, but not others such as designing the investigation or raising their questions. The outcomes of inquiry-based science learning are predominantly positive throughout the available scholarship. In Lee, Linn, Varma, and Liu's (2010) study of students' knowledge integration in three middle schools and seven high schools, the researchers recognized that students learning inquiry science through their home language have a higher chance for success than those learning inquiry science through the non-home language. Furthermore, their study revealed that students across grade levels and with different home language backgrounds, frequencies of technology use, beliefs about the proximity of science, and beliefs about the role of complex ideas in science learning formed beliefs about science being part of their lives and as complex ideas through inquiry as an approach. Similarly, Schwartz, Lederman, Khishfe, Lederman, Matthews, and Liu (2002) found through videotaped lessons, lesson plans, and classroom observations that students developed an understanding of science as "inferential, subjective, and tentative" (p. 12) and, thus, developed an acceptance of subjectivity in their interpretation of data, which deepened students' understanding of the nature of science.

As indicated by the studies summarized above, inquiry-based science instruction promotes active engagement, relatable learning experiences, learning of scientific method, and deepened understanding of science. Therefore, inquiry-based science instruction as pedagogy requires learning to be a social and cultural practice and situate individual learners at the center of meaning construction. Additionally, inquiry-based science instruction involves the development of methods used by scientists and scientific understanding.

The impacts of inquiry instruction on ELL students' science outcomes. Research on the implementation of inquiry science instruction has led to disputed results about the achievement gaps between students of different linguistic backgrounds. In particular, inquiry-based science instruction seems to have either a nonexistent or a negative correlation with the achievement gaps between ELLs and non-ELLs. That is, the achievement gaps between ELLs and non-ELLs either remain as wide despite the intervention of inquiry-based science instruction or decrease as inquiry-based science instruction adds more value to ELLs than to non-ELLs.

For example, Lee et al. (2010) explored how students' understanding of the same science topics changed when 27 teachers switched from typical teaching methods in the first year to an inquiry approach in the second year. The study compared the outcomes between two student cohorts — a Typical Cohort ($n = 2,060$) as a control group in the first year and an Inquiry Cohort ($n = 2,685$) in the following year in three middle schools and seven high schools in three states in the United States. Eleven out of the 27 teachers developed 10 inquiry units between the two cohorts. Lee et al. (2010) recognized the mis/alignment between students' home language and the language of instruction as an important variable that may contribute to student inquiry experience as the research they studied proves that there is a higher likelihood of success in inquiry learning through English if a student's home language is also English. However, in their

measurement of the students' knowledge integration estimates using the Rasch Partial Credit Model analysis and the *mean/sigma* method, they found little impact of student inquiry experience on the change in student knowledge integration (high impact student inquiry index M = 2.88, SD = 1.64; low impact student inquiry index M = 3.11, SD = 1.41; t(25) = 0.37, p = 0.72). Lee et al.'s (2010) study concluded that the success of inquiry science varies depending on the context. Therefore, it is worthwhile to discuss the impact of the methodology on the achievement gaps between ELLs and non-ELLs in specific studies and then see if any patterns emerge.

Some researchers discovered that inquiry-based instruction led to no fundamental change to the science achievement gaps between ELLs and non-ELLs. Estrella, Au, Jaeggi, and Collins (2018) conducted a meta-analysis of 26 quantitative studies that evaluated the impact of inquiry instruction on science achievement for ELLs aged from kindergarten to sixth grade. This meta-analysis concluded that inquiry science instruction allows more benefits for non-ELLs than for ELLs due to the different levels of students' background schemata.

By contrast, other researchers found that inquiry science instruction helps close achievement gaps between ELLs and non-ELLs. Cuevas, Lee, Hart, and Deaktor (2005) conducted a quantitative study of an inquiry science instruction intervention with 25 students from a large, urban school district in the southeastern United States to explore the impact of inquiry-based science instruction on the gaps in students' ability among demographic subgroups, including students' English proficiency. Based on students' scores from rubrics evaluating the conceptual accuracy and completeness of their responses during elicitation sessions, the 12 non-ELLs had a more exceptional ability to conduct an inquiry (M = 8.75, SD = 2.80) than the 13 ELLs (M = 7.38, SD = 2.60); after the intervention, the outcomes were comparable between the two groups: a mean of 12.17 (SD = .84) points for non-ELLs and a mean of 12.15 (SD = 1.41)

points for ELLs. Therefore, ELLs had slightly more gains from the inquiry-based instruction than the non-ELLs.

While a simple, generalized correlation seems impossible for researchers to settle on, the impact of inquiry-based science instruction on the achievement gaps between ELLs and non-ELLs is dependent on the nuances of the instructional implementation. Therefore, studies diving deep into different variables during inquiry-based science instruction revealed primary factors that empower ELLs, including an interdisciplinary method (Tong, Irby, Lara-Alecio, & Koch, 2014), strategies to enable English language and reading skills (Tong et al., 2014), and purposeful planning and vocabulary building (Jackson & Ash, 2012). For example, when inquiry-based instruction follows an "interdisciplinary" method and enables "English language and reading skills" to serve as the foundation for academic learning in science, ELLs achieve results above benchmark standards (Tong et al., 2014, p. 423). In Tong et al.'s (2014) study of 56 fifth grade Spanish-speaking ELLs in an urban school district in Southeast Texas, United States, researchers examined English literacy and science achievement following the interdisciplinary intervention of embedding science instruction in English reading literacy. The 56 students came from eight control classrooms and 11 interdisciplinary-instruction classrooms. The 23 weeks of the intervention included incorporating reading and writing activities into science instruction, as such scaffolded text, explanation of science concepts, vocabulary development and extensions, word-reading instruction, partner reading, and focused science vocabulary. After comparing the participants' scores in Science Benchmark Test 6 and English TAKS scores from the spring of 2010, the study found the passing rates were an average of 76.9% in the control group and 100% in the treatment group. These results suggested that the intervention effectively enhanced student

outcomes "in areas of English oral reading fluency, knowledge of word meanings, and mastery of science concepts comparable to grade level" (p. 421).

Moreover, Jackson and Ash (2012) investigated the impact of a three-year professional development program on the achievement gaps for ELL and low SES students in two elementary schools in Texas. They used questionnaires and qualitative analysis of teachers' written responses and found significant increases in the science achievement of ELL and low SES elementary school students of teachers participating in the program due to "the combination of purposeful planning, inquiry science instruction, and interactive, multisensory vocabulary development" (p. 725). Similar to Tong et al.'s (2014) study, the explicit inclusion of vocabulary teaching and learning plays a crucial role in ELL student success in Jackson and Ash's (2012) investigation.

The association between inquiry science instruction and the achievement gaps between ELL and non-ELL students may seem nebulous as researchers across studies reach different findings. However, when teachers planning and delivering inquiry-based science lessons pay special attention to the linguistic needs of ELLs, the achievement gaps close. Therefore, including language development into inquiry-based science instruction plays a vital role in ELLs' achievement and performance compared to their non-ELL counterparts (Cuevas et al., 2005; Jackson & Ash, 2012; Tong et al., 2014).

The impacts of inquiry instruction on ELLs' English language development (ELD). Researchers mostly agree on the benefits that inquiry-based instruction brings to the ELD of ELLs. The integration of ELD and inquiry-based science instruction offers opportunities for meaningful, familiar, and tangible contexts for the English language and, therefore, enhances ELD for ELLs (Tong et al., 2014; Zwiep, Straits, Stone, Beltran, & Furtado, 2011). The instruction of ELD requires teachers' awareness of students' linguistic and cultural needs and

strategies to facilitate "the learning of vocabulary, syntax, and lexical grammar, and the use of language in both social and academic situations" (Stoddart, Pinal, Latzke, & Canaday, 2002, p. 666). The hands-on experiences and rich use of visuals during inquiry-based instruction (Suthers, 2003) allow for "multisensory vocabulary activities," the aid of visuals and realia, and application of scientific vocabulary within contexts (Jackson & Ash, 2012, p. 740). Besides, inquiry-based instruction encourages students to connect learning to their cultural backgrounds, enhancing student familiarity with the content and helps frame the language into students' schemata (Stoddart et al., 2002). Therefore, inquiry-based science instruction features contextualized use of language and enhances ELLs' language development.

Apart from the contextualization of language use during inquiries, the expectation for communication and teamwork in inquiry instruction highlights the use of language in the content area of science (Song et al., 2014). The multiple opportunities for using language related to science, or "science-related observations, questions, and ideas" (Zwiep et al., 2011, p.784) encourage students to apply language skills. For example, Ardasheva, Norton-Meier, & Hand (2015) viewed the dual focus on language and content development through the lens of the Science Writing Heuristic (SWH) approach, which uses language-heavy activities such as guided dialogue, reading, and writing as thinking tools to replicate science inquiry investigations. They identified argument-based inquiry (ABI), the theoretical foundation of SWH, as the themes of "negotiation, embeddedness, and non-threatening learning environments," which promotes language learning for ELLs (Ardasheva et al., 2015, p. 237). Therefore, the emphasis on interaction during inquiry-based science instruction relies on language and promotes ELD.

Inquiry-based instruction has a positive influence on ELLs' language development. Content instruction provides a meaningful context for language learning. The nature of inquiry

investigation allows multiple opportunities for language use, which makes an inquiry-based science classroom language-rich and, thus, an ideal environment for language development.

Teachers' knowledge of and beliefs about blending inquiry science instruction and ELD. Teachers play a crucial role in bringing together ELD and inquiry-based science instruction. As these two areas can function independently in many contexts, not all teachers have the experience of bridging the two together. Since one's efficacy beliefs affect their behavior (Bandura, 1986), a teacher's knowledge and beliefs about ELD and inquiry science instruction affect students' experience.

Based on their preparation and experience, teachers may have limited knowledge of both science and ELD, two key areas for successful science instruction with ELLs. Given the default separation of the ESL/EAL department from the science and/or classroom teachers in many elementary schools and lower social and professional status compared to general educators (Bascia & Jacka, 2001), most elementary school teachers have skills in either field, but not both (National Center for Education Statistics, 2001). Science instruction with ELLs, however, demands teachers' knowledge and skills in both fields. On the one hand, teachers must know the science and pedagogical content knowledge (PCK) to implement inquiry-based instruction (Zwiep et al., 2011). On the other hand, teachers need knowledge, understanding, and ability to "administer, score and interpret results of language assessments" for ELLs (Szecsi et al., 2017, p. 25), and knowledge of English for speakers of other languages (ESOL), which can help teachers to understand what language functions and scientific terms to frontload (Zwiep et al., 2011). Educators teaching science to ELLs require skills from these two separate areas of study due to the dual learning needs of ELLs in a science inquiry classroom – both as language learners and science inquiry students.

Teachers' beliefs regarding the role of students in the learning process may impact their instruction. For example, Adamson, Santau, & Lee (2013) confirmed that teachers' beliefs affect how they view the curriculum and design and deliver science instruction. Through interviews with 198 third, fourth, and fifth-grade teachers, this study of a model of professional development intervention supporting teachers' science instruction in nine urban elementary schools with high numbers of ELLs, Adamson et al. (2013) identified teachers' beliefs about student diversity as one of the challenges that a professional development program must overcome. When explaining incongruence between the length of participation in the project and the level of sophistication of inquiry-based strategies in teachers' instruction, Adamson et al. (2013) recognized that teachers' original beliefs are crucial in teachers' decisions about curriculum and instructional tasks. For example, teachers who believe in the importance of knowledge transmission and content coverage over inquiry-based approaches may not use an inquiry-based approach, which would otherwise prove beneficial for ELL students (Adamson et al., 2013).

Similarly, in a qualitative study of six bilingual Hispanic teachers working with fourth-grade, primarily Hispanic students in the Southeast United States, Lee (2004) described the development of teachers' beliefs and practices over three years by comparing the observation and interview data at the start and end of the three-year research. At the start, some teachers demonstrated uncertainty about the connection between students' linguistic and cultural backgrounds and science; through reflective conversations about their personal experiences of immigration, the teachers became aware of the need to address the linguistic and cultural needs of their students in science classrooms, which would promote student learning. As a result, their

teaching practices became responsive and appropriate to students' linguistic and cultural backgrounds.

Schools can easily assume the distinction between science instruction and instruction for ELD if the separation of Science and English Language Departments results in beliefs that teachers specialize in just one aspect of students' development. However, when ELL populations grow and add to the linguistic and cultural diversity of a context, the need to integrate these two areas must occur as students have the dual needs for development in both science and English. Therefore, teachers must recognize the dual needs of ELLs, be knowledgeable about both ELD and inquiry science instruction, and believe in the benefits of integrating the two so that their instruction can help ELLs in their science classrooms.

Assessing ELL students. ELLs' identity as a language learner is easy for researchers, educators, and schools to define in theory but challenging to identify and assess in practice. The assessments with ELLs demand attention not only to students' linguistic needs but also to their cultural backgrounds. Without an accurate assessment of ELLs' language levels and progress, teachers may find it challenging to use the appropriate language to engage ELLs in science learning (Quinn, Lee, & Valdés, 2012).

Despite agreement over the identity of ELLs in research and education models, different practices for identifying ELL students results in the use of various tools across contexts (Abedi, 2004; Abedi et al., 2004; Szecsi et al., 2017). Szecsi et al. (2017), for example, first identify ELL students by reviewing a student's home language (language used at home), first language (the first language acquired), and most frequently spoken language (language used in most interactions) and then assess the ELLs with Language Assessment Battery (LAB) for placement

and annually monitoring for exit assessments using *ACCESS for ELLs 2.0.* The specificities of assessing ELL students vary between school contexts.

The method and results of assessment decisions depend on policy and procedure, funding, capacity to serve the needs of ELL students, size of the ELL population, and assessment tools. Assessment decisions include those who administer the assessment of ELL students — teachers of English as a second language (ESL) or English as an additional language (EAL). The assessment of ELLs is crucial in providing data to classroom teachers and informing their pedagogical decisions to support ELL students' learning of subject content. Assessment delivery, nevertheless, inconsistently considers the needs of ELL students, which leads to inaccurate monitoring and tracking of their learning progress and hinders effective intervention (Abedi, 2004; Abedi et al., 2004).

When an ELL student assessment is oblivious to students' cultural backgrounds, the assessment results may inaccurately reflect students' competence (Ebe, 2010). Ebe (2010), for example, studied nine third-grade children and their parents to examine student outcomes in reading and retelling two third-grade stories. Though the two stories were comparable in the number of words and reading level, they differed in how relevant the content of the stories was to the children's cultural background. The qualitative study discovered that the children demonstrated a higher level of comprehension of texts that were more culturally relevant, which aligns with Steffensen, Joag-Dev, and Anderson's (1979) finding that subjects processed more quickly, had higher rates of recall and constructed more culturally appropriate interpretations of the passage about their native culture than the one about a non-native culture. Similarly, Gilakjani and Ahmadi (2011) defined reading as a linguistic and knowledge-processing process using the schema theory and suggested the importance of activating students' background

knowledge when they read. Therefore, assessment with ELL students can disadvantage them with outcomes that fail to reflect their actual competencies.

Mismatched cultural backgrounds between teachers and students. The intertwined relationship between language and culture has made incongruous cultural backgrounds between teachers and students a factor juxtaposed with inquiry-based instruction with ELLs. Therefore, the mismatched cultural backgrounds may become a barrier to the accessibility of the inquiry-based science lessons and, hence, the engagement and outcomes of ELLs (Atwater et al., 2010; Callaway, 2017; Oyerinde,2008; Settlage et al., 2005).

Teachers' sense of cultural efficacy positively contributes to their ability to support their students in meaning-making with new information and experiences in the classroom as language and culture are two inseparable constructs (Edwards & Edick, 2013; Ladson-Billings, 2009; Villegas & Lucas, 2002). For example, In Savva's (2017) qualitative study of 30 Anglophone teachers working overseas across 17 international schools in Europe and China, cross-cultural experience enhanced the participants' intercultural abilities. In summarizing the teachers' reflections on teaching the English language explicitly in their instruction, Savva (2017) advocated for explicitly teaching idioms and the inferred social, cultural, and political meaning of the English language. The research even revealed the role of learning the host country's language in a teacher's awareness of language and culture teaching as this experience helps teachers explicitly teach culture as they taught language. Similarly, Aikenhead (2001) conducted a case study on the collaborative project called "Rekindling Traditions" to explore cross-cultural science teaching for Aboriginal students across northern Saskatchewan, Canada. Results indicated strategies for managing cultural mismatch during science instruction, positioning a series of science units that integrate Aboriginal and Western cultures as a bicultural and bilingual

continuum. These findings are consistent with those from a study of second-grade teachers' science instruction for ELLs at San Juan School in Utah, the United States. In a school where 60% of the student population were ELLs, Settlage et al. (2005) showed that instruction attending to both language and culture led to "a discernible improvement in English language learners' success in science" when they analyzed students' written responses and verbal discussions (p. 55). Therefore, effective instruction with ELLs involves attention to language and the mismatched cultural backgrounds between teachers and students.

Research on the impacts of cultural mismatch involves contexts with multiple races, ethnicities, cultural backgrounds, and linguistic backgrounds in the student population and can fall into three separate categories. The first group of studies focuses on educational settings such as those schools in the United States with high percentages of African, Hispanic, and Asian American students (Atwater et al., 2010; Callaway, 2017; Oyerinde, 2008; Settlage et al., 2005). In these settings, ethnic, racial, and cultural differences among staff and students create a multicultural environment. The second group involves schools with an Aboriginal population, from a linguistic and cultural background different from the school culture and the mainstream social culture (Aikenhead, 2001; Roehrig, Dubosarsky, Mason, Carlson, & Murphy, 2011). These schools, therefore, become a bicultural environment. The third group involves international schools where students from varied linguistic and cultural backgrounds converge (Cavendish, 2011; Deveney, 2007; Savva, 2017). These contexts can be at different places on a monocultural-multicultural continuum, depending on the school's identity, vision, mission, and its approach towards cultural diversity (Hayden, 2011).

Across the above groups of studies, the misalignment of cultural background between teacher and student may cause disengagement if teachers ignore cultural differences (Khalifa,

Gooden, & Davis, 2016). Gay (2015) analyzed the necessity to address cultural mismatches in any context with culturally responsive teaching. Apart from the attributes in the term itself and teachers' beliefs about and professional preparedness for culturally diverse students, Gay (2015) argues for the importance of recognizing the specific contexts for learning such as the demographics of the societal and school environment and how these contextual features affect cultural responsiveness in teaching. Gay (2015) suggested that culturally responsive teaching is applicable and appropriate for international contexts as long as its definition is nuanced to the specificities of a context and that culturally responsive teaching is imperative for international contexts to remove achievement gaps among "ethically and culturally diverse students" (p. 136). Therefore, recognizing and addressing cultural mismatches in the current study context is essential to promote ELL success in science.

Addressing cultural misalignment plays a role in benefiting students who may be disadvantaged otherwise. For example, Byrd (2016) found a partially positive relationship between CRT and student outcomes. She measured CRT with two subscales — the Constructivist Teaching Practice subscale and the Cultural Engagement subscale — and measured academic outcomes with students' self-reported grades, interest in school, sense of belonging, and academic self-concept. Based on quantitative data from 315 sixth- through twelfth-grade students across the United States, the study found a positive, significant relationship between the Constructivist practices and students' interest in school ($B = 0.384$, $p < .001$) and between the Constructivist practices and sense of belonging ($B = 0.366$, $p < .001$). Therefore, the study found the constructivist aspect of CRT positively impactful student engagement and social and emotional development, partially confirming the positive association between CRT and academic outcomes. Limitations of the study included the potential lack of reliability of students' self-

reported grades as a measure for academic outcomes and its lack of detail about where teachers developed the constructivist practices of CRT.

For students learning English as a Foreign Language (EFL), teachers need to develop their intercultural communicative competency (ICC; Young & Sachdev, 2011). For students whose home culture holds different values and beliefs about science from those held in their science classroom, teachers can act as cultural brokers and use inquiry-based pedagogy to help students reconcile the different conceptions and worldviews and develop positive science identities (Aikenhead, 2001). For Asian students, whose cultural value systems prioritize community, whether they are Asian American students in the United States or Chinese students, the pedagogical need is to empower them to participate in learning in the way they are most comfortable with, e.g., through cooperative groups and peer coaching (Gay, 2002; Kennedy, 2002). Furthermore, in collective groups, Asian learners prioritize hierarchical relationships over individual voices, which may hinder them from the free expression of personal opinions in a teacher-student relationship (Kennedy, 2002).

Teachers' awareness of the impacts of culture. Researchers proposed that teachers' awareness of the impacts of culture in learning results from a sociocultural practice that considers learning as a social and cultural practice and values learners' beliefs, experiences, cultures, and practices at home (Brown, 2017; Savva, 2017; Villegas & Lucas, 2002). This principle demands teachers to view students' different cultural backgrounds as an asset or channel rather than a barrier to effective learning (Callaway, 2017; Gay, 2002).

Teachers' awareness of the impacts of culture can facilitate inclusive techniques and develop an inclusive culture in the learning environment. For example, in her investigation of 29 primary and secondary teachers in an international school in Thailand through questionnaires and

two focus group interviews, Deveney (2007) found that multicultural education tended to be a missing piece in many teachers' teacher training experience and that specific on-job training can help teachers, especially those who are "curious, reflective, flexible, caring, optimistic, and genuinely interested in other cultures," improve their teaching practice with culturally diverse students (p. 325). Additionally, she suggested that teachers who practice inclusive pedagogy have the same level of expectations for all their students rather than simplifying learning for some and strive to engage students across cultures (Deveney, 2007). Teachers with cultural awareness start their instruction from what students are familiar with and extend their cultural understandings (Villegas & Lucas, 2002). Teachers also help bridge what students learn from home and what they do at school. The key characteristics of this inclusive culture include the development of topics that are relevant and interesting to students, questions reflecting students' cultures, explanations using cultural examples and materials, links between classroom and family life, and teachers' affirming attitude toward the values those different cultures and languages can bring into learning (Callaway, 2017; Gay, 2002; Savva, 2017; Settlage et al., 2005; Villegas & Lucas, 2002).

Teachers' experience with technology. Researchers agree on the role of technology in enhancing inquiry-based science instruction, which ultimately enables better students' outcomes in language and science learning (Isiksal-Bostan, Sahin, & Ertepinar, 2015; Lee et al., 2010). In Lee et al.'s (2010) study (described on Page 12), technology is a significant enabler in the effectiveness of the inquiry science units as designing the units involved technological features such as "temperature-sensitive probes, classroom experiments, interactive visualizations, online discussion boards, and embedded assessments" (p. 74). The authors concluded that technology-enhanced science inquiry helped students achieve better outcomes in science knowledge

integration (the Inquiry Cohort: $M = 0.28$, $SD = 1.23$, Typical Cohort as the control group: $M = 0.18$, $SD = 1.52$). Therefore, integrating technology into inquiry-based science instruction enhances student outcomes compared to traditional inquiry instruction.

Showing similar results in a different context, Isiksal-Bostan et al. (2015) examined 258 Turkish classroom teachers' beliefs toward using inquiry-based approaches, traditional teaching approaches, and technology to teach science and mathematics in public and private elementary schools in Ankara, Turkey. This quantitative investigation found that teachers' beliefs in using inquiry-based approaches were significantly (Lisrel estimate: Beta=0.90) related to "beliefs in using technology-enhanced approaches" (p. 603). Despite their broad reference to technology as the use of computers and the Internet in their questionnaire during data collection, Isiksal-Bostan et al. (2015) recommended the possible application of technology in visualizing during inquiry-based science instruction, which overlaps with Lee et al.'s (2010) inclusion of visualizations in integrating technology into inquiry-based science instruction. Therefore, technology can improve inquiry-based science instruction, which can bring evident benefits to student outcomes.

Teacher efficacy. Teacher efficacy, according to Katz and Stupel (2016), is the belief in one or many teachers' ability "to help students learn, influence students' performance and commitment, and thus plays a crucial role in developing the student in all aspects" (p. 421). Teacher efficacy is widely anchored in Bandura's (1986) social cognitive theory (Tschannen-Moran & Chen, 2014). Researchers generally approach teacher efficacy following Bandura's (1997) division of self-efficacy into individual self-efficacy (Isiksal-Bostan et al., 2015; Ruan, Nie, Hong, Monobe, Zheng, Kambara, & You, 2015; Tran, 2014) and collective efficacy (Dumay & Galand, 2012; Goddard & Skrla, 2006; Klassen, Usher, & Bong, 2010; Mitchell, Mendiola, Schumacker, & Lowery, 2016; Schechter & Qadach, 2012; Voelkel & Chrispeels, 2017).

Researchers probe into teachers' self-efficacy in different ways. Ho and Hau (2004) and Jungert, Östergren, Houlfort, & Koestner (2019), for example, follow Gibson and Dembo's (1984) measurement of two dimensions of teacher's self-efficacy: personal teaching efficacy, i.e., teachers' competence beliefs, and general teaching efficacy, i.e., teachers' beliefs about external factors that decide students' behavior. Duran et al. (2009) and Lotter, Thompson, Dickenson, Smiley, Blue, and Rea (2018), for example, follow Bandura's (1986, 1997, 2006) division of perceived self-efficacy, referring to teachers' beliefs about their performance level, and outcome expectancy, referring to predictions of possible results of this performance.

Social cognitive theory (Goddard, Hoy, & Hoy, 2004) posits four sources of the formation of efficacy: social persuasion, vicarious experience, mastery experience, and affective state. Social persuasion refers to persuasion by formal and informal group leaders or in the form of strong group norms. Vicarious experience observes others succeed in similar contexts, and mastery experience is one's lived experiences. The affective state is emotional responses to experiences, group interactions, and the inside of a group's interchange with the outside.

Researchers like Lotter et al. (2018) explored the impacts of interventions from these sources on teachers' efficacy beliefs. Lotter et al. (2018) focused on mastery experience as a source for science teachers' efficacy and their practice of inquiry-based science instruction. They explored the effects of a one-year professional development (PD) on 102 science teachers' efficacy and inquiry science instruction in a Southeastern state in the United States. Apart from the significant relationship between the PD and the teachers' efficacy and instructional practice, Lotter et al. (2018) pointed out the need for professional development built on mastery experience, i.e., opportunities for teachers to practice the intended teaching strategies reflect on their instruction.

Research on teachers' affective states indicates that multiple facets may be essential to consider (Goddard & Skrla, 2006; Ninković & Knežević, 2018). Mitchell et al.'s (2016) concept of faculty trust in clients describes teachers' willingness to trust their students and parents and collaborate with them, which depends on enabling school structure and contributes to academic optimism. Price's (2012) proximal trust outcomes develop from the interaction between principals and teachers and are dependent on sharing a definition of expectations. The different roots of affective states reflect the complex web of social interactions around teachers.

Summary

ELLs' English language and science achievement are subjective to many factors described in the above literature review. In the context of the present study, these factors fall into the layers of Bronfenbrenner's (1994) ecological systems. These factors help provide a holistic view of the problem and provide a foundation for collecting and analyzing data in Chapter Two.

Conceptual Framework

The conceptual framework below shows the key factors mentioned in the above ecological systems and their relationships. These factors are directly related to the outcome and will be responsive to intervention in the present context. Additionally, the factors in the conceptual framework inform the design of the needs assessment described in Chapter Two.
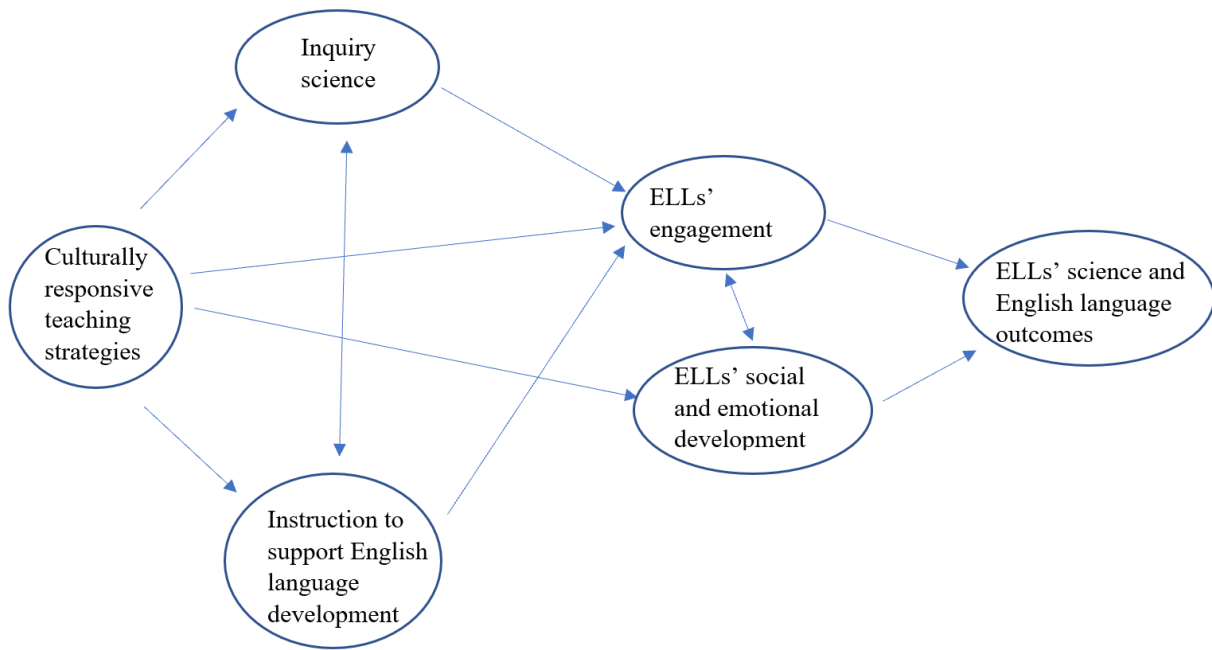
Figure 2. Conceptual framework. A network of actionable factors that directly impact students' learning in the context.

ELLs' Science and English Language Outcomes

Researchers use students' scores in national or international standardized tests to understand ELL students' science and English language outcomes (Lee, 2005; Lee & Luykx, 2006; Jiang & McComas, 2015; Schleicher, 2019). These outcomes result directly from students' engagement in learning and their social and emotional development — two factors that reciprocally affect each other (Niehaus & Adelson, 2014). The integration of instructional practices contributes to these two factors, including teachers' inquiry science instruction, teachers' use of culturally responsive teaching strategies, and teachers' instruction to support ELLs' English language development (Adamson et al., 2013; Ardasheva et al., 2015; Lee, 2004; Song et al., 2014; Tong et al., 2014; Zwiep et al., 2011).

Inquiry Science

Inquiry-based science instruction refers to the teaching of science through an inquiry approach, i.e., allowing students to explore real-life issues with purpose and focus on developing scientific understanding, knowledge, and skills (Adam, 1997; Jiang & McComas, 2015; Supovit et al., 2000). One key element of inquiry-based science instruction is the engagement of individual learners, as science inquiry starts from students' voices and choices and on the foundation of students' prior knowledge and experiences. Therefore, inquiry-based science instruction promotes student engagement (Jiang & McComas, 2015; Tuan et al., 2005).

Culturally Responsive Teaching Strategies

Culturally responsive teaching is a crucial aspect of any instructional practice with ELLs as teachers and students may come from different cultural backgrounds (Edwards & Edick, 2013; Ladson-Billings, 2009; Villegas & Lucas, 2002). In inquiry-based science classrooms, culturally responsive teaching strategies require teachers' consideration of learning as a social and cultural practice and their prioritization of students' beliefs, experiences, cultures, and practices at home (Brown, 2017; Savva, 2017; Villegas & Lucas, 2002). Therefore, these strategies ensure student engagement (Gay, 2002; Kennedy, 2002; Khalifa et al., 2016) and students' social and emotional development (Aikenhead, 2001), which eventually contribute to student outcomes (Settlage et al., 2005).

Instruction to Support English Language Development (ELD)

Researchers prove the interconnection between inquiry-based science learning and ELLs' ELD and, hence, the value of inquiry science instruction and support to ELD. On the one hand, inquiry science offers an authentic context for ELD (Ardasheva et al., 2015; Tong et al., 2014; Zwiep et al., 2011). On the other hand, strategies in support of ELD align with scaffolding during

inquiry science instruction, such as the focus on mastery science concepts (Tong et al., 2014), interactive and multisensory learning (Jackson & Ash, 2012; Suthers, 2003), hands-on experiences (Suthers, 2003), and collaboration (Song et al., 2014). Therefore, inquiry science instruction and techniques for ELD mutually benefit each other.

In summary, multiple factors contribute to elementary ELLs' outcomes in science and English language in international school settings, including international English-speaking teachers' conceptions of effective inquiry science instruction with ELLs and international English-speaking teachers' perception of the effectiveness of their inquiry science instructional practice with ELLs. According to findings across studies (Jackson & Ash, 2012; Lara-Alecio et al., 2012; Tong et al., 2014), these selected focuses directly impact students' achievements. For example, in their study of investigating how inquiry science instruction transformed by professional development rapidly improved science outcomes in an elementary student population with diverse linguistic and cultural backgrounds, Jackson and Ash (2012) revealed the positive relationship between effective inquiry science instruction and ELLs' scores on high-stakes tests. Similarly, Lara-Alecio et al.'s (2012) comparative study of 166 treatment students and 80 control group students proved "inquiry-based learning, direct and explicit vocabulary instruction, integration of reading and writing, and enrichment components" significantly enhanced ELLs' achievement in standardized science and English reading assessments ($ps <$ 0.05$;$ p. 987). The three types of instruction, i.e., inquiry science, culturally responsive teaching, and practices that support ELD, need to converge in science teaching with ELLs. Instructional practices integrating the three have positive influences on ELLs' engagement and social and emotional development, which ultimately benefit their English language and science outcomes. This concept map helps design the need assessment study with a focus on these three aspects.

The needs assessment in the following chapter will provide information about the relationship

between the concepts in the concept map within my particular context.

Chapter 2

Needs Assessment

Chapter One explained a problem in educational settings, i.e., the achievement of Chinese ELLs who studied science through English as an additional language, and identified factors that the literature suggests contributing to the problem. The following needs assessment examined these constructs through a mixed-method approach, including an interview to investigate international English-speaking teachers' conceptions of effective inquiry science instruction with ELLs and a survey to measure international English-speaking teachers' perception of the effectiveness of their inquiry science instructional practice with ELLs.

Context of the Study

This needs assessment took place in three international bilingual schools located in three cities in China. These schools served 620 elementary students in the first, second, third, fourth, and fifth grades. All three schools belong to an international education management company, which prescribes the educational vision and mission and the curriculum model and approaches of the three schools. Overall, the schools aim to develop bilingual, bicultural high school graduates through a 50% Chinese to 50% English bilingual model from the first to the ninth grades and a 20% Chinese to 80% English high school program. The eleventh and twelfth graders complete the International Baccalaureate Diploma Program, an English-medium high school program recognized globally for university entry. The schools admit students whose first language is Chinese. English, therefore, is not only the language of instruction during 50% of the subject learning time but also the target language for the elementary students. The current practice in my context is using Oxford Online Placement Test to diagnose baseline data with all new students and assessing all students' English language at the end of each school year using the Oxford

Online Placement Test and New Group Reading Test. Additionally, the management company stipulates that inquiry-based learning is the approach in English-medium subjects and provides professional development for the goal that every teacher is a teacher of language regardless of their subject area.

The context of this needs assessment may seem to belong to the international school category; however, representing a new trend on the international school market (Hayden, 2011), students in the context come from the same cultural background as each other. Nevertheless, the cultural difference is evident for two reasons: first, the organization's mission is to develop bilingual and bicultural students who otherwise live through a monocultural life outside the schools; second, the international culture represented by the international English-speaking teachers mismatches the homogeneous Chinese culture the students represent.

The target population of this assessment includes teachers who teach a content-based subject through students' non-native language, in this case, English. All these teachers come from and have prior teacher training experience in English-medium countries. For some, the current international bilingual school is their first overseas employment after teaching in their national education system; for others, this present employment is one of several professional experiences working as an international teacher. These international English-speaking teachers work alongside a Chinese-speaking co-teacher most of their classroom time. This co-teaching design is in place to support the linguistic and cultural gaps between the international English-speaking and their Chinese students.

These teachers share the following three characteristics. Firstly, they all teach science, a non-language subject, which means that the school expectation is for these teachers to help their students reach content learning objectives, i.e., science-based knowledge and skills. Secondly,

these teachers teach through English — students' non-native language. The non-native medium of instruction brings an additional focus into teaching and learning: students must learn the English language to access science content and develop their English language proficiency through science learning. The teachers must be aware of and competent with the dual focus of content and language; otherwise, learning can hardly occur for these ELLs. Thirdly, all the teachers come from a cultural background different from the students. The distinction between the students' Chinese background and the international teachers' backgrounds of the English-speaking cultures is evident in the context, including the teachers' and students' different expectations for teaching, learning, behavior, and interaction. These three characteristics of the target population enable broad applicability of the findings of this needs assessment to contexts where teachers need to meet the dual needs of content and English language learning with students from different cultural backgrounds. The study, therefore, may contribute to broader discussions about elementary ELLs' students' development, Content and Language Integrated Learning (CLIL), and Culturally Responsive Pedagogy in the study of science.

Statement of Purpose

The needs assessment aimed to explore factors contributing to the gap between aspired and achieved outcomes of this whole-ELL population in the context. The focus of this needs assessment was twofold: first, to discover how international English-speaking teachers understand effective science instruction with ELLs; second, to investigate how these teachers perceive their science instructional practice with ELLs. The findings from this needs assessment helped with an intervention plan to develop a school environment that transforms teachers' practices so that international English-speaking teachers support ELLs' learning of science and the English language.

The needs assessment focused on the following four research questions (RQs).

RQ one: How did international English-speaking teachers describe effective science instruction for elementary ELLs?

RQ two: How often did international English-speaking teachers report using research-based instructional practices to promote students' scientific understanding and inquiry?

RQ three: How often did international English-speaking teachers report using the research-informed instructional practices that support students' English language development?

RQ four: How often did international English-speaking teachers report using culturally responsive practices when teaching science?

RQ five: How do international English-speaking teachers' conceived and self-reported inquiry science teaching practices with ELLs differ?

Research Design

This needs assessment adopted an exploratory mixed-methods design to capture and analyze qualitative and quantitative data and integrate the two forms of data to develop a holistic understanding of the phenomenon, i.e., teachers' description of effective science instruction with elementary ELLs (Creswell & Plano-Clark, 2018). The qualitative data from teacher interviews helped address RQ one, which focused on teachers' conception of effective science instruction with ELLs. The quantitative data from a teacher survey addressed RQs two, three, and four, emphasizing teachers' perceptions of their science teaching practice with ELLs by meeting the needs for developing scientific understanding and inquiry, ELD, and culturally responsive pedagogy. The multiple data sources, therefore, supported a holistic exploration of possible factors contributing to the problem.

Participants

There was a total of 14 intended participants who met the selection criteria. They came from different countries of origin outside of China, including one from Australia, two from New Zealand, one from the USA, ten from the UK. I emailed an invitation message together with the consent form to these 14 intended participants. Eight of them responded to the email and received a Zoom meeting invitation. Of all the teachers who agreed to participate, five were male, and three were female. The study expected to use several survey questions to find out the demographic information such as grade level(s) they currently teach, years of teaching experience, and highest degree attained.

Measures and Instrumentations

The needs assessment focused on four constructs: first, teachers' conception of inquiry science instruction with ELL students; second, teachers' reported practice of inquiry science instruction; third, teachers' reported practice of supporting the needs of ELL students; and fourth, teachers' reported use of culturally responsive teaching strategies. The needs assessment also operationalized teachers' reported practice by measuring how often they used relevant strategies in the past month. The following section shows the measures and instrumentations for these constructs.

Interview. The needs assessment used a qualitative instrument — a semi-structured interview (see Appendix A) to address RQ one by investigating the construct of teachers' conception of effective science instruction with ELLs. The interview included eight guiding questions adapted from Stoddart et al.'s (2002) study that examined teachers' conceptions of science–language integration. Stoddart et al. (2002) included seven questions in their semi-structured interviews with 24 first- through sixth-grade teachers to collect teachers' perceptions

of how the integration of science and language benefited both science learning and language acquisition. For example, their sixth question asked, "what are your thoughts about integrating science and language instruction?" (p. 674). My adaptations included the addition of one question about culturally responsive pedagogy. The eight guiding questions examined teachers' conception of effective science instruction with ELLs from four angles: their conception of effective inquiry-based science instruction, that of effective instruction to facilitate the linguistic needs of ELLs, that of effective instruction to facilitate the cultural needs of ELLs, and that of the integration of inquiry science and the linguistic and cultural needs of ELLs.

Survey. This study also used a quantitative survey (see Appendix B) to address RQs two, three, and four to explore teachers' perceptions of their science instruction with ELLs. The survey operationalized four constructs: the participants' reported frequency to promote scientific understanding and inquiry by measuring five and seven items, respectively, their reported frequency to support ELLs' English language development by measuring eight items, and their reported frequency to use culturally responsive teaching by measuring four items. Therefore, the survey consisted of 24 items and three questions about demographic information such as grade level(s), years of teaching experience, and highest degree attained.

The survey adapted and combined two instruments: Section One: Teacher Knowledge and Practices in Science Instruction with ELLs from Lee and Maerten-Rivera's (2012) questionnaire of teachers' self-reported "reform-oriented practices in science and ESOL/bilingual education" (p. 2016) and Oyerinde's (2008) Culturally Responsive Teaching Techniques Scale (CRTTS). This study adjusted Section One from Lee and Maerten-Rivera's (2012) questionnaire to measure three constructs in RQs two and three: teachers' reported frequency to promote scientific understanding, teachers' reported frequency to promote scientific

inquiry, and teachers' reported frequency to support ELD. Lee and Maerten-Rivera (2012) developed their questionnaire based on reform-oriented practices in science (AAAS, 1989; NRC, 1996, 2000) and English language (TESOL, 1997, 2006)" (p. 15). The estimated reliability of this questionnaire ranged from a Cronbach's alpha score of 0.67 to 0.94. Given the unlikelihood for this study to intervene with the participants' knowledge of science content, I decided not to use the Teacher Knowledge of Science Content subscale in Lee and Maerten-Rivera's (2012) questionnaire. I also changed the wording in the Teaching Practices to Support English Language Development Scale from 'ESOL' to 'ELL' for consistency and relevance within this study.

Additionally, I adjusted the items for small-group collaboration between English-proficient and ELLs as the context of this study consists of only ELLs; instead, the items became one about purposeful creation of small-group collaborations between students with different English language proficiency levels and one about small-group communication in Chinese. Lastly, I replaced 'home language' with 'Chinese,' the home language shared by all students in the context. Addressing RQ four, this needs assessment used Oyerinde's (2008) CRTTS, a survey instrument, to focus on culturally responsive teaching, following the premise that academic learning needs to take place "within the lived experiences and frames of reference of the students" and personal meanings and interests help enhance the effectiveness of learning (p. 20).

Though Oyerinde's (2008) CRTTS embraces diversity caused by social, economic, ethnic, and cultural backgrounds, the fundamental focus of this assessment is on the mismatched cultural experiences and backgrounds between teachers and students, which addresses the fourth construct of this study. This needs assessment study shares the same premise of valuing students' experiences and backgrounds and follows the same pedagogical principles of a respectful and

inclusive learning environment. The estimated reliability of the CRTTS was a Cronbach's alpha score of 0.754. Given the relatively homogenous student culture in the context, I either removed words such as 'racial' or 'ethnic' or replaced them with 'cultural' in the CRTTS. I also replaced the original 5-point Likert scale with a 4-point frequency scale to keep the subscales on this survey consistent. Therefore, the original anchors — *Strongly Agree, Moderately Agree, Agree Slightly, Disagree Slightly, Moderately Disagree,* and *Strongly Disagree* — became *Never or Almost Never, Some Lessons, Most Lessons,* and *Every Lesson*.

Therefore, the adapted survey included four subscales: first, Teaching Practices to Promote Scientific Understanding Scale; second, Teaching Practices to Promote Scientific Inquiry Scale; third, Teaching Practices to Support English Language Development Scale; and fourth, CRTTS. Each subscale includes a 4-point Likert scale for the altogether 24 items, ranking by one for *Never* or *Almost Never*, two for some lessons, three for most lessons, and four for every lesson. Table 1 shows the alignment of the research questions, variables, their definition, and samples survey questions and measures:

Table 1

Survey

Research Question	Variable	Definition	Sample Survey Question and Measurement
RQ Two	Teaching Practices to Promote Scientific Understanding	Teachers actively use students' prior knowledge to develop students' understanding of scientific concepts and enable students to connect,	• On a 4-point Likert scale, during the last month, how often did you use students' mistakes to generate class discussion in your science lessons? • On a 4-point Likert scale, during the last month, how often did you ask students to

Research Question	Variable	Definition	Sample Survey Question and Measurement
		make arguments about, and apply concepts to natural phenomena or previously unencountered situations. (Lee & Maerten-Rivera, 2012)	discuss their prior knowledge or experience related to the science topic or concept in your science lessons for at least 10 minutes?
RQ Three	Teaching Practices to Promote Scientific Inquiry	Teachers engage students in developing "knowledge and understanding of scientific ideas and an understanding of how scientists study the natural world" (Lee & Maerten-Rivera, 2012, p. 5).	• On a 4-point Likert scale, during the last month, how often did you ask students to use science process skills (e.g., hypothesize, organize, infer, analyze, evaluate, describe patterns, make models or simulations) in your science lessons? • On a 4-point Likert scale, during the last month, how often did you ask students to write about what was observed and why it happened in your science lessons for at least 10 minutes?
RQ Four	Teaching Practices to Support English	Teachers meet ELLs' needs for language scaffolding so that they access the content learning.	• On a 4-point Likert scale, during the last month, how often did you reduce difficulty language to key science vocabulary in English with ELL students in your science lessons? • On a 4-point Likert scale, during the last month, how often did you purposefully create small groups of

Research Question	Variable	Definition	Sample Survey Question and Measurement
RQ Five	Culturally Responsive Teaching Techniques	Teachers use strategies to meet all students' learning needs through the knowledge and use of their cultural backgrounds (Oyerinde, 2008).	students with different English language levels to work together in science class? • On a 4-point Likert scale, during the last month, how often did you provide students with examples and materials, which reflect different cultures other than their own? • On a 4-point Likert scale, during the last month, how often did you help students develop more positive cultural attitudes and values?

Procedure and Method

The research design informed the following procedure, which includes three processes: participant selection, data collection, and data analysis. The mixed-methods design of this needs assessment aimed at triangulation by comparing and contrasting qualitative findings of teachers' conceptions of effective inquiry science practices with ELLs and quantitative statistical results about their perceptions of their inquiry science practices with ELLs. The two types of data complement each other and together inform a holistic understanding of teachers' conceived and perceived inquiry science practices with ELLs (Creswell, 2009). The procedure below reflects this need for the triangulation design.

Participant Selection Process

The overall study targeted the international English-speaking teachers in a group of bilingual international schools in China. The needs assessment study involved a purposive sampling process (Lochmiller & Lester, 2017), approaching potential participants who met the following criteria:

- work in an elementary school (from first- through to fifth-grade),

- work in the context of three international bilingual schools in China,

- teach science in English,

- teach students who are English language learners,

- come from a cultural background different from the students', and

- have received pre-service teacher training outside of China.

I emailed all the 14 potential participants, including the study's description, consent form, and confidentiality assurance (Appendix C). The Heads of Elementary schools granted permission to use the schools' email systems. Two participants expressed interest in taking part after the first email in July 2020. Six more participants replied to take part after the second email, which I sent a month after the first one. The study included all those who agreed to participate in their response to the two recruitment emails.

Data Collection Methods

I took a sequential approach to collect qualitative and quantitative data. After gaining written consent, I first invited volunteers to participate in an individual interview that lasted about 30 minutes. Due to COVID-19, the teacher interviews took place on Zoom with the audio recorded with the participants' permission. At the end of the interview, the participants responded to a 27-question survey on Qualtrics. The research design involving an interview

before the survey was to avoid leading teachers' responses to the interview questions about their conceptions of effective inquiry science instruction with ELLs. Because the survey items reflect research-based practices for inquiry science, teaching ELLs, and CRT, any pre-exposure to these items may lead respondents into beliefs about the researcher's anticipation of hearing these practices rather than revealing their practices in the interview. Therefore, the sequence was individual interviews before the participants received the survey.

Data Analysis

The qualitative and quantitative data analysis complement each other, following a concurrent triangulation design of mixed-methods research (Creswell & Plano-Clark, 2018). Therefore, I collected and analyzed qualitative and quantitative data simultaneously to address different research questions before integrating the analysis results. The qualitative data responded to RQ one about teachers' conception of effective science instruction with ELLs, and the quantitative data from a teacher survey responded to RQs two, three, and four about teachers' self-reported science teaching practices. I followed the multilevel model of the triangulation design by collecting and analyzing data from different levels within a system, "with the intent of forming an overall interpretation of the system" (Creswell, 2009, p. 84). Therefore, this needs assessment equally integrates data from the interviews and survey responses for a holistic understanding of teacher conceptions of effective practices and perceptions of their practices. The interviews help to answer RQ one, and the survey helps to answer RQs two to four. Furthermore, the comparison between the interviews and survey responses addresses RQ five. The data analysis involved the following three levels in Figure 3.

Level 1: Survey data analysis of teachers' perceived practices

Overall interpretation

Level 3: Quantitative data analysis of perceived and conceived practices
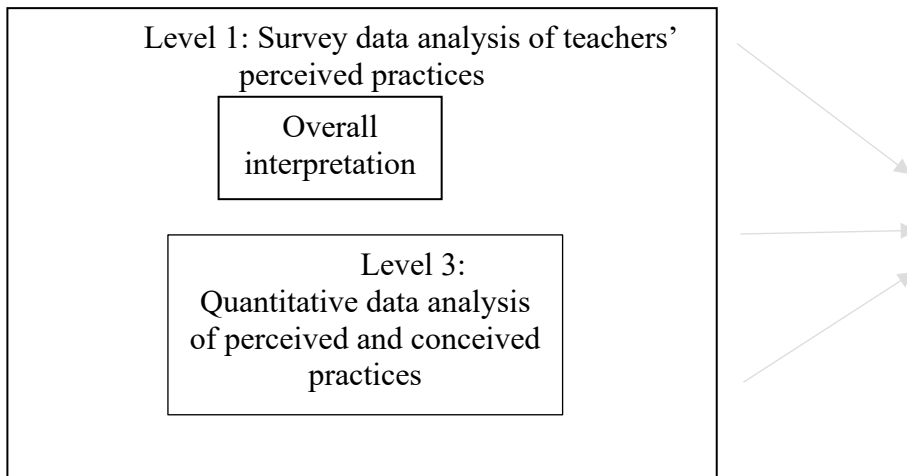
Figure 3. The study adapted Creswell's (2009) multilevel model of triangulation design and developed three data analysis levels. Level 1 involved an analysis of the quantitative data on teachers' self-reported practice. Level 2 involved analyzing the qualitative data from the interviews about how teachers conceived general and personal inquiry science instruction with ELLs. Level 2 also quantified qualitative data into numerical codes (Teddlie & Tashakkori, 2003). Level 3 involved triangulating the data from the two sources (Onwuegbuzie & Leech, 2006).

Level 1: teachers' self-reported practices. As shown in Table 2, the study operationalized five constructs, including teachers' self-reported practices, teachers' self-reported practices to promote scientific understanding, teachers' self-reported practices to promote scientific inquiry, teachers' self-reported practices to support students' ELD, and teachers' self-reported practices to use Culturally Responsive Teaching Techniques (CRRTs). The study operationalized the first construct with teachers' aggregate scores across the four subscales and the second to the fifth constructs with teachers' aggregate scores on each subscale. I sent the survey to each participant who volunteered for the study, and all participants responded to the survey. Therefore, the response rate was a hundred percent. Each participant responded to all the questions on the survey.

Table 2

Correspondence Table: Teachers' Self-Reported Practices

Variables	Measures	Survey Question No.
Teachers' Self-Reported Practices	Integrated Teaching Practices	From Q1 to Q22
Teachers' Self-Reported Practices to Promote Scientific Understanding	Teaching Practices to Promote Scientific Understanding	From Q1 to Q5
Teachers' Self-Reported Practices to Promote Scientific Inquiry	Teaching Practices to Promote Scientific Inquiry	From Q6 to Q10
Teachers' Self-Reported Practices to Support Students' ELD	Teaching Practices to Support English Language Development	From Q11 to Q18
Teachers' Self-Reported Practices to Use CRTTs	CRTTS	From Q19 to Q22

The aggregate scores of 22 items that represented teachers' self-reported practices are ordinal variables (Allen & Seaman, 2007) measured by four-point Likert-scale items, i.e., (1) *Never or Almost Never*, (2) *Some Lessons*, (3) *Most Lessons*, and (4) *Every Lesson*. The analysis of the quantitative data included descriptive statistical and inferential analysis. The descriptive statistical analysis involved calculating the mean and standard deviation across and within the subscales.

The descriptive statistics generated by SPSS show that overall, all eight teachers responded to each question on the survey and perceived their teaching practices at a level of $M = 2.73$, $SD = 0.46$, suggesting that the reported average frequency at which the participants perceive their level of teaching inquiry science effectively with ELLs was between *some lessons* and *most lessons*. The descriptive statistics in Table 3 show that the Teaching Practices to Promote Scientific Understanding Scale has the highest mean ($M = 3.08$, $SD = 0.52$), suggesting that the reported average frequency at which the participants promoted scientific understanding

was between *most lessons* and *every lesson*. Furthermore, the Teaching Practices to Promote

Scientific Inquiry Scale had the lowest mean (M =2.53, SD = 0.53), suggesting the reported

average frequency at which the participants promote scientific inquiry was between *some lessons*

and *most lessons*. The means difference between these two scales is 0.55, which accounts for

more than one SD, indicating that the difference between these two scales is meaningful.

Furthermore, the means difference between the Teaching Practices to Support English Language

Development Scale and the Teaching Practices to Promote Scientific Understanding Scale is

0.52, which accounts for one SD, indicating that the difference between these two scales is also

meaningful. There is a lack of meaningful difference between other scales' means. The

preliminary analysis also tested the normality of the aggregate scores across and within the

subscales to check the data's eligibility for further statistical analysis. The Shapiro-Wilk results

indicate that none of the data distribution is normal.

Table 3

Descriptive Statistics (n=8)

Variables	M	SD	Skewness	Kurtosis	Shapiro-Wilk
Teachers' Self-Reported Practices (22 Items)	2.73	.46	1.50	3.26	.19
Teachers' Self-Reported Practices to Promote Scientific Understanding (5 Items)	3.08	.52	.67	.01	.79
Teachers' Self-Reported Practices to Promote Scientific Inquiry (5 Items)	2.53	.53	1.38	1.42	.10
Teachers' Self-Reported Practices to Support Students' ELD (8 Items)	2.58	.51	1.44	1.91	.06
Teachers' Self-reported Practices to Use CRTTs (4 Items)	2.88	.50	.36	.10	.60

Level 2: teachers' conceived practices. The analysis of the qualitative data involved

three iterations. The first iteration was emergent coding — coding the responses using *ATLAS.ti*.

Then I arranged a priori codes from the four variables of the survey used in Chapter Two and organized the codes into corresponding four categories: practices to promote scientific understanding, practices to promote scientific inquiry, practices to support ELD, and practices reflecting CRT. The third step was to quantify the qualitative data with the counts of survey items throughout the interview scripts to integrate the quantitative and qualitative data for a relatively complete understanding of the phenomenon (Kerrigan, 2014).

Themes from the emergent codes. The first iteration of the qualitative data analysis aimed to reveal the major themes emerging from the participants' articulation of their conceived effective practices of teaching inquiry science with ELLs (Creswell, 2013). With descriptive codes (Miles, Huberman, & Saldana, 2014) generated inductively, this iteration generated the following themes that represented the shared conceptions across the participants. The following section analyzed the three themes supported by quotations from the interview transcripts.

Firstly, all the participants claimed in the interview to emphasize integrating language and science inquiry, but evidence from their comments on the functions of language and science inquiry showed that their understanding of the integration was one way. Researchers showed that the integration of language and science inquiry complements each other (Pearson, Moje, & Greenleaf, 2010); however, the participants expressed their understanding of inquiry science as the purpose and context for ELD and missed the impacts of ELD on science inquiry. Seven out of eight participants mentioned the importance of integrating inquiry and language. For example, Participant 6 commented, "lessons always had elements of both and are almost always taught elements of both." Participant 2 used the analogy of "two sides of the same coin" to describe the relationship between language and content. He further explained the relationship:

I used an effective science experiment. So the children were learning the scientific knowledge. But the end result was there right in the instruction text. So they were working on the skills that they needed for English, but actually, by integrating it, they were able to learn two things at once.

These participants described the simultaneity of science inquiry and ELD. A direct reason for this emphasis is a professional training program that the schools organized to promote Content and Language Integrated Learning (CLIL) in the 2019-2020 school year. Therefore, some of the participants even explicitly used the term CLIL when describing their beliefs and practices.

Nevertheless, unlike the complementary link between content and language, most participants focus more on how inquiry science helps contextualize language than how language facilitates inquiry science learning. For example, Participant 2 conceived inquiry to be the purpose of language use in his classroom:

If I can give the children a purpose, and a reason why we're doing this learning, then it gives them more reason to discuss the vocabulary discuss the work so I think for it to be a successful science lesson the children need to be able to describe what they can see, but also start to break down the vocabulary and to use it comfortably with their friends.

When I asked them open questions about teaching inquiry science with ELLs and teaching inquiry science in general, none of the participants shared concrete examples or elaborated on how language promotes higher-order thinking or cognitive development in scientific inquiry except for a couple of them, who briefly mentioned the connection between language and thoughts/thinking. Therefore, these participants' understanding of the integration of

language and science appeared salient, but the underlying unidirectional benefits that inquiry science brings to ELD revealed gaps in their conception.

Secondly, as reported in their interviews, the participants' conceived practices reflected a social constructivist approach to teaching and learning, including the Zone of Proximal Development (ZPD; Vygotsky, 1978) and scaffolding (Wood, Bruner, & Ross, 1976). Social constructivism (Wood et al., 1976; Vygotsky, 1978) posits that children's development relies on challenges at the right level and requires scaffolding before they eventually complete the challenges independently. Seven out of eight participants explicitly pointed out the importance of their students' role in learning. For example, Participant 5 expressed, "the children guide the learning." The salient message across the participants was the central role of learners in their classrooms, which put their students in the driver's seat in learning.

The participants also identified varied strategies to scaffold students' development in their ZPD. Six of them emphasized the importance of hands-on activities in both ELD and inquiry-based learning. As Participant 7 said, "I tend to use a lot of hands-on activities. I do a lot of craft and a lot of art." Three participants pointed out the role of students' prior knowledge and the importance of getting to build on students' prior knowledge. Participant 4 commented, "So for me, inquiry or that first step of any inquiry cycle is about that hook about getting those questions. What do they want to know? What do they already know? So I think, for me, that's, that's really important." Besides, Participant 8 particularly described her focus on modeling and releasing the teacher's power step by step. Furthermore, five participants mentioned translanguaging as a scaffolding technique. For instance, Participant 7 explained her approach to translanguaging:

What's really important is the use of your co-teacher here. Because getting that

initial content language over in their language, as well as in English, is, you know,

that's key. So it's not just, it's not just building a relationship with a kid, it's having

a really good relationship with your co-teacher, and so that you're in sync with each

other. And that's really important. I've been very fortunate that, you know, I've

always had great co-teachers, and I just think it makes that process so much more

fluid. And so it's upfront in the language. It's getting that across. It's building in

scaffolding for those who are struggling.

The recognition of translanguaging could be an extension of the teachers' emphasis on the

central role of learners and learners' prior knowledge. The participants considered using students'

mother tongue as a tool to build comprehension and relationships, demonstrating an inclusive

approach to students' heritage.

Apart from acknowledging students' mother tongue, four participants recognized the need

for scaffolding cross-cultural learning behavior. The participants brought up the gaps between

learning behaviors that they expected and that students previously developed. For example,

Participant 8 pointed out the need to provide scaffolding for students to work in groups. She

explains:

It was explicitly taught the language as well, that suited I found the class, the

children, the Chinese children, because they were looking for some part where they

were reassured, and they had to, you know, oh, this is what I have to do. Okay, I can

do this, you've told me if you've shown me they do it. And so that's what I'm

saying, you know, it's, it's that reassurance, it's like, they may be culturally used to,

you know, having to do you know, exactly what maybe the teacher is sent to do.

Okay, maybe I don't know, from I don't know, whether they have, you know, even

working in the groups, I think, you know, that group work, you know, it was like,

Well, you know, you can talk to the person, but you couldn't just say, you know,

you can talk to your person, I'd be like, you'd have to show them you'd have to

model, this is something that you could ask, or you could, you know, you could do

together.

The participants viewed learning behavior as a cultural construct, understanding that the Chinese

students had developed certain patterns and beliefs about teaching and learning, which differed

from how the international teachers organized lessons. Thus, a couple of participants understood

possible challenges if their students received instructions without scaffolding.

The third theme is the participants' overemphasis on vocabulary building, which

overshadowed macro language skills. According to the Communicative Language Teaching

theory, language development should focus on macro skills, such as speaking, listening, reading,

and writing, rather than micro-skills, i.e., pronunciation, spelling, vocabulary, and grammar

(Aydoğan & Akbarov, 2014). Although the respondents described their understanding of ELD

from varied angles, including vocabulary, structure, speaking, listening, speaking, writing, and

reading, the dominating theme from their interview responses is vocabulary building. For

example, all the respondents explicitly mentioned vocabulary in their interviews. In contrast,

only two mentioned speaking, two mentioned writing, one mentioned listening, and one

mentioned reading. The dominance of vocabulary development in the responses reflected a

relatively simplistic view of language learning, which in practice may limit the opportunities for

ELD.

Themes from a priori codes. Following the inductive approach, I used a deductive

approach as the second iteration of the qualitative data (Miles et al., 2014). I developed a priori

codes from the research-supported constructs on the conceptual framework developed from the

literature in Chapter One and reanalyzed the interview data. Table 4 shows that the constructs

appeared in the participants' responses to different degrees. The counts across participants

showed the total number of each code, and the counts between participants showed the total

number of participants who mentioned the code.

Table 4

A Priori Coding

A Priori Codes	Counts across Participants	Counts between Participants
Inquiry Science	47	7 (P2, P3, P4, P5, P6, P7, P8)
Instruction to Support ELD	41	8 (P1, P2, P3, P4, P5, P6, P7, P8)
Culturally Responsive Teaching	15	7 (P2, P3, P4, P5, P6, P7, P8)
ELLs' Engagement	10	5 (P2, P4, P5, P6, P8)
ELLs' Social and Emotional Development	14	6 (P1, P2, P3, P5, P6, P7)
ELL's Science and English Language Development	6	5 (P1, P2, P4, P5, P6)

Following the above a priori coding, three themes emerged. Firstly, the participants'

conceived inquiry science practices with ELLs featured an unbalanced spread among the

research-supported strategies. Most participants conceive that the application of science concepts

and reduction to scientific vocabulary as effective strategies. For example, Participant 5 shared

the emphasis of his lesson as "the discussion and trying to understand trying to place that into a

context of the wider topic." Additionally, Participant 1 emphasized the importance of delivering

"a message to the children in simple terms as possible." The recurring messages about these two

strategies across the participants reflected a unified understanding of the nature of scientific inquiry, i.e., applying science concepts and knowledge, and the accessibility for ELLs, i.e., through simplified language to reduce linguistic barriers. The discussions of students' prior knowledge and experience are also important to five respondents, e.g., knowing "what they already know about the particular science topic that we're doing" (Participant 7), which reflected a constructivist perspective into teaching and learning. Half of the participants deemed "a really nice mix of writing activities, which are linked to the science" (Participant 5), using examples/materials "relevant in China" (Participant 8) and "extending it (the young learners' initial culture) into other cultures" (Participant 7). Surprisingly, none of the participants mentioned using measurement tools or allowing students to write in Chinese or develop positive cultural attitudes and values. Therefore, the participants' conceived inquiry science instruction with ELLs coincided with only some research-supported strategies identified by the research.

Secondly, the participants associated the ELLs' social and emotional development with the linguistic and cultural challenges. Like Participant 5 described:

I'd say the first month or two was very, we have an expression here of getting blood from a stone that especially like you keep tries really hard, really hard to get going. But, but then something clicked, I'd say about six or seven weeks in, I think the children maybe got used to the school, they sort of had a much clearer understanding of the separation between CML (Chinese-Medium Learning) and EML (English-Medium Learning). And they forged all their relationships within the class. So they weren't nervous to talk in front of other people. And that's when it really started to kick on. But I think a big factor in that has been the circle time as well, because we're really sort of forcing the

> idea. We listen to each other. Everyone has a chance to speak if you would like
>
> to, and I think that sort of really intertwines with emotions.

As described by Participant 5, learning intertwined with students' emotional development when they got used to the differences between a system with which they were familiar — Chinese-Medium Learning — and a system with which they were new — English-Medium Learning. Participant 5 pointed out the expected learning behaviors, e.g., verbally communicating with others, as part of the acculturation process, which she related to students' emotional openness and adaption.

Furthermore, the participants considered a series of strategies to support their students in these challenges, including engaging students in the "bigger community" (Participant 1), "using the iPads" (Participant 2), and most importantly, collaborating with their Chinese teaching assistant in building an inclusive, safe environment as their "support was absolutely vital for our progress" (Participant 6). Participant 7 commented on her work with her teaching assistant:

> what's really important is the use of your teaching assistant here. Because getting
>
> that initial content language over in their language, as well as in English, is, you
>
> know, that's key. So it's not just building a relationship with a kid. It's having a
>
> really good relationship with your co-teacher and so that you're in sync with each
>
> other.

The brokerage provided by her teaching assistant to bridge the linguistic and cultural bridge between the international English-speaking teacher and the students acted as a bridge to allow social and emotional links for the ELLs. Thus, the ELLs' social and emotional development depended on the bonding they could build to overcome the linguistic and cultural barriers.

Thirdly, the participants' descriptions of their strategies to teach inquiry science with ELLs overweighed the ELLs' engagement and social and emotional development. Additionally, they barely mentioned ELLs' development in science and the English language. The lack of reference to ELLs' engagement, social and emotional development, and learning outcomes revealed the disconnection between the participants' effective instruction and its impacts on their students or the lack of means to measure or describe students' progress. Therefore, their responses emphasized more the description of the strategies than the ELL progress in English or science.

Level 3: teachers' self-reported and conceived practices. Based on the absence and presence of each survey item in the interview responses between the participants, I further quantified the interview data with three values: 1, 0, and -1. 1 represents the presence of a research-recommended code, 0 represents the absence of a code, and -1 represents being against a research-recommended code. Thus, each survey item becomes a code, being either present, absent, or against in the interview scripts. Table 5 is a summary of the quantification results. The first column is a list of the survey items. The second column, the quantification values, represents the accumulated score of each survey item throughout the interview transcripts based on how many times each item is categorized as being present, absent, or misunderstood: when a participant mentioned a survey item once, the survey item received a score of one; when no participant mentioned a survey item, it received no score; when a participant mentioned the opposite of a survey item, it received a score of minus one. The quantification value in the second column is the sum of these scores. For example, the item "allowing students to write in Chinese" received a total score of minus one because none but one participant mentioned this item in their response; furthermore, the one mention by Participant 3 revealed an understanding

contrary of "allowing students to write in Chinese" when he said, "I'm not a big fan of having any Mandarin in the classroom." The third column represents how I categorized the survey items into variables based on the four subscales: teachers' conceived practices to promote scientific understanding, teachers' conceived practices to promote scientific inquiry, teachers' conceived practices to support students' ELD, and teachers' conceived practices to use CRRTs. The last column shows the percentages of how many times participants brought up the variables. Thus, Table 5 depicts quantified qualitative data for comparison with quantitative data.

Table 5

Quantification of the Qualitative Data

Survey Items	Sum Quantification Values	Variables	Quantification Percentages
Using Students' Mistakes	3	Teachers'	48%
Explaining Reasoning	3	Conceived	
Applying Science Concepts	6	Practices to	
Connecting with Home Life	3	Promote Scientific	
Discussing Prior Knowledge or Experience	4	Understanding	
Using Scientific Skills	3	Teachers'	30%
Using Measurement Tools	0	Conceived	
Using Everyday Items	3	Practices to	
Analyzing Relationships	3	Promote Scientific	
Writing about Scientific Findings	3	Inquiry	
Revising English Materials	3	Teachers'	27%
Reducing to Key Science Vocabulary	7	Conceived Practices to	
One-On-One Assessment	2	Support Students'	
Creating Small Mixed-Ability Groups	3	ELD	
Using Science Vocabulary in Chinese	2		
Allowing Students' Discussion in Chinese	1		
Encouraging Using Chinese in Small Groups	0		
Allowing Students to Write in Chinese	-1		

Survey Items	Sum Quantification Values	Variables	Quantification Percentages
Examples/Materials Reflecting Chinese Culture	4	Teachers' Conceived	44%
Varied Teaching Styles	4	Practices to Use	
Developing Diverse Cultural Perspectives	3	CRTTs	
Developing Positive Cultural Attitudes and Values	3		

According to Table 5, regardless of the variances within each variable caused by an imbalanced use of each survey item, forty-eight percent of the participants aligned with research literature-identified practices to promote scientific understanding. Thirty percent of the participants conceived research-supported practices to promote scientific inquiry. Twenty-seven percent of the participants' conceptions of effective practices to support students' ELD align with the research literature. Furthermore, forty-four percent of the participants concurred with the research literature regarding effective practices to use CRTTs. The last step of the data analysis also involved comparing the quantified qualitative data with the quantitative data. This step included a cross-tabulation analysis to examine the relationship between teachers' self-reported practices and their conceived inquiry science instruction practices with ELLs.

Table 6 shows how I transformed the quantified values of conceived practices into ordinal data. I gave each survey item in Table 5 an ordinal value from zero to three, depending on the number of respondents who mentioned each survey item across the eight participants. For example, if no participant mentioned a survey item or more participants showed a misunderstanding of the survey item than those whose understanding aligned with the survey item, I assigned zero to the survey item. When one to four participants mentioned a survey item correctly, the survey item received an ordinal value of one. When five to seven participants conceived a survey item correctly, the survey item received an ordinal value of two. I gave an

ordinal value of three to survey items which all eight participants correctly mentioned. Consequently, the original counts of participants whose conceived practices aligned with the survey items became ordinal data ranging from zero to three and ready for a cross-tabulation analysis.

Table 6

Transforming Quantified Values of Conceived Practices

Original Counts	Transformed Ordinal Data
Below 0 or 0 respondent	0 — Incorrectly conceived or conceived by none
From 1 to 4 respondents	1 — Conceived by some participants
From 5 to 7 respondents	2 — Conceived by most participants
8 respondents	3 — Conceived by all participants

Based on the preliminary analysis results, this study tested the chi-square of independence between the average of self-reported practices across participants and the quantified values of conceived practices as the data comply with the following three assumptions. Firstly, both variables are ordinal, meeting the chi-square test's assumption for the measurement level to be nominal or ordinal. Secondly, both variables involve frequency counts. Thirdly, the data are mutually exclusive — no participants can report that they use CTTs in every lesson and in some lessons. Besides, the same mutual exclusivity applies to their responses to the conceived practices (McHugh, 2013). Therefore, running the chi-square test of independence is appropriate to disclose the association between the two variables. Additionally, the study predetermines the level of significance to be $\alpha = .05$.

The chi-square test of independence failed to reject the null hypothesis and showed The. Therefore, the participants' self-reported practices in their classroom last month differed from their conceived inquiry science instructions with ELLs. The mixed-methods analysis revealed

that gaps existed between the participants' conceptions of best practices and self-reported practices.

Findings and Discussion

The above quantitative data analysis answered research questions two, three, and four regarding international English-speaking teachers' self-reported instructional practices. The qualitative data analysis responded to RQ one regarding international English-speaking teachers' conceived science instruction, and the comparison between the qualitative data and the quantification of the qualitative data addressed RQ five. Overall, the findings from the mixed-method study disclosed the disconnections between international English-speaking teachers' conceived self-practice and research-supported science inquiry practices with ELLs.

Findings for Research Question One

RQ one was, "how do international English-speaking teachers describe effective science instruction for elementary ELLs?" The inductive qualitative data analysis revealed how international English-speaking teachers conceived inquiry science practices with ELLs. Their conceptions indicated a social constructivist approach to teaching and learning and an overemphasis on vocabulary development and the impacts of scientific inquiry on students' ELD. Furthermore, the international English-speaking teachers' conceptions featured the research-supported strategies to different degrees. They emphasized their strategies more than their ELLs' engagement and social and emotional development, as indicated by the underwhelming reference to students' engagement and social-emotional development in the interviews. Lastly, the international English-speaking teachers associated the ELLs' social and emotional development with linguistic and cultural challenges.

Findings for Research Questions Two through Four

Research Questions two to four asked, "how often do international English-speaking teachers report using research-based instructional practices to promote scientific understanding and inquiry, to support English language development, and to use culturally responsive practices when teaching science?" The participants reported to promote students' scientific understanding between *Most Lessons* and *Every Lesson* ($M = 3.08$, $SD = 0.52$), to promote scientific inquiry between *Some Lessons* and *Most Lessons* ($M = 2.53$, $SD = 0.53$), to support ELD between *Some Lessons* and *Most Lessons* ($M = 2.58$, $SD = 0.51$), and to use CRTTs *Some Lessons* and *Most Lessons* ($M = 2.88$, $SD = 0.50$). Additionally, the participants' self-reported practices for the four purposes are independent of each other, X^2 (30, $N = 8$) = 34.67, $p = .26$.

Findings for Research Questions Five

RQ five asked, "how do international English-speaking teachers' conceived and self-reported inquiry science teaching practices with ELLs differ?" Two data analysis sources responded to this research question: the qualitative data analysis disclosing international English-speaking teachers' conceived inquiry science practices with ELLs and the quantitative data analysis revealing their self-reported inquiry science practices with ELLs. The two sources complement each other in getting a full picture of international English-speaking teachers' descriptions of effective science instruction for elementary ELLs. The quantitative and qualitative data together suggested a lack of association between the teachers' self-reported practices of research-suggested strategies and their conceived effective inquiry science practices with ELLs, X^2 (6, $N = 22$) = 8.38, $p = .21$.

The above findings revealed that international English-speaking teachers prioritized different strategies to teaching inquiry science with elementary ELLs despite their self-reported

perceptions of their adherence to research-suggested practices. The gaps between the participants' self-reported and conceived practices in teaching inquiry science with ELLs helped identify needs in multiple areas to rectify the teachers' priorities. For example, the teachers need to consider using evidence-based and research-supported strategies in their instructional practices. They need to base their evidence on students' learning outcomes in science and the English language. They also need to adopt a holistic view of students' ELD and recognize and promote its benefits to students' science inquiry. Furthermore, the teachers need to enhance their attention to and efficacy with students' engagement and social and emotional development.

As a member of the head office that manages the three schools in this needs assessment study, I acknowledge potential biases caused by the proximity between the researcher and the context. For example, I observed some of the international English-speaking teachers' lessons before this study and developed some prior knowledge of their teaching practices and the challenges their ELL students faced. Therefore, I adopted an existing survey from the literature rather than designing a new survey to mitigate this information. Besides, I mixed a priori coding with emergent coding in my qualitative analysis to allow broader perspectives into the interview data and used quotations throughout my qualitative data analysis.

There was the possibility that the participants completed the survey with subject bias due to my leadership role in the context, which may threaten the validity of my needs assessment. Therefore, further research should consider triangulating the survey data with classroom observations and surveys on ELLs' perceptions of their international English teachers' practice. Besides, the small sample size, the non-normality of the quantitative data, and the adapted Likert scale from five points to four points for CRTTS may have compromised the quantitative data

collected in this study. Therefore, further research needs to consider bigger sample sizes for

generalizable findings.

Chapter 3

Intervention Literature Review

The mixed-methods needs assessment study in Chapter Two revealed a lack of significant association between eight international English-speaking teachers' instructional priorities and the research-supported practices, $\chi2$ (6, N = 22) = 8.38, p = .21, in the context of three international bilingual elementary schools in China. Although the participants reported in the quantitative survey that they employed research-suggested strategies at a range between *some lessons* and *every lesson*, participants reported prioritizing an oversimplified teaching role of building ELLs' English vocabulary rather than embracing a balanced approach to ELLs' engagement and social-emotional development through science inquiry, ELD, and CRT (Lee & Maerten-Rivera, 2012; Oyerinde, 2008). Furthermore, the teachers' levels of attention to ELLs' engagement and social-emotional development from the qualitative data analysis offered preponderant evidence of a disconnection between the teachers' instructional practices and ELLs' academic access and outcomes, which the participants considered challenging due to the cultural differences between teachers and students.

Within the multiple areas for improvement identified by the needs assessment, the context and literature suggest an intervention specifically to address the cultural difference between the international English-speaking teachers and their Chinese students for multiple reasons. Firstly, the cultural gap is a critical factor in student learning behavior (Vincent, Randall, Cartledge, Tobin, & Swain-Bradway, 2011), engagement (Bradshaw, Pas, Bottiani, Debnam, Reinke, Herman, & Rosenberg, 2018; Fataar, 2012), and academic achievement (Kanaʻiaupuni, Ledward, & Jensen, 2010), so related interventions have the potential to impact multiple areas of student development. Secondly, a focus on cultural competence can help foreground ELLs'

engagement and social-emotional development and enhance any instructional strategies for ELD and science inquiry. Lastly, my context already launched inventions targeting inquiry-based learning and supporting ELD, making intervening in the area of cultural competence a salient but unaddressed need.

With the above intervention focus identified by the needs assessment study, grounded in the relevant literature, and related to needs in the context, the following literature review aims to surface intervention strategies that impact the cultural difference between ELLs and their teachers. The review integrates the social cognitive theory (Bandura, 1978, 1986) and the professional capital (Hargreaves & Fullan, 2012) as lenses to discuss interventions that develop teachers' intercultural competence (Deardorff, 2011), which impacts their implementation of CRT (Cramer & Bennett, 2015; Gay, 2001; Villegas & Lucas, 2002) in their support of ELLs' engagement and social-emotional development. The review consists of four parts: theoretical framework, conceptual framework, intervention literature synthesis, proposed intervention summary, and conclusion.

Theoretical Framework

This review combines two sets of theories to develop the intervention's theoretical framework: Bandura's (1978, 1986) social cognitive theory and Hargreaves and Fullan's (2012) professional capital theory. Both sets of theories emphasize the role of the environment in individuals' cognitive and behavioral changes. Bandura's (1978, 1986) social cognitive theory frames the impacts of the environment with the triadic reciprocal determinism, while the professional capital (Hargreaves & Fullan, 2012), inclusive of social capital theory (Coleman, 1986; Putnam, 1993), interprets the environment as the social interactions individuals make. Furthermore, Hargreaves and Fullan (2012) posit that teachers' professionalism can be dependent

on their decisional capital collectively. That is, individual teachers' professionalism improves when a group of them make the same decisions in their everyday practice. Therefore, combining the two sets of theories allows exploration of interventions with individual teachers' cognitive and behavioral changes through their social interactions. The following section describes the two theories separately before integrating them into this literature review's theoretical framework.

Social Cognitive Theory

Bandura (1986) posits that *triadic reciprocal determinism* explains the bidirectional relations between person, behavior, and environment. Accordingly, this review follows the triadic reciprocal determinism framework to mediate teachers' efficacy beliefs and, subsequently, their instructional practices, ultimately contributing to students' learning outcomes. Therefore, teachers' efficacy beliefs are intervenable through their environment and impact their teaching practices.

This literature review recognizes the "cognitive mechanism" behind behavioral changes and adopts Bandura's (1978) social cognitive theory as its framework (p. 139). As Bandura (1978) underscores, the reciprocal relationship exists between cognitive processes and behavioral changes as the former can intervene in the latter's effectiveness and that the latter's effects can affect the former. As this literature review focuses on making changes in teachers' professional practices, i.e., professional development, the review acknowledges the bidirectional association between teachers' professional development and their cognitive processes.

Bandura (1978) deconstructs efficacy beliefs into efficacy expectations and outcome expectations, and the difference between the two terms is their focus: the former on individuals' beliefs with themselves, whereas the latter on the causality between actions and outcomes. This literature review examines both types of beliefs in its design. Additionally, this review seeks to

address the four sources of efficacy expectations: performance accomplishments, vicarious experience, verbal persuasion, and emotional arousal, as the review serves to support an intervention (Bandura, 1986).

Professional Capital Theory

The second theoretical framework considered is the professional capital theory. Professional capital includes three parts: human capital, social capital, and decisional capital (Hargreaves & Fullan, 2012). Human capital refers to individuals' knowledge, skills, and abilities (Becker, 1964), and social capital refers to the structure and content of any individual's social relations, including internal social capital — the relationship between individuals — and external social capital — the relationships between individuals and organizations (Adler & Kwon, 2002; Hitt, Lee, & Yucel, 2002). The human and social capital theories share a common focus on individual development; however, the two theories differ in their views of where the development derives. The human capital theory adopts the perspective of individuals' acquisition or inheritance of knowledge, skills, and attitudes, whereas the social capital theory underscores a network of relations with individuals or organizations that any individuals can access in their development (Coleman, 1986; Putnam, 1993).

Furthermore, Hargreaves and Fullan (2012) posit that decisional capital is the third component of teachers' professional capital. As teachers learn from their personal practices and from others' practices, they develop standards for their decisions in assessing various circumstances, leading to a shared sense of professionalism. For example, most teachers in a school with diverse population may develop differentiated classroom instruction as they consider differentiation an appropriate decision for students in their context. Gradually, differentiation

becomes a professional standard for teachers in this context. Therefore, decisional capital results from individual development and social interactions, i.e., human capital and social capital.

Similar to the social cognitive theory's interpretation of the reciprocal determinism between individuals and their environment, professional capital encompasses three interdependent components, human capital, social capital, and decisional capital(Adler & Kwon, 2002; Hargreaves & Fullan, 2012). For example, Coleman (2009) argues that social capital can often lead to human capital improvement. Furthermore, Hsu (2007) posits that human capital development contributes to that of social capital. Therefore, individual teachers' development of knowledge, skills, and abilities is interdependent on their social relations, and the two together contribute to their professional growth and their decisions collectively and as individuals (Hargreaves & Fullan, 2012).

Integrating Theories

The above two frameworks parallel each other in multiple ways. Firstly, they situate individuals within their environment, the social cognitive theory focusing on the broad environment, and the professional capital on individuals' relationships and relationships between individuals and organizations. Secondly, both frameworks describe the bidirectional relationship between individuals and their environment. The social cognitive theory concentrates on changes in individuals' beliefs and behavior, while the human and social capital theories focus on the association between the decrease or increase of human and social capital through an economic lens. Thirdly, the social cognitive theory posits that people's efficacy beliefs buttress their behavioral change, whereas the professional capital theory recognizes the professional capital underpins individual and collective decisions. These parallels allow this review to integrate the two sets of theories and develop the theoretical framework in Figure 4.
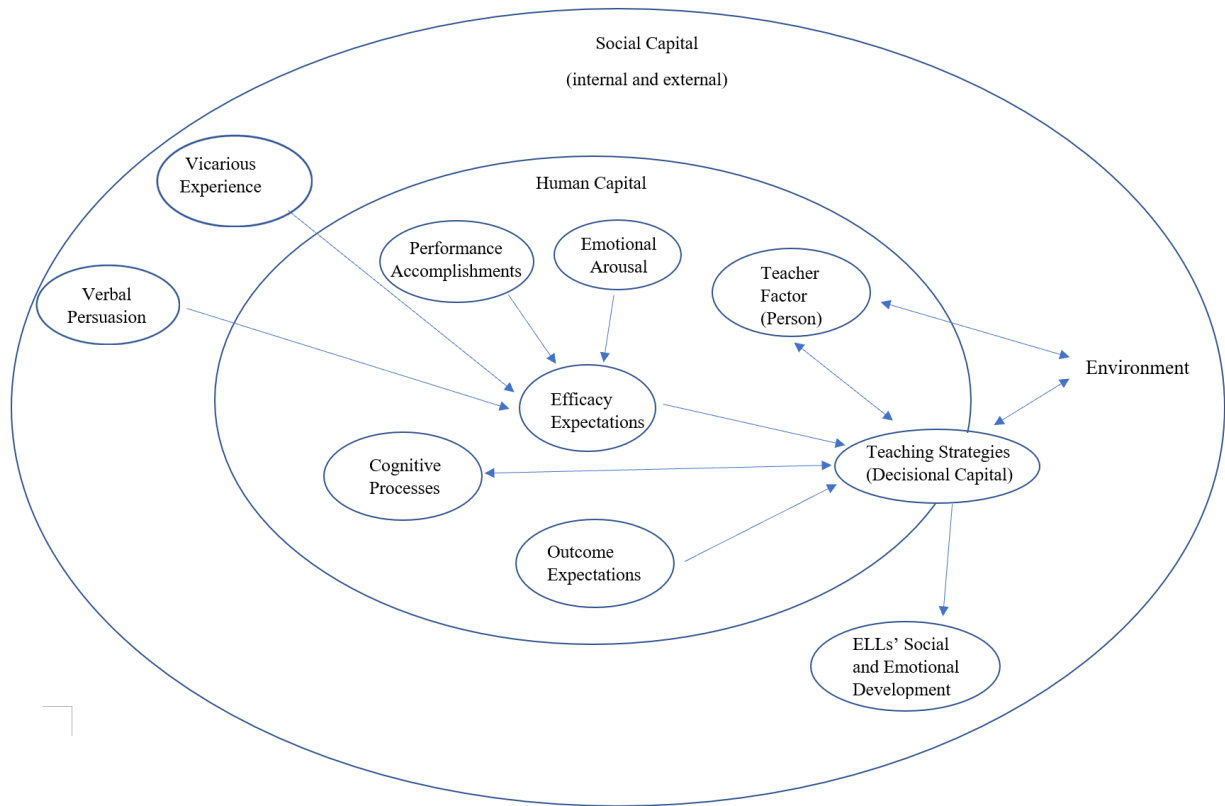
Figure 4. Theoretical framework combining Bandura's (1986) triadic reciprocal determinism, Bandura's (1978) two types of beliefs and four sources for efficacy beliefs, Becker's (1964) human capital theory, the social capital theory (Adler & Kwon, 2002; Hitt et al., 2002), and Hargreaves and Fullan's (2012) professional capital.

According to this framework, the focal point for my intervention — changing teachers' teaching strategies (behavior) or decisions when they interact with ELLs (decisional capital) — derives from a series of direct and indirect sources. The direct sources include the teacher factor (person) and the environment as posited by Bandura's (1986) triadic reciprocal determinism and teachers' cognitive processes according to Bandura's (1978) social cognitive theory. Besides, the relationships between teaching strategies (behavior) or teachers' professional decisions (decisional capital) and person, environment, and cognitive processes are bidirectional. Specifically, the indirect sources of teachers' efficacy expectations include verbal persuasion,

emotional arousal, performance accomplishments, and vicarious experience. Alongside teachers' classroom practices, their outcome expectations contribute to using teaching resources to support ELLs' social and emotional development.

In this theoretical framework, the two sets of theory coincide in multiple ways. Firstly, the inner circle factors in the social cognitive theory constitute the human capital of individual teachers, and the outer circle factors in the social cognitive theory make up the social capital through the lens of the social capital theory or the environment through the lens of the social cognitive theory. Secondly, both theories consider teachers' behavioral changes as the direct or indirect result of individual and social factors. For example, professional capital theory considers human and social capital as contributors to teachers' decision-making, whereas the social cognitive theory posits that social interactions can impact individual beliefs, ultimately leading to teachers' behaviors. Thirdly, the two theories enhance each other as integrated in the theoretical framework. On the one hand, the social cognitive theory complements the human capital theory with intervenable factors such as efficacy beliefs and cognitive processes. On the other hand, the social capital theory foregrounds the social relations in an individual's development environment. Therefore, integrating the two theory sets enhances the likelihood of intervening international English-speaking teachers' strategies with ELLs.

Conceptual Framework

The above theoretical framework outlines international English-speaking teachers' behavioral change through interventions through their cognitive processes, efficacy beliefs, and social relations. Therefore, this chapter posits that intercultural competence encompasses intervenable knowledge, skills, and attitudes for developing CRT techniques, which support the international English-speaking teachers to overcome the barrier of mismatched teacher-student

cultural backgrounds. Furthermore, this chapter considers professional development and

coaching intervention methods to develop international English-speaking teachers' intercultural

competence. The conceptual framework in Figure 5 presents the factors in the intervention

literature. As the conceptual framework in Chapter One (Figure 2) suggests, multiple factors

contribute to ELLs' outcomes in science and English language in international school settings.

The direct factors include ELLs' engagement and their social-emotional development, and the

indirect factors include international English-speaking teachers' instruction to promote ELD,

which CRT strategies can drive. The current conceptual framework extends the one in Chapter

One with the immediate factor that contributes to CRT strategies, i.e., intercultural competence,

and two factors driving the development of intercultural competence and CRT strategies, i.e., PD

and coaching.
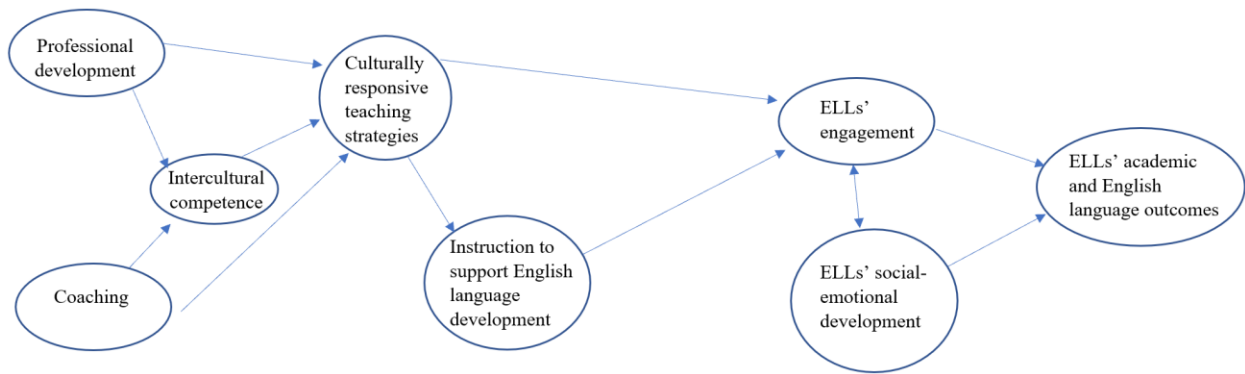
Figure 5. Conceptual framework.

Intervention Literature Synthesis

The above conceptual framework (Figure 5) zooms onto teachers' growth in intercultural

competence and CRT strategies. Besides, the theoretical framework (Figure 4) looks at teacher

development through the lens of a blend of two sets of theories: the social cognitive theory and

the professional capital theory. The former reveals that teacher development is intervenable

through various factors and reversely impacts them. Apart from the goal for any intervention program to improve teacher performance in classrooms, some intervention programs aim to influence teachers' efficacy beliefs to support their behavioral changes (Bandura, 1978; Franke, Carpenter, Levi, & Fennema, 2001).

Additionally, like the social cognitive theory's conviction that individuals' environment and their beliefs and behavior affect each other bi-directionally, the human, and social capital theories posit that individuals' human and social capital impact each other (Adler & Kwon, 2002; Coleman, 2009), and the professional capital theory states that human capital and social capital contribute to the development of decisional capital, directly affecting teachers' professional decisions as a group and as individuals (Hargreaves & Fullan, 2012). Accordingly, teacher development contributes to teacher-student, teacher-teacher, teacher-leader, teacher-parent relationships, and the correlation between teachers and school development; reversely, these above relationships impact teacher growth (Coleman, 2009; Hsu, 2007).

Apart from Hargreaves and Fullan's (2012) theory that human capital and social capital contribute to teachers' decisional capital, studies also support the significant impacts of teachers' human and social capital on student achievement directly (Daly, Moolenaar, Der-Martirosian, & Liou, 2014; Sclafani, 2008). For example, in their quantitative study in five elementary schools in a school district in the United States, Daly et al. (2014) collected human and social capital measures, i.e., years of experience and teachers' frequency of interaction with other educators on a variety of relationships, from 63 teachers and prior and present results on an English Language Arts Interim Benchmark Assessment of 1,196 third to fifth graders whom the 63 teachers taught. The study analyzed student achievement from the May 2008 English Language Arts Interim Benchmark Assessment as a dependent variable and its relationship with independent variables,

including teachers' years in education and years at the same school as their human capital, their incoming, outgoing, and sharing ties around knowledge about reading comprehension as their social capital, and school-level, teacher-level, and student-level control variables. Despite methodological limitations related to sample size and simplification of teachers' capital, the study followed the social network analysis and hierarchical linear modeling and significantly impacted student achievement by teachers' human and social capital. Given the importance of teachers' human and social capital as recognized by Daly et al.'s (2014) exploratory study, the following section focuses on which elements of teacher human and social capital to address and how different contexts develop teachers' human and social capital. Therefore, the following is a presentation of the literature about teacher development for serving linguistically and culturally diverse students, examining constructs identified in the above theoretical framework, and organizes into two parts: human capital and social capital.

Human Capital

Teachers' human capital includes teachers' knowledge, skills, and abilities (Becker, 1964), which teachers can either acquire or inherit from prior experience, training, or professional experience (Hsu, 2007). Teachers' human capital has a significant relationship to students' academic performance. For example, Cebula, Mixon, and Montez (2015) explored the relationships between 172 high schools' Academic Performance Index and their teachers' human capital in Los Angeles County. Like Daly et al.'s (2014) oversimplified interpretation of teachers' human capital as years of experience, Cebula et al. (2015) quantified teachers' human capital as their educational attainment. They operationalized this construct as teachers' current salary range, missing the nuanced competencies needed for teaching different subjects and students and human capital gained from in-service professional development. Nonetheless, this quantitative

study found that the association between teachers' salary range, directly reflecting their educational attainment, and their school's performance is positive and statistically significant at the 95% level or higher. Therefore, given the importance of teachers' human capital as an intervenable area to impact student outcomes, this section includes literature about two human capital resources crucial for educational contexts involving ELLs — intercultural competence and CRT.

PD for intercultural competence. Intercultural competence is a term associated with multiple interpretations depending on the discipline that uses it or the focus of its assessment (Deardorff, 2011). For example, the names that various assessment tools give the term vary from "multiculturalism, cross-cultural adaption, intercultural sensitivity, cultural intelligence, international communication, transcultural communication, global competence, cross-cultural awareness, and global citizenship" (Deardorff, 2011, p. 66). In the context of K-12 schools, intercultural competence serves as the foundation for cultural intelligence, CRT, multiculturally educated students, culturally responsive school leadership, and a multicultural school community (Goh, 2012; Khalifa et al., 2016; Ng, Dyne, & Soon, 2009; Reintjes, 2019). Therefore, the development of teachers' intercultural competence is meaningful in culturally diverse school environments.

Developing intercultural competence through reflection. Given the multiple connotations of the term, some researchers explored the conceptions of intercultural competence within contexts, which helps identify sources of the conceptions and inform components of an intervention focusing on intercultural competence. Some researchers identified the importance of reflection and connecting feelings, actions with knowledge. For example, Jokikokko's (2005) phenomenographical study investigated how 25 qualified teachers, who recently graduated from

a Masters of Education International Teacher Education Program, conceptualized intercultural competence needed to teach diverse students in Finnish schools through ten interviews and an open-ended questionnaire. Her study revealed three themes related to the participants' conceptions of intercultural competence: first, as an ethical orientation in intercultural encounters in education; second, as efficiency orientation in completing tasks and managing issues; and third, as a pedagogical orientation in engaging students learning. Therefore, this sample of teachers in Finnish schools conceived intercultural competence as an overarching philosophy rather than specific instructional strategies. Although the study offered a holistic framework to approach teachers' intercultural competence, Jokikokko's (2005) findings did not fully support their suggestion that teacher education consider transformative, critical, and experiential pedagogies to develop intercultural competence. Nonetheless, they identified vital characteristics contributing to the program's success, including the emphasis on feelings, action, knowledge, and the combination of experiences with diversity and reflection on these experiences, all of which are inimitable in intervention programs aiming to enhance intercultural competence.

Similar to Jokikokko's (2005) emphasis on teachers' reflection on their feelings, experience, and knowledge, Bastos and Araújo e Sá (2015) also recognized the combination of theory and experience through reflection in developing teachers' intercultural competence. In comparison to Jokikokko's (2005) overarching approach to interpreting intercultural competence as ethical, efficient, and pedagogical orientation, Bastos and Araújo e Sá (2015) focused on how nine language teachers in secondary schools in the Aveiro district (Portugal) conceptualized intercultural communicative competence (ICC) and its development at the end of a one-year in-service professional development program. Bastos and Araújo e Sá's (2015) training program about ICC aimed to promote teachers' awareness, reflection, communication, and professional

action through research, action, and reflection cycles. Their training program consisted of two stages of development: the first one focusing on informing teachers with theories the second on experimenting in practice. Researchers found that the participants identified the affective, cognitive, and praxeological components through interviews with teachers as three interconnected strands of ICC. The affective component was the trigger for developing ICC, including positive attitudes towards others and oneself and relationship with others multilingual and intercultural communication. The praxeological component included personal, linguistic and communicative, and cognitive skills needed for intercultural communication. Despite the least valued in the participants' discourse, the cognitive component involves knowledge of others, the interaction process, oneself, general culture, and concepts. Therefore, Bastos and Araújo e Sá (2015) suggested heavy investment in the affective dimension of ICC in teachers' professional development, which would then lead to praxeological and cognitive development. Furthermore, admitting the small sample size and the participants' relatively homogeneous backgrounds, the researchers concluded that the co-occurrence of theoretical and experimentation and reflection are critical in the training program. Therefore, although the two studies targeted different aspects of intercultural competence, Jokikokko's (2005) broader in the program's scope than Bastos and Araújo e Sá's (2015), the researchers reached similar conclusions about the features leading to the learning success of a teachers' development program. Both studies conceptualized intercultural competence as a blend of emotions, actions, and cognition and accentuated the merging of experience, theory, and reflection in developing intercultural competence.

Given the critical role of connecting experiences and theories leading to the development of intercultural competence (Bastos & Araújo e Sá, 2015; Jokikokko, 2005), research-based intervention models can play a critical role in developing intercultural competence. For example,

in their quantitative study of 284 teachers and teaching aides across nine elementary, middle, and high schools in a suburban school district in the United States, DeJaeghere and Zhang (2008) used an 11-item cultural competence scale to measure individuals' and groups' perceived intercultural development after they participated in a 1.5-year in-service professional development program, which followed Bennett's (1993) Development Model of Intercultural Sensitivity (DMIS). At the beginning of the study, DeJaeghere and Zhang (2008) used the model's related instrument — the Intercultural Development Inventory (IDI; Hammer, Bennett, & Wiseman, 2003) — as a baseline assessment to generate individual and group profiles and diagnose training needs. The rest of the professional development included activities that revealed the participants' values, identity, cultural assumptions, and behaviors, the Seeking Educational Equity and Diversity (SEED) courses, an assessment of intercultural conflict styles (Hammer, 2005), or culture-specific workshops to raise awareness of particular ethnic/religious groups in the school population. After the intervention, the study collected quantitative data about the following factors: cultural self-awareness, awareness of cultural differences, awareness of how cultural differences affect classroom teaching, curriculum content, pedagogy, teaching styles, classroom management, and communication styles and calculated the composite scores of these items to measure perceived intercultural competence development. The ANOVA and the multiple regression analysis disclosed a statistically significant and positive association between participation in professional development and participants' intercultural competence ($R = .188$, $p<.001$ for professional development about the DMIS model and $R = .292$, $p<.001$ for other topics). Additionally, attendees of the PD, which started with the IDI group profile and individual profile interpretation, scored higher on intercultural competence than the non-attendees, and participants who received an individual profile interpretation achieved more development in the

perceived intercultural competence score than those who received a group profile interpretation. Therefore, DeJaeghere and Zhang's (2008) intervention showed the importance of addressing individual needs diagnosed by Bennett's (1993) DMIS and that purposeful design of professional development involving a diagnosis framework like the DMIS helps develop teachers' intercultural competence.

Also aiming to develop an intervention for building intercultural competence, Dimitrov and Haque (2016) targeted teachers and proposed a model for intercultural teaching competence (ITC) to serve as a tool for self-reflection, mentoring their colleagues in teaching across cultures, and feedback sharing after classroom observation. Dimitrov and Haque (2016) built the model by integrating the following four areas: the social justice and academic equity featured in Gay's (2010) CRT as the core for ITC's instructional and curricular competencies, the attitudinal and knowledge components of Deardorff's (2011) process model of intercultural competence as the foundational and facilitation skills, Paige's (1996) intercultural trainer competencies and intercultural learning as the facilitation competencies, and research (Arkoudis et al., 2013) on teaching strategies involving student engagement in cross-cultural settings as the facilitation competencies. Consequently, the model embraced twenty competencies across three groups: foundational skills, facilitation skills, and curriculum development skills, qualifying the model as an encompassing tool to support ITC development and bridge ITC and CRT.

This section of the review explored the conceptualization of intercultural competence and found that the term embodies different conceptions depending on the circumstances. Two themes came through the literature. Firstly, by developing teachers' intercultural competence, they embrace emotion-, action-, and knowledge-related dimensions, among which the emotional dimension acts as the beginning of intercultural competence development. Secondly, intercultural

competence development results from cycles of theories, actions, and reflections. Specifically, Dimitrov and Haque's (2016) ITC model can function as a reflection tool. Therefore, effective interventions to enhance teachers' intercultural competence should consider the role of affection, the integration of theories, actions, reflections, and tools like the ITC model.

PD for Culturally responsive teaching (CRT). CRT is an umbrella term that refers to constructing effective teaching for culturally diverse students based on their cultural experiences and paradigms (Gay, 2001). Researchers interpret CRT from different angles (Cramer & Bennett, 2015; Gay, 2001; Villegas & Lucas, 2002). Cramer and Bennett (2015) focused on the role of CRT in developing socially acceptable behavior and developed a checklist called Positive Behavior Interventions and Supports for three-tiered intervention on the whole school, small groups, and individual levels. Gay (2001) deconstructed CRT as a knowledge base, curricula, demonstration of cultural caring and building a learning community, cross-cultural communications, and classroom instruction. Besides, Villegas and Lucas (2002) proposed six criteria for courses that prepare culturally responsive teachers, including sociocultural consciousness, an affirming attitude toward students from culturally diverse backgrounds, commitment and skills to act as agents of change, constructivist views of learning, learning about students, and CRT practices. Thus, all these above theoretical interpretations of CRT go beyond the single act of classroom instruction. The following part about CRT will start with how CRT affects students and continue with how to develop CRT within teachers.

The above conceptions led to CRT practices with various focuses that had different impacts on student development. Firstly, CRT with behavioral orientation improved student behavior outcomes. For example, Fetterman, Ritter, Morrison, and Newman (2020) conducted a case study to examine the implementation of culturally responsive School-Wide Positive

Behavior Interventions and Supports (SWPBIS) in a Spanish-language magnet school in the Midwestern United States after one year of implementation. The intervention in this case study involved teachers' collaboration to establish and embed a behavioral management system through a multi-tiered behavioral framework for a recently founded school. The intervention included the following four aspects (Table 7).

Table 7

Fetterman et al.'s (2020) SWPBIS Intervention

Steps	Actions
1	PBIS Behavior Expectations Survey
	Operationalizing each expectation
	Developing behavior matrices
	Teaching and modeling behavior
2	Discussing prior experience with SWPBIS
	Reinforcing behavioral expectations with rewards
3	Developing an action plan to assess progress:
	SWPBIS Tiered Fidelity Inventory,
	classroom observations,
	PBIS Classroom Observation tool
4	Engage families in SWPBIS:
	a letter about SWPBIS,
	a home behavior matrix

Firstly, the school administered the PBIS Behavior Expectations survey to embrace the different perspectives within the school and develop shared ownership, leading to three primary behavioral expectations: Be Respectful, Be Responsible, and Be a Problem-Solver. Then teachers operationalized each expectation for each aspect of the school, collated the expectations into behavior matrices, and teaching this behavior through prompts and modeling followed by evaluation. Secondly, all the staff met to discuss their prior experience with SWPBIS with a focus on their personal culture and backgrounds and their students'. Then the school reinforced the behavioral expectations using individual rewards and behavioral expectation posters of

students modeling expected behaviors. Additionally, the school used a reward menu poster to show redeemed activities from the rewards. Thirdly, a PBIS team met monthly to develop a goal and action plan and assess progress against the SWPBIS Tiered Fidelity Inventory, followed by classroom observations and behavioral coaching feedback using the PBIS Classroom Observation tool (Georgia Department of Education, 2017). The last aspect was to engage families in SWPBIS through a letter about the components of SWPBIS, the implementation structure, the roles of caregivers with the SWPBIS system, and a home behavior matrix to customize areas or activities in the home environment. The study revealed the program's early successful implementation by measuring the implementation fidelity, student knowledge of behavioral expectations, and teachers' social validity judgments. For instance, students' understanding of behavioral expectations was at an accuracy rate of 73.4% with Spanish speakers and 77% with non-Spanish speakers. Therefore, Cramer and Bennett's (2015) Positive Behavior Interventions and Supports played the role of a framework for a whole-school approach to behavior through the lens of CRT.

Similar to the above study, Larson, Pas, Bradshaw, Rosenberg, and Day-Vines's (2018) quantitative study disclosed a statistically significant, positive association between observed CRT and student behavior outcomes. The study collected quantitative data from 146 teachers who participated in PD and coaching intervention in 18 elementary and middle schools. The PD adapted the Classroom Check-Up coaching model (CCU) that served as a classroom management coaching model and involved five steps: interviewing teachers for relationship building, collecting data from classrooms, providing teachers with feedback, setting goals, and continuous process monitoring. Besides, the coaching intervention asked coaches to keep a log for each participant based on their interactions. Based on the data analysis using Structural

Equation Modeling, the results revealed one standard deviation change of CRT, such as connecting the teaching to the real world and using positive humor, yielded a 0.12-point increase in observed positive student behavior. Thus, Larson et al.'s (2018) study indicated a strong relationship between CRT and student behavior outcomes following teacher professional development and coaching related to CRT.

In addition to improved student behavior outcomes, the use of CRT leads to improved student engagement as a result of CRT. For example, Walker (2009) found positive effects of CRT on student engagement in homework despite finding no significant difference in student mathematics achievement between a group with culturally relevant teaching, i.e., an ethnocentric pedagogy group, and a group without culturally relevant teaching, i.e., a traditional pedagogy group. In her quantitative study on the impacts of culturally relevant pedagogy on 55 "at-risk" students in the third, fourth, and fifty grades, Walker (2009) compared 33 participants in an ethnocentric pedagogy group and 22 participants in a traditional pedagogy group over six weeks of daily rotation through three one-hour sessions. The culturally relevant pedagogy involved adapted classroom setting/organization to promote a sense of community through cooperation and interdependence, culturally relevant instruction by facilitating students' meaning-construction following their interests and experiences, and curriculum design to reflect students' daily lives in a cultural and historical context. A t-test result indicated a significant relationship between treatment and higher frequency in homework submission and higher quality in submitted homework (t (47) = 3.34, p = .002). However, a repeated measure ANOVA disclosed a lack of significant differences between the two groups' mathematics achievement (F(1, 45) = 2.19, p > .05). Therefore, culturally relevant teaching led to higher engagement in homework completion and submission but not academic outcomes.

The above literature focused on the effects of CRT from two angles: first, behavior, including increased student understanding of behavior expectations and behavior outcome, and engagement, including engagement with homework and general engagement. These studies proved the benefits of CRT in students' social and emotional development and interventions of CRT through developing behavior management systems, learning environment, teaching approaches, and curriculum designs. Therefore, intervening in CRT through the above aspects can play a crucial role in culturally diverse students' social and emotional development.

Furthermore, the twenty competencies in Dimitrov and Haque's (2016) ITC model coincide with the aforementioned aspects of CRT, making the model relevant to interventions in CRT. As Gay (2010) posited, CRT follows four principles: developing a cultural diversity knowledge base, designing culturally relevant curricula that feature cultural caring, promoting a learning community, and cross-cultural communication. The first and second principles match ITC's curriculum design competencies, e.g., to build in "content and learning resources that represent diverse perspectives, paradigms, or disciplinary approaches" and to "provide opportunities for students to reflect on and gain a better understanding of their own multiple cultural, personal, and disciplinary identities" (Dimitrov & Haque, 2016, p. 439). The third and fourth principles agree with the facilitation competencies in Dimitrov and Haque's (2016) ITC model. Therefore, Dimitrov and Haque's (2016) ITC model can become a tool to promote teachers' CRT development.

Social Capital: Professional Learning

As described in the theoretical framework in Figure 4, social capital emphasizes the internal and external connections that individuals develop with other individuals and organizations and affect individuals' acquisition and development of human capital resources.

While enhancing individuals' efficacy beliefs is subject to environmental factors, efficacy beliefs and environment affect an individual's growth. Besides, according to Bandura's (1978, 1986) social cognitive theory, vicarious experience (Dobbs, Ippolito, & Charner-Laird, 2017), verbal persuasion (Desimone & Stuckey, 2014), and emotional arousal (Brezicha, Bergmark, & Mitra, 2015) can become sources for teachers' efficacy beliefs. Hence, the increase in teachers' social capital resources can improve their human capital, including their intercultural competence and CRT practice.

Although researchers like Lopes-Murphy and Murphy (2016) found that the more extensive cross-cultural experience a pre-service teacher had, the more culturally competent the teacher was in using culturally competent strategies, studies (Jokikokko, 2005) on in-service teachers' professional development found no direct translation from intercultural encounters into the formation and development of intercultural competence. Instead, studies recognized the positive impacts of PL on supporting intercultural competence development and highlighted PL as a form of facilitating social interactions that develop teachers' social capital (Darling-Hammond et al., 2017; Desimone & Garet, 2015; Griffith, Ruan, Stepp, & Kimmel, 2014; Learning Forward, 2011; Youngs & Lane, 2014). Therefore, professional learning with intentional instruction and reflection designs increases intercultural competence rather than intercultural experiences alone. The following parts explore the literature on interventions that develop teachers' intercultural competence and CRT through professional development, virtual professional community, and peer coaching.

Collective professional learning. According to Desimone and Garet (2015), effective PL programs adopt designs that facilitate collective participation. For example, Griffith, Ruan, Stepp, and Kimmel (2014) investigated strategies such as coaching, mentoring, and communities

of practice in elementary and early childhood settings and found collaboration facilitated by these strategies promoted the effectiveness of a PL program. Furthermore, collaboration such as lesson study allows goal alignment and collective responsibility and promotes the notion that teachers are accountable for their own and each other's professional growth (Darling-Hammond et al., 2017; Desimone & Garet, 2015; Learning Forward, 2011; Youngs & Lane, 2014). Therefore, collective engagement is key to the success of a PL program.

Several successful PL programs focused on CRT promoted collective learning through group discussions and reflections. For example, Samuels (2018) highlighted the importance of spaces where teachers can collectively engage in discussions and share reflections about their emotions and attitudes, including their personal biases, during professional learning about CRT. In her qualitative study that included focus group interviews with 200 teachers, Samuels (2018) collected teacher voices through focus groups during a six-hour professional development over two sessions over four months, which disclosed advantages and challenges for CRT. The challenges of CRT identified by the participants led to Samuel's (2018) conviction that professional development and learning must enable teachers to reflect on and discuss their beliefs and assumptions about diversity and collaboratively develop an inclusive climate and culture. Hence, the collective aspects of discussions and group discussions enhance professional learning outcomes.

Collaboration through coaching in professional learning. Apart from collective discussions and reflections, some PL that focused on CRT featured coaching in its design. For example, Savage, Hindle, Meyer, Hynds, Penetito, and Sleeter (2011) developed a national PD program beginning in 2004 for teachers of Maori students in 32 secondary schools in New Zealand, consisting of four parts: the initial introduction workshop, structured classroom

observations followed by individual feedback, collaborative meetings to solve problems derived from student data, and shadow-coaching sessions. The researchers also evaluated the impacts of the teacher PD on student classroom experiences by observing 32 Years 9-10 classrooms and interviewing 214 Years 10-13 Maori students in 39 focus groups. This evaluation study found meaningful differences in teaching practices between teachers from participant and non-participant schools in the PD through these qualitative data. Furthermore, the participants' Maori students perceived changes in their teachers' engagement in culturally responsive pedagogies and supported their identity as Maori learners. Although Savage et al.'s (2011) study missed the opportunity to connect specific elements of the national intervention to the positive outcomes, the study shared powerful findings that collective participation in PL in forms like coaching can contribute to desired outcomes for teacher practice.

Collaboration through technology in professional learning. Web technology can enhance interaction and collaboration in PL on CRT. In a qualitative study on the impacts of a virtual community of practice (VCoP) called INTERACT on teachers' intercultural professional development, Hajisoteriou, Karousiou, and Angelides (2018) observed and interviewed forty teachers out of the 103 participants in the VCoP. They were in-service teachers and had attended the distance-learning Master's Programme on Special Education at the University of Nicosia in Cyprus. Following Fowler and Blohm's (2004) typology of the methodology of intercultural professional development, which included cognitive, active, and intercultural methods, the INTERACT online platform clearly defined goals and purpose, examined the target audience and examined their experience and familiarity of technological tools, specified knowledge, skills, and concepts as the objectives of the professional learning, and estimated inputs needed for the successful delivery of the VCoP. Furthermore, the platform included audio-recorded and live

online lectures with written materials as the cognitive method, introduced intercultural simulation games, role games, and exercises as the active method, and organized collaborative planning, adaptation of plans and resources, and teaching narrations or videos discussions as the intercultural method. The researchers found the INTERACT VCoP promoted online collaborative inquiry, enhanced teacher efficacy with inclusive and intercultural education to engage families and the broader community, and encouraged teachers to implement aspects of the program such as facilitate online intercultural learning for their students. Therefore, Hajisoteriou et al.'s (2018) highlighted the power of VCoP in constructing teachers' knowledge, facilitating their collaboration and sharing, and encouraging networking.

The benefits brought by collaboration through coaching and technology coincide with Bandura's (1997, 2000) proposition about the interrelationship between a group's collective efficacy and its performance accomplishments. Additionally, collective participation makes possible opportunities for peer observation, which creates vicarious experiences for people to increase their efficacies while observing others succeed with a specific practice (Calvert, 2016; Learning Forward, 2011). Thus, PL needs to build resources such as designated time for teachers to observe each other. Peer observation, sharing, and discussion focusing on intercultural competence and CRT can help increase chances for vicarious experiences, which eventually lead to enhanced self-efficacy.

Active and reflective professional learning. PL programs that promote performance accomplishments help increase teachers' efficacy beliefs. Teachers' success in exerting a proposed change leads to their efficacy with the change, which subsequently leads to their generalization of the change to other scenarios (Bandura, 1978). Additionally, some researchers designed their PL intervention through reflective professional development for the interplay

between enactment and reflection, a combination that facilitates the four stages of experiential learning: concrete experience, reflective observation, abstract conceptualization, and active experiment (Kolb, 1984). Therefore, PL programs need to adopt designs that enable teachers to enact and observe the conceived practice successfully and reflect on their abstract and transferrable learning practices.

For example, Mellom, Straubhaar, Balderas, Ariail, and Portes (2017) investigated the impacts on teachers' attitudes and practice of an in-service teacher training program about culturally responsive Instructional Conversation pedagogy on ELLs' academic outcomes based on qualitative data from a mixed-methods multi-year study. The intervention followed a randomized control design with 147 third and fifth-grade classroom teachers in three cohorts across 47 high-poverty elementary schools within 15 school districts in Northern Georgia. During the two-year program, the first year involved extensive face-to-face training and intensive coaching support, and the second year included monthly check-ups. Moreover, the face-to-face training engaged teachers in week-long training such as active collaboration and discussions about linguistics, second language acquisition, culturally responsive instruction, and contextualizing lessons for diverse learners. Furthermore, the researchers drew ethnographic data from general questionnaires at the beginning of the study, bi-weekly logs about participants' perceptions of ELLs' learning needs, the pedagogy, and their practices, spring and fall teaching videos at the beginning and at the end of the program, and monthly fidelity of implementation evaluations. In Mellom et al.'s (2017) discourse analysis of the qualitative data, training in culturally responsive pedagogies seemed to reduce the deficit mentality that the participants held about ELLs' language needs and their passive acceptance of ELLs' home language use in the classroom.

Like Mellom et al.'s (2017) evaluation of active PL about culturally responsive pedagogies, Biasutti, Concina, and Frate (2019) assessed a PD training course on intercultural competence for Italian primary and middle school in-service teachers and identified the value of reflection by examining the perceived engagement in the course, the development of knowledge and skills, and the self-assessed confidence with the use of new teaching methods. For the study, the researchers recruited 53 teachers from three school institutions in North-East Italy and collected their responses to open questions in a written survey at the end of the training course. The training course included three workshops of three hours. The three workshops focused on orientational, pedagogical, and linguistic components, aiming to enhance the participants' knowledge and ability to create a welcoming and inclusive classroom, to develop migrant and refugee students' linguistic literacy, and to facilitate teachers' self-reflection, critical thinking, self-awareness, and a student-centered teaching approach. Using an inductive approach, Biasutti et al. (2019) analyzed the participants' responses and found that the participants appreciated how the reflections induced by the course transformed their attitudes, teaching methods, and instruments. Additionally, the participants identified four strengths of the course: promoting the participants' active role, the instructors' competence, links between the course and prior training experiences, and the social environment during the workshops. The study was also valuable in evaluating the course weaknesses, such as the lack of differentiated content for participants of different levels of competence.

Similar to active learning in facilitating teachers' professional growth, continuous reflection is vital as discussed by Mellom et al. (2017) and as Biasutti et al. Zooming into reflection as a contributing factor to the success of a PL program, Brown and Crippen (2016) conducted an evaluation study on an intervention called the Science Teachers are Responsive to

Students (STARTS) program. They focused on developing life science teachers' understanding and application of culturally responsive science teaching across five high schools in a large, culturally and linguistically diverse school district in the southeastern United States during 2013-2014. The STARTS program included monthly Saturday Collaboration Sessions, in which teachers participated in six activities in pairs: studying a research lesson, reflecting through completing the Growing Awareness Inventory tasks, inquiring into a curriculum topic featured in their culturally responsive science unit, doing professional growth tasks based on their self-identified needs, receiving modeling from the first author, and creating culturally responsive science units. The researchers stimulated reflections through Reflective Writing Prompts for each activity and collected qualitative data from program artifacts, group interviews, video recordings, and teachers' science units. The findings of the research questions were threefold: first, there was a link between teachers' interactions with elements such as the Growing Awareness Inventory, professional growth tasks, and the reflective writing prompts and perceived culturally responsive instructional strategies; second, there was a connection between modeling exemplars, readings discussions, and evaluating sample lesson plans, and the participants' envisioned culturally responsive teaching; and third, teachers' development from awareness to practice resulted from scaffolded construction of context-specific science curriculum materials. Despite the lack of students' voices in evaluating the effectiveness of the intervention, Brown and Crippen's (2016) study offered valuable design features for successful interventions such as reflective writing prompts and exemplars to facilitate professional development that bridges practice and reflection, which improved the teachers' intentional connections between student experiences and teacher instruction.

Therefore, the facilitation of active learning and reflection is an integral part of a successful PL program (Darling-Hammond et al., 2017; Desimone & Garet, 2015). Teachers' active engagement must be instrumental throughout PL through discussion, planning, and teaching, as active engagement ensures teacher accountability and shifts from teacher compliance to teachers creating evidence for their success (Desimone & Garet, 2015; Reutzel & Clark, 2014). These aspects of design allow teachers to engage in "deeply embedded, highly contextualized professional learning" (Darling-Hammond et al., 2017, p. v). Furthermore, self-reflection and collective reflection on links with prior learning, personal practices, and modeled practices facilitate transferrable learning of intercultural teaching content and skills. Hence, integrated active and reflective learning enhances teachers' motivation for engagement and application as the desired outcomes of a PL program.

The previously discussed PL foregrounds a series of elements leading to a successful PL program, especially through creating collective, active, and reflective learning experiences for program participants. These elements presented themselves in group discussions and reflections, coaching, and web technology to create collective learning environments, coaching, collaboration, discussions, and modelling exemplars to create experiential opportunities and self-reflection and reflection prompt for reflection and thinking. It is worth noticing that none of the elements lead to impacts single-handedly. The complementarity of these elements is evident in Tschannen-Moran and McMaster (2009) found in their quasi-experimental study about the potency of different sources of 93 primary teachers' self-efficacy beliefs. Researchers tested the participants' efficacy levels before and after four formats of PD involving the same teaching strategy. The four formats increased in their levels of efficacy-relevant input sources, from treatment one through an information-based workshop, treatment two through an information-

based workshop with the presenters' modeling, treatment three through an information-based workshop with the presenters' modeling, followed by participants' practicing the implementation of the strategies, and treatment four through an information-based workshop with the presenters' modeling followed by participants' practice with these ideas in their classrooms and subsequent coaching sessions. Tschannen-Moran and McMaster (2009) analyzed ANOVA test results using quantitative data from surveys. They concluded that treatment four creating mastery experience through follow-up coaching had the most substantial impacts on teachers' self-efficacy beliefs about the pedagogy and their application of the pedagogy. Hence, the design of a PL program should consider the integration of collective, active, and reflective experience for its effectiveness.

The aforementioned literature on professional learning emphasizes enhancing teachers' social capital as precursory to increasing their professional practices and promoting a school culture and climate conducive to collaborative discussion and reflection. The conclusions coincide with Bandura's (1978) theory about three sources for efficacy beliefs: vicarious experience, verbal persuasion, and emotional arousal. Thus, interventions should allocate resources to support conversations and collaborations centered around teaching and learning (Calvert, 2016; Learning Forward, 2011), leading to teachers' practice changes and eventually improved student outcomes.

Summary

This literature review addresses intervention approaches to enhance teachers' awareness, knowledge, skills, and teaching practices when their cultural background differs from their ELL students. Following a theoretical framework underpinned by Bandura's (1978, 1986) social cognitive theory and the human and social capital theories (Coleman, 1986; Putnam, 1993), this

review synthesizes empirical studies that focus on the professional development of teachers' intercultural competence, CRT, collective PL, and active and reflective PL.

The following themes emerge from the literature review. Firstly, the interconnection between ITC and CRT is twofold: on the one hand, ITC contributes to the development of CRT; on the other hand, Dimitrov and Haque's (2016) ITC model embraces CRT as its core for instructional and curricular competencies. Thus, the development of ITC and CRT come hand in hand. Secondly, the emotional dimension of ITC acts as the start of other dimensions of ITC, i.e., praxeological and cognitive development, suggesting any ITC intervention begin with participants' affection and attitudes. Thirdly, reflection is of paramount importance in teachers' experiential learning, promoting learning from cycles of knowledge, actions, and reflections (Kolb, 1984). Fourthly, an intervention targeting the development of CRT should define its scope and frame to include the multiple facets of the umbrella term CRT, ranging from building a student behavior management system, creating an interdependent learning environment, developing inclusive and constructivist teaching approaches, and designing culturally relevant curriculum. Besides, as its encompassing nature, Dimitrov and Haque's (2016) ITC model is a highly relevant framework for interventions of ITC and CRT. Fifth, PL programs with features such as creating a collaborative learning environment and facilitating mastery experiences followed by coaching are effective, suggesting the design of a PL program incorporating coaching, collaborative inquiry, modeling, and building on the strengths of web technologies to promote interactions.

The proposed PL program will consider all the above themes from the literature and include A, B, C, D, and E. (five elements above). The focus of the PL program will be using Dimitrov and Haque's (2016) ITC model to promote teachers' ITC and CRT. The program

involves PD sessions, with peer coaching activities before and after the sessions to link theories, actions, and reflections for transferrable experiential learning (Kolb, 1984). Besides, the reflections throughout the program follow prompts that start with the engagement of teachers' emotions. Lastly, my intervention relies on Microsoft Teams, a platform that all teachers use for professional activities, to establish a virtual community of practice.

The literature review in this chapter illuminated how PL as teachers' social capital can enhance their attitudes and efficacy beliefs about ITC and CRT, leading to enhanced ELL student engagement and identity development. The key elements contributing to the success of a PL program are multifold, adhering to Kolb's (1984) experiential learning framework and Tschannen-Moran and McMaster's (2009) advocated mastery experiences followed by coaching. Therefore, I propose a PL program that consists of development objectives following Kolb's (1984) framework and Tschannen-Moran and McMaster's (2009) structure, focusing on developing international English-speaking teachers' awareness, knowledge, and skills of ITC and CRT. Following Guskey and Yoon's (2009) findings, my PL program will last 31 hours, combining myself as an outside expert and structured and sustained follow-up for participants. The follow-up activities will include participants' adaptation of varied ITC and CRT practices to their specific classroom contexts. Therefore, I will facilitate three reflective PD sessions, each following a pre-session coaching activity to build a trusting relationship and listen to individual participants and followed by post-session coaching observations and discussions, which will include feedback sharing and goal setting.

Chapter 4

Intervention Procedure and Program Evaluation Methodology

Chapter Three viewed teachers' culturally responsive teaching (CRT) and intercultural teaching competence (ITC) development through two theoretical lenses: Bandura's (1978, 1986) social cognitive theory and human and social capital theories (Coleman, 1986; Putnam, 1993). Both sets of theories supported that multiple factors can influence teacher growth. On the one hand, teachers' CRT and ITC, as a set of awareness, beliefs, skills, attitudes, and behavior, sit in the reciprocal triangle between the individuals, their behavior, and their environment. On the other hand, their human capital growth results from activating and increasing their social capital. Therefore, the studies in Chapter Three showed the role of PL in teachers' CRT or ITC development and identified a series of contributing factors to the success of a PL program. The components include addressing participants' emotions and affections, reflection, a developed framework like Dimitrov and Haque's (2016) ITC model, and facilitating collaboration and mastery experience before coaching. Using Leviton and Lipsey's (2007) four-step model, the following treatment theory (Figure 6) depicts the process of implementing a proposed intervention, i.e., the independent variables, the mediating variable, and eventually the target outcomes, i.e., the dependent variable. That is, this figure demonstrates how a PL program focusing on international English-speaking teachers' ITC and CRT would enhance their use of CRT techniques and ultimately ELLs' engagement and social-emotional development. Therefore, the treatment theory explicates the steps leading to the desired outcomes.
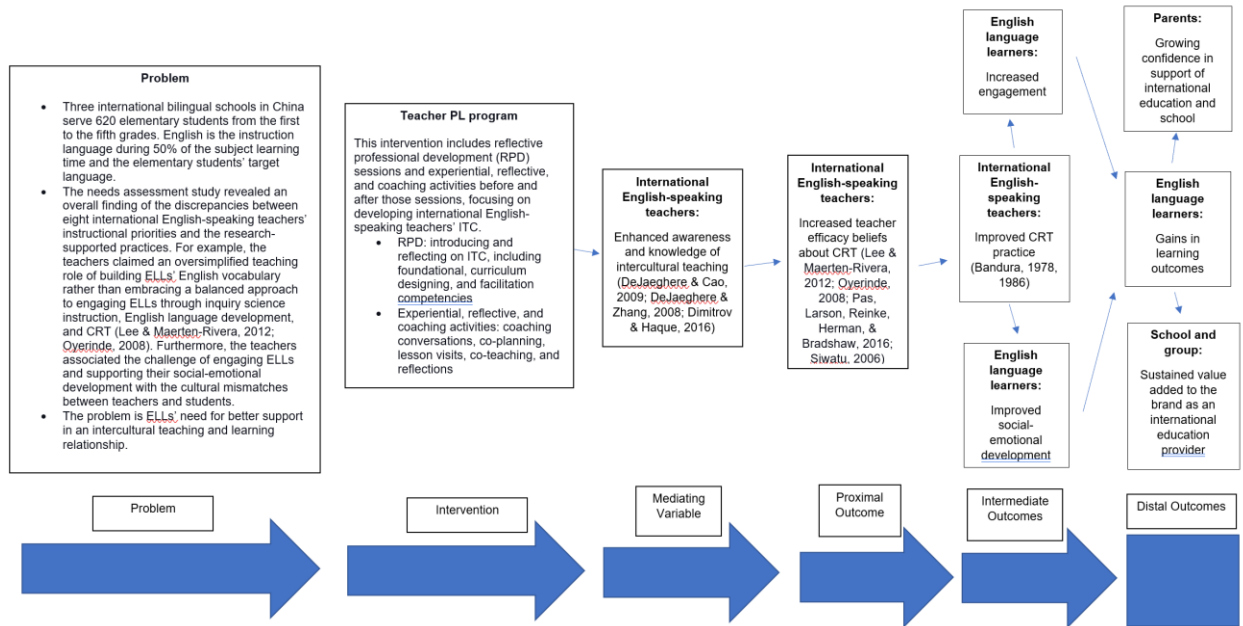
Figure 6. Theory of treatment.

The first step of the model is to define a problem, which is ELLs' need for better support

in an intercultural teaching and learning relationship. The target population — international

English-speaking teachers at a group of international schools in China and Singapore — play the

role of instruction providers in the intercultural teaching and learning relationship, determining

the quality of support ELLs receive. The second step is to define the treatment, including a PL

program consisting of professional development (PD) sessions and coaching activities before and

after the PD sessions. Then, the third step involves describing the change mechanisms of the

treatment, including the effectiveness of PD in enhancing teachers' intercultural competence

(DeJaeghere & Cao, 2009; DeJaeghere & Zhang, 2008) and the role of coaching in enhancing

teachers' CRT efficacy (Pas, Larson, Reinke, Herman, & Bradshaw, 2016), and the importance of

intercultural competence and CRT techniques in CRT practice (Cramer & Bennett, 2015; Gay,

2001; Villegas & Lucas, 2002). Lastly, the fourth step is to specify the desired outcomes, i.e.,

ELLs' gains in academic achievement due to their increased engagement and social-emotional development.

Research Design

The evaluation study followed an explanatory sequential design, a mixed-methods design that adheres to a pragmatic paradigm (Creswell & Plano-Clark, 2018; Guba, 1981; Mertens, 2018). Selecting the pragmatic paradigm, I recognized that a single reality of the intervention exists and that the researcher and individual participants have their unique personal interpretation of this reality (Mertens, 2018). Furthermore, I adopted the methodological strengths of pragmatism by matching methods to specific needs of evaluation questions and purposes, opening doors to complex evaluation questions (Greene & Hall, 2010; Mertens, 2018; Teddlie & Tashakkori, 2009). Therefore, this study attached equal value to objective and subjective knowledge about the intervention.

Additionally, the explanatory sequential design collected and analyzed quantitative data before qualitative data (Creswell & Plano-Clark, 2018). For a full picture in evaluating the intervention, the study shifted its paradigm from postpositivism to constructivism to allow multiple and dialectic positions to the evaluation (Creswell & Plano-Clark, 2018). On the one hand, the quantitative results helped inform the development of qualitative questions; on the other hand, I compared and contrasted the qualitative and quantitative results for in-depth data analysis. Therefore, the evaluation first collected quantitative data and then qualitative data about the intervention process, including fidelity of implementation, reach, and participant responsiveness (Baranowski & Stables, 2000; Dusenbury, Brannigan, Falco, & Hansen, 2003), and about the intervention outcome, i.e., participants' perceived change in efficacy beliefs about culturally responsive teaching.

Logic Model

The logic model depicted in Figure 7 includes the intervention context, inputs, outputs, and short-, medium-, and long-term outcomes (Cooksy, Gill, & Kelly, 2001; Wholey, Hatry, & Newcome, 2010). The intervention inputs included time, space, and materials for four 1.5-hour PD sessions on Zoom, each following a coaching discussion and followed by a total of four coaching activities, each lasting one and half hours. Apart from the 13 interactive hours, teachers also use Microsoft Teams to share materials and connect. Materials such as ITC (Dimitrov & Haque, 2016; Appendix F), Diamond Nine (Appendix G), Internet video clips of cultural perspectives and intercultural teaching strategies (Appendix H), school development plans (Appendix I), and reflection questions (Appendix J) are included in facilitates PD sessions. Materials like the GROW model of coaching (Whitmore, 2010; Appendix K) support the post-session activities.

Context	Processes			Outcomes
English language learners (ELLs) attract much attention for their lower performance in science than non-ELLs across international and local contexts, suggesting ELLs' need for better support in an intercultural	**Inputs**	**Outputs**		**Short-Term**
	Time (Total 13 hours of professional learning) - One one-hour taster session - Four 1.5-hour professional development (PD) sessions - Four 1.5-hour post-session activities **Space** - Zoom meeting links for the PD sessions and	**Activities** - Voluntary participation in a taster session - Introducing the program Introducing ITC and CRT - Group participation in four RPD sessions - Session 1: - Introducing ITC: Foundational competencies	**Participation** - Participation of 10 international English-speaking teachers - Criteria include work in the context of international schools in China and Singapore,	- Increased teachers' self-efficacy of CRT - Improved intercultural teaching practice **Intermediate** - Increased ELL engagement - Improved ELL social-emotional development

teaching and learning relationship. In the summer of 2020, I collected quantitative and qualitative data from eight international English-speaking teachers who work at three international bilingual schools in China. The study found that the teachers claimed an oversimplified teaching role of building ELLs' English vocabulary rather than embracing a balanced approach to engaging ELLs through inquiry science instruction, English language development, and	coaching activities - Channel on Microsoft Teams for materials sharing and collaborative conversations **Materials** - Taster session: slides about program overview, coaching activities, schedule, a GROW coaching conversation structure, a presentation of GROW coaching guidelines, a video of cultural perspectives, a video of CRT in action - PD sessions • Session 1: slides about intercultural foundation competencies, assumption-busting, diamond nine, slides with prompts • Session 2: slides about intercultural facilitation competencies, the cultural maps, slides with prompts	o Think, pair, share: assumption busting o Self-reflection: Diamond Nine • Session 2: o Introducing ITC: Facilitation competencies o Going through the cultural maps o Think, pair, share: The impacts of cultural misalignment on teaching and learning o Role play o Self-reflection • Session 3: o Introducing ITC: Curriculum design competencies o Think, pair, share: analyzing a lesson plan o Self-reflection • Session 4: o Introducing Culturally Responsive PBIS o Watching a video clip of CRT o Think, pair, share: learning behaviors	• teach students who are ELLs, • come from a cultural background different from the students', and • have received pre-service teacher training outside of China or Singapore.	**Distal** • Gains in ELLs' learning outcome • Growing parental confidence in support of international education and school • Sustained value added to the brand as an international education provider

culturally responsive teaching (CRT). Furthermore, the teachers associated the challenge of engaging ELLs and supporting their social-emotional development with the cultural mismatches between teachers and students.	• Session 3: slides about intercultural curriculum design competencies, school development evaluation table, slides with prompts • Session 4: slides about CRT and Culturally Responsive Positive Behavior Interventions and Supports (PBIS), video clips of CRT techniques, • - The GROW model of coaching - Session feedback survey	teachers reward ○ Self-reflection - Small-group participation in post-session activities : ○ Coaching activity for reflection and personal action plans for ITC ○ Active experimentation: individual teaching ○ - Ongoing planning and teaching practice with students in classrooms - Ongoing sharing on Teams - Assessment - Individual participation in session feedback survey with closed and open-ended questions		
	Assumptions • ELLs' interactions with international English-speaking teachers can affect ELLs' individual development • International English-speaking teachers want to support ELLs and close the cultural gap • International English-speaking teachers will accurately self-assess and report their awareness and self-efficacy of intercultural teaching		**External Factors** • The existing relationship with individuals may lead to variance in coaching effectiveness • Teachers' schedule or their school allow them to participate in coaching activities • The school allows the researcher to schedule the intervention for both Term 1 and Term 2	

Figure 7. Logic model.

The intervention outputs include instructional activities and participation in the PD sessions and coaching activities. I aimed to involve 10 international English-speaking teachers who teach ELLs and come from a personal and professional culture different from some, if not all, of their students'. Teachers started professional learning in the third week of November 2021 and participated in reflective professional development (RPD) sessions and coaching activities for thirteen hours over seven months. The four PD sessions focused on introducing and reflecting on the foundational, facilitation, curriculum design competencies of ITC, and CRT. The post-PD coaching activities involved coaching conversations for relationship-building and trust-building, goal-setting, and co-designing lessons or units and reflections. Teachers also received resources on Microsoft Teams to maintain continuous engagement. Furthermore, teachers continued to plan and teach lessons individually during and after the PL intervention.

Process Evaluation

The choice of mixed-methods evaluation served to leverage the benefits of allowing multiple evidence sources to judge my intervention fully (Johnston, Midgett, Doumas, & Moody, 2018). I collected quantitative and qualitative data about the fidelity of implementation, reach, and participant responsiveness (Baranowski & Stables, 2000; Dusenbury et al., 2003). I also planned to capture the participants' voices through their responses to surveys, focus group questions, and checklists and my in-depth analysis of the group session transcripts and the researcher's notes during the ITC and CRT PL program.

Fidelity of implementation. The first process-related research question about the fidelity of implementation asks, "to what extent was the PL program implemented in adherence to the established content?" This first indicator of the process evaluation, the fidelity of

implementation, was in line with the inputs and outputs of the logic model (Cooksy et al., 2001; McLaughlin & Jordan, 2010) and the intervention of my theory of treatment (Leviton & Lipsey, 2007). I measured this indicator by comparing participants' responses to surveys based on session objectives at the end of each PD and coaching activity with the prescribed goals for each PD session and coaching activity. Therefore, the collection and comparison of data regarding the fidelity of implementation lasted throughout the intervention.

Reach. The second process-related research question asks, "to what extent did international English-speaking teachers take part in the PL program?" The second indicator, reach, refers to how much participants receive the delivery of the ITC and CRT PL program. This indicator aligns with the outputs in my logic model (Cooksy et al., 2001; McLaughlin & Jordan, 2010) and the intervention of my theory of treatment (Leviton & Lipsey, 2007). I measured this indicator from two angles: participants and experimenter. From the participants' angle, I evaluated the data from participants' reflections during each PD session and their action completion after each post-session coaching conversation. From the experimenter's angle, I kept attendance logs from each PD session. These data focused on the percentage of participation and completion and the quality of written reflections.

Participant responsiveness. The last process-related research question asks, "what were international English-speaking teachers' experiences with the PL program?", examining participant responsiveness, which aligns with my logic model's participation component (Cooksy et al., 2001; McLaughlin & Jordan, 2010) and the intervention of my theory of treatment (Leviton & Lipsey, 2007). I measured this indicator through the participants' attendance and completion of tasks during the ITC and CRT PL program and their fidelity in coaching activities, which revealed how much of the participants responded to the intervention. For example, my

attendance record reflected the time element of the inputs in the logic model, and my notes about the completion indicated the activities in which the participants took part. Therefore, I collected these data at the end of each PD session and each post-session.

Outcome Evaluation

As part of this evaluation study, the outcome evaluation examines the proximal outcome related to the intervention as identified in the theory of treatment (Figure 6), i.e., enhanced teacher efficacy beliefs about culturally responsive teaching. The outcome evaluation follows a sequential mixed-methods design (Creswell & Plano-Clark, 2018), integrating a pre-intervention and post-intervention quasi-experimental design and qualitative data collection and analysis (Guba, 1981; Shadish, Cook, & Campbell, 2002). The choice of a quasi-experimental design resulted from a natural setup of the intervention, which non-randomly engaged all the international English-speaking teachers in the context as a voluntary PL program. Additionally, the results from a paired t-test or Wilcoxon signed rank test of the pre-intervention and post-intervention survey data informed the development of questions I asked to collect qualitative data, which I analyzed through two iterations: a priori coding based on the survey items and emergent coding. The sequential mixed-methods design allowed quantitative data collection and analysis before qualitative data, which supplemented the initial quantitative data and allowed in-depth analysis of the causal inference between the intervention and any change in participants' efficacy beliefs (Shadish et al., 2002). Therefore, the study measured participants' efficacy beliefs before and after the invention through quantitative surveys followed by 45-minute focus group interviews at the end of the intervention.

Quasi-experimental pretest and posttest design. The effectiveness of evaluating the intervention depends on how the study measures the causal relationship between the independent

variable, the ITC and CRT PL program, and the proximal outcome, change in participants' efficacy beliefs about CRT. Since a randomized control trial design may cause the ethical challenges of bringing professional growth to a proportion of teachers in my context and limiting the support level to students whose teachers are in the control group, I chose to use a quasi-experimental pretest-posttest design to measure any change in participants' efficacy beliefs in this study (Shadish et al., 2002). The study team administered a survey at the beginning of the intervention in November 2021, inviting all participants in the PL program to complete the pretest survey.

The intervention adhered to contributing factors to successful PL, including the promotion of cycles of knowledge, actions, and reflections (Kolb, 1984), a collaborative environment (Desimone & Garet, 2015), and the facilitation of mastery experience followed by coaching (Tschannen-Moran & McMaster, 2009). I collected process evaluation measures during the intervention at the end of each PD session and each coaching activity and administered the posttest survey and focus group interviews at the end of the intervention.

Sequential mixed-methods design. The study also follows a sequential mixed-methods design for the following three reasons. Firstly, the quantitative results help develop a priori codes for collecting and analyzing the focus group interview questions, which create opportunities for participants to further explain their responses from the quantitative surveys. Therefore, the mixed-method design helps disclose a complete picture of participants' experiences and perceptions. Secondly, the two iterations of the qualitative data analysis involve a priori coding before emergent coding, enhancing the likelihood to catch any themes not anticipated by the a priori codes. This design integrates the strengths of postpositivism and constructivism (Creswell & Plano-Clark, 2018; Mertens, 2018). Thus, the two iterations offer data analysis that may

converge or diverge from the quantitative results, further extending the extent and depth of the deductive and inductive analysis of the intervention outcome. Thirdly, the sequential mixed-methods design allows comparing quantitative and qualitative data on a group level, which increases the richness of data analysis through group trends. Besides, the comparison between individuals can help reveal individual nuances and potential connections between demographic characteristics and individual outcome variations. Thus, the sequential design provides an enhanced depth of analysis.

Adhering to the above research design, the following three questions guide the process evaluation:

1. To what extent was the PL program implemented in adherence to the established content?

    a. To what extent did the PD sessions and peer coaching activities adhere to the established number of sessions?

    b. To what extent did the intervention meet the stated content goals?

2. To what extent did international English-speaking teachers take part in the PL program?

3. What were international English-speaking teachers' experiences with the PL program?

Furthermore, the following two research questions emphasize teachers' efficacy beliefs as indicated in the theoretical framework (Figure 4) and guide the outcome evaluation:

1. To what extent does did participation in the intervention increase teachers' overall efficacy beliefs about using culturally responsive teaching techniques with ELLs?

a. To what extent did participation in the intervention increase teachers' self-efficacy for using culturally responsive teaching techniques with ELLs?

b. To what extent did participation in the intervention increase teachers' outcome expectancy for using culturally responsive teaching techniques with ELLs?

2. How did the participants describe the results of their use of culturally responsive teaching practices with ELLs after participating in the intervention?

Method

This intervention study took place across six international schools located in China and Singapore. As part of a growing international education management company, the six schools served approximately 6501 students in November 2021. To support the delivery of their international program, the schools employ teachers from international English-speaking backgrounds. In their everyday work, these international English-speaking teachers teach students whose home environments are different from the schools' English-speaking culture. Therefore, the linguistic and cultural backgrounds between the students and the international English-speaking teachers in my context are not congruent. The students may experience a cultural mismatch in their interactions with the English-speaking teachers, and all the English-speaking teachers may face the challenge of engaging their students and optimize their students' learning because of the cultural difference.

Participants

This study recruited nine international English-speaking teachers into the intervention evaluation. The evaluation involved a purposeful sampling process, following the selection criteria of contexts in which ELL's linguistic and cultural backgrounds misalign with their

teachers' backgrounds. Besides, the sampling criteria included individual teachers who speak English, come from a different cultural background to the ELLs, have professional qualifications from an overseas institute, and teach a subject through English. The purposeful sampling process allowed evaluating the intervention with a specific population — teachers of ELLs whose linguistic and cultural backgrounds mismatch the students' (Lockmiller & Lester, 2017). Therefore, the sampling method aligned with the evaluation interest.

Measures and Instrumentation

The study examined three process evaluation constructs, i.e., the fidelity of implementation, reach, and participant responsiveness, and two outcome constructs, i.e., teachers' efficacy beliefs about and implementing CRT. The data collection matrix in Table 8 depicts the alignment between these constructs and the research questions, data sources, data collection tools, and data collection frequency. The following section will focus on the primary measures from the matrix.

Table 8

Data Collection Matrix

Evaluation Question	Construct	Data Source(s)	Data Collection Tool	Frequency
To what extent was the PL program implemented in adherence to the established content?	Fidelity of implementation	Teachers and experimenter's notes	Program plans, session feedback surveys	9x
To what extent did international English-speaking teachers take part in the PL program?	Reach	Teachers and experimenter's notes	Attendance logs, and participants' written reflections	9x

Evaluation Question	Construct	Data Source(s)	Data Collection Tool	Frequency
What were international English-speaking teachers' experiences with the PL program?	Participant responsiveness	Teachers and experimenter's notes	Focus groups, research log with field notes, and participants' written reflections	9x & At the end of the last coaching session
To what extent does participation in the intervention increase teachers' overall efficacy beliefs for using culturally responsive teaching techniques with ELLs?	Efficacy belief	Teachers	Culturally Responsive Teaching Self-Efficacy Scale (CRTSE; Siwatu, 2007) Culturally Responsive Teaching Outcome Expectancy (CRTOE; Siwatu, 2007)	At the beginning of the launching session & At the end of the last coaching session
How do the participants describe the results of their teaching practices with ELLs after participating in the intervention?	Perceived impact(s)	Teachers	Focus group interviews	At the end of the intervention

Culturally Responsive Teaching Self-Efficacy Scale (CRTSE). Self-efficacy is a

construct of efficacy beliefs, referring to teachers' confidence about using CRT techniques with

ELLs in their classroom (Bandura, 1986, 1997, 2006). The use of Siwatu's (2007) CRTSE helps

to reveal whether and how teachers' self-efficacy evolved from the beginning to the end of their

participation in the PL program for ITC. CRTSE includes 40 items (Appendix D), initially

developed by Siwatu (2007) based on Culturally Responsive Teaching Competencies (Siwatu,

2007) and Bandura's (1978) self-efficacy theory. Similar to its original use, this study used a

scale from zero to 100 to indicate a range of confidence levels from *no confidence at all* to *completely confident*. Therefore, the higher a respondent's score is, the stronger this individual's self-efficacy is about their ability to engage in CRT practices, e.g., adapting instruction to meet the needs of their students. Siwatu (2007) found that the internal reliability for this measure was 0.96, as estimated by Cronbach's alpha.

Culturally Responsive Teaching Outcome Expectancy Scale (CRTOE). Outcome expectancy is the other variable of efficacy beliefs, referring to teachers' confidence about predicting the outcomes resulting from using CRT techniques with ELLs in any classroom (Bandura, 1986, 1997, 2006). This study used Siwatu's (2007) CRTOE to disclose whether and how teachers' outcome expectancy evolved from the beginning to the end of their participation in the PL program for ITC. The scale includes 26 items (Appendix E), developed from Siwatu's (2007) Culturally Responsive Teaching Competencies and Bandura's (1978) outcome expectancies, i.e., one's prediction of the causal relationship between a specific behavior and certain outcomes. In line with the CRTSE scale, this study placed CRTOE responses on a scale from zero to 100 to indicate a range of confidence levels from *entirely uncertain* to *entirely certain*. Therefore, the higher a respondent's score is, the more confident this individual is about culturally responsive teaching practices resulting in positive classrooms and student outcomes. For example, CRTOE measures how confident participants are about using culturally familiar examples in making learning new concepts more accessible. Siwatu (2007) found that the internal reliability for this measure was 0.95, as estimated by Cronbach's alpha.

Focus group interview protocol. The focus group interview occurred at the end of the intervention and examined two constructs: participant responsiveness and perceived impact. Participant responsiveness refers to the participants' engagement with the PL program

(Dusenbury et al., 2003). As a result, I operationalized this construct into how the participants describe their experiences with the PL program. Apart from the quantitative data that I collected through the end-of-session surveys, I included questions about their engagement in the RPD sessions and coaching activities in the focus group interview. Furthermore, the focus group interview helped collect data about participants' perceptions of the PL program's impact on their teaching practices using CRT. Therefore, the questions in the focus group interview were semi-structured and covered the following key areas of interest:

- How would you describe your engagement during the PL program? Can you give an example?

- How would you describe your teaching practices with ELLs in your classroom after you participate in the PL program? Can you give an example?

- How do you approach planning for lessons with ELLs after you participate in the PL program? Can you give an example?

Following the sequential exploratory design mixed-method design, the focus group interviews also included questions that asked participants to clarify their response to the survey.

Procedure

In the same way, the participants and measures reflected the design of this study, and the study's procedure aligned with the sequential explanatory mixed-methods design. The PL program for ITC included participant recruitment, the delivery of the intervention, process and outcome evaluation data collection, and data analysis. The section below will describe these procedural elements.

Participant recruitment. Following the purposeful sampling approach, this study recruited all participants who fulfill the following criteria:

Criteria 1: works in the elementary school sector of three international bilingual schools in China,

Criteria 2: teaches students who are English language learners,

Criteria 3: teaches through English,

Criteria 4: comes from a cultural background different from the students', and

Criteria 5: received pre-service teacher training outside of China.

Additionally, the recruitment process excluded those teachers who fulfill the following criteria:

Criteria 1: teaches through Chinese,

Criteria 2: comes from a Chinese cultural background, and

Criteria 3: obtained a teaching qualification from a Chinese institute.

Intervention. Table 9 shows the sequence of 13-hour PL activities in my proposed program with clear objectives for each activity (Guskey, 2002). The taster session took place in November, lasting one hour for participants to understand culture, ITC, CRT, and the PL program structure. Session One introduced the foundational competencies of ITC (Dimitrov & Haque, 2016), providing the theoretical lens through which participants reflected on the basics of their professional identity through a cultural lens. Moreover, session one allowed participants to approach their emotions through reflections on the assumptions of their foundational strategies. Post-session one extended participants' learning and used a GROW coaching-structured small-group conversation as a method to extend their learning into their practice (Kolb, 1984; Whitmore, 2010), in which each participant identified their developmental goal and an action plan to achieve the goal. The post-session coaching aimed to build a relationship with individual participants and use the GROW coaching structure to help them set a goal for the personal

development of ITC before taking actions in their personal and professional development regarding intercultural competence and culturally responsive teaching.

Session two introduced the facilitation competencies of ITC (Dimitrov & Haque, 2016) and asked participants to explore the impacts of the following cultural dimensions on their instructional strategies: hierarchy, communication, politeness, expressing emotions, problem-solving and feedback, time and scheduling, and relationships (Meyer, 2014; Tschannen-Moran & McMaster, 2009). The participants also reflected on the characteristics of a culturally responsive classroom in small groups by responding to the following prompts:

- What would be main ingredients?

- What would you see?

- What would you hear?

- What would people be thinking?

- What would people be feeling?

Depending on each participant's progress in their individual action, post-session two adopted a differentiated approach to small-group coaching. I continued the GROW-styled coaching (Whitmore, 2010) conversation with those who started their action plan and those who needed a narrowed focus on their plan. Meanwhile, I collaborated with other participants who requested co-planning.

Session three focused on the curriculum design competencies of ITC by framing instructional design with responsive pedagogy (Dimitrov & Haque, 2016). The participants reflected in pairs the status, strengths, and next step for their school community's curriculum design to reflect culturally competent practices (Kolb, 1984). For example, they discussed in pairs to what extent does their school community include concrete learning outcomes related to

intercultural or global learning at the course and curriculum levels. Lastly, the participants

reflected on the question whether they can embed cultural competence into their curriculum

development using Bloom's taxonomy as a structure to move to higher levels of thinking

(Armstrong, 2010). Similar to post-session two small-group coaching, I differentiated my

approach based on individual participants' needs. For those who asked for collaboration, I led the

session with questions and feedback; and for others, I continued the GROW-styled conversations

by asking coaching questions.

Session four emphasized culturally responsive teaching strategies in action and the

establishment of a classroom and school environment conducive to learning behavior with

students from diverse cultural backgrounds (Dimitrov & Haque, 2016). The participants focused

on the prompts of how to develop a positive classroom culture and how teachers support students

in developing their identity as intercultural learners. Therefore, the participants analyzed an

exemplary culturally responsive lesson (Tschannen-Moran & McMaster, 2009), reflected on

tools such as universal design of learning and culturally responsive positive behavior

interventions and supports (Cramer & Bennet, 2015; Vincent et al., 2011). Afterward, post-

session four coaching continued to use the two differentiated methods to connect participants'

learning with their practices, the GROW-styled coaching conversations and co-planning (Kolb,

1984; Whitmore, 2010).

Table 9

Intervention table

Session	Activities	Topic/Content	Duration	Reflection Prompts	Theory Alignment

Taster	• Introducing the program • Introducing ITC and CRT o What is a culturally irresponsive teacher like? o What are ITC competencies?	• Program overview • Understanding ITC and CRT	1 hour	• What does culture mean? • What cultural assumptions do you bring to your students?	• ITC (Dimitrov & Haque, 2016) • CRT (Lee & Maerten-Rivera, 2012; Oyerinde, 2008)
Session 1	• Introducing ITC: Foundational competencies • Diamond Nine • Think, pair, share: perspective taking	• Understanding foundational competencies • Analyzing personal cultural assumptions • Reflecting on one's professional identity	1.5 Hours	• What are the fundamental attributes of your professional identity? • Security, responsibility, order, accomplishment o What does it mean to you as an educator? o What does it mean to different students? o Why are there alignments/misalignments?	• ITC (Dimitrov & Haque, 2016) • Tschannen-Moran & McMaster (2009) • Experiential learning (Kolb, 1984) Effective PL (Guskey & Yoon, 2009)
Post-session 1	• Coaching conversation about personal goals • Active experimentation • Self-Reflection	• Becoming an interculturally competent teacher • Coachee-led conversation	1.5 hour	• GROW coaching questions (Whitmore, 2010)	• ITC (Dimitrov & Haque, 2016) • GROW coaching questions (Whitmore, 2010) • Guskey (2002) • Tschannen-Moran & McMaster (2009) • Experiential learning (Kolb, 1984)

					• Effective PL (Guskey & Yoon, 2009)
Session 2f	• Introducing ITC: Facilitation competencies • Introducing the cultural maps • Think, pair, share: analyzing one's assumptions as a teacher • Self-reflection • Role play	• Understanding facilitation competencies • Analyzing and reflecting on personal assumptions • Perspective taking	1.5 Hours	• Where are you on the cultural maps? • Where are your students on the cultural maps? • How does your positionality impact your role as a teacher? • How do you approach teaching with students from a different cultural background? • What are the main ingredients of a culturally responsive classroom?	• ITC (Dimitrov & Haque, 2016) • Tschannen-Moran & McMaster (2009) • Experiential learning (Kolb, 1984) • Effective PL (Guskey & Yoon, 2009) • The culture maps (Meyer, 2014)
Post-session 2	• Coaching conversation about personal goals • Active experimentation • Self-Reflection	• Becoming an interculturally competent teacher • Participantled conversation	1.5 hour	• GROW coaching questions (Whitmore, 2010)	• ITC (Dimitrov & Haque, 2016) • GROW coaching questions (Whitmore, 2010) • Guskey (2002) • Tschannen-Moran & McMaster (2009) • Experiential learning (Kolb, 1984) • Effective PL (Guskey & Yoon, 2009)

Session 3	• Introducing ITC: Curriculum design competencies • Watching a video clip of interculturally competent teaching • Think, pair, share: One-size-fit-all vs. stratified vs. precision • Self-reflection • Pair reflection	• Understanding curriculum competencies • Strength-based analysis of a school community's current status • Team planning for a school community's next step	1.5 Hours	• What are the differences in the approaches and purposes between one-size-fit-all, stratified, and precision curriculum? • Where is your classroom/school on a scale from 1 (one-size-fit-all) to 10 (precision) in its curriculum? • What is your community's strengths that you can build on? • What one thing you can do to move this in the right direction?	• ITC (Dimitrov & Haque, 2016) • Tschannen-Moran & McMaster (2009) • Experiential learning (Kolb, 1984) • Effective PL (Guskey & Yoon, 2009)
Post-session 3	• Coaching conversation about personal goals • Active experimentation • Self-Reflection	• Becoming an interculturally competent teacher • Coachee-led conversation	1.5 hour	o GROW coaching questions (Whitmore, 2010)	• ITC (Dimitrov & Haque, 2016) • GROW coaching questions (Whitmore, 2010) • Guskey (2002) • Tschannen-Moran & McMaster (2009) • Experiential learning (Kolb, 1984) • Effective PL (Guskey & Yoon, 2009)

Session 4	• Re-Introducing CRT • Introducing Culturally Responsive PBIS • Watching a video clip of culturally responsive classroom and reflecting on the elements that make the classroom culture culturally responsive • Small group reflection	• How do I develop a positive classroom culture?	1.5 hours	• What role does culture play as a hurdle to learning in your context? • What role can culture play as an aid in eliminating hurdles in your context? • What teaching and learning behaviors are rewarded in your context? • What role does language play in behavior management?	• Tschannen-Moran & McMaster (2009) • Experiential learning (Kolb, 1984) • Effective PL (Guskey & Yoon, 2009) • CRT (Lee & Maerten-Rivera, 2012; Oyerinde, 2008) • Culturally Responsive PBIS (Cramer & Bennet, 2015) • PBIS (Leverson, Smith, McIntosh, Rose, & Pinkelman, 2021) • Universal Design of Learning (Hanesworth, Bracken, & Elkington, 2019)
Post-session 4	• Coaching conversation about personal goals • Active experimentation • Self-Reflection	• Becoming an interculturally competent teacher • Coachee-led conversation	1.5 hour	○ GROW coaching questions (Whitmore, 2010)	• ITC (Dimitrov & Haque, 2016) • GROW coaching questions (Whitmore, 2010) • Guskey (2002) • Tschannen-Moran & McMaster (2009) • Experiential learning (Kolb, 1984) • Effective PL (Guskey & Yoon, 2009)

Data Collection. Data collection was threaded through the intervention at three stages: before the intervention, during the intervention, and after the intervention, reflecting the quasi-experimental pretest and posttest design. The collection involved quantitative and qualitative data. For example, the outcome evaluation followed a sequential explanatory design, with quantitative data collected before qualitative data followed by integrating the two (Creswell & Plano-Clark, 2018; Mertens, 2018). The section below details data collection procedures.

Process evaluation data collection. The process evaluation included quantitative and qualitative data. The quantitative process data derived from participants' session feedback surveys and the experimenter's program plans, attendance logs, and field notes. The experimenter ensured that participants completed the survey at the end of each PD session and the checklist at the end of each coaching activity. The experimenter also recorded the attendance log and field notes at the end of each session. Therefore, the collection of quantitative data lasted from November 2021 to the end of the intervention.

The qualitative data came from participants' reflections throughout the PL program and their responses during the focus group interviews at the end of the intervention. Besides, the experimenter's field notes provided another angle into the qualitative descriptions of the intervention process and provide opportunities for reflexivity. The focus group interviews were semi-structured and last 45 minutes on Zoom, with participants in small groups based on their availability.

Outcome evaluation data collection. The outcome evaluation involved first quantitative and then qualitative data collection, integrating a quasi-experimental design with qualitative data collection. The quantitative data came from participants' responses to the pretest and posttest

surveys at the beginning and the end of the PL program. The survey covered two scales: the

CRTSE and CRTOE, including 66 items on a scale of zero to 100. The time for completion was

approximately 20 minutes.

Data Analysis. The data analysis followed a sequential mixed-methods design. Once the

researcher collected quantitative data, quantitative data analysis followed before qualitative data

collection. This sequential design made qualitative data collection purposeful, leading to a full

story of the intervention (Creswell & Plano-Clark, 2008). Furthermore, the qualitative data

analysis brought about results complementing the quantitative results, extending the study's

richness.

Process evaluation data analysis. The quantitative data about the intervention process

were about how much the intervention program's delivery was coherent to the original plan, the

materials and the duration of sessions and activities, the number of participants as expected, and

the level of their responsiveness to the intervention program. The analysis of these data was from

calculating the ratios of the delivered, reached, and responded intervention program to the

original plan. For example, I calculated the number of actual participants to the number of

planned participants for each PD session and coaching activity based on the attendance logs. One

out of the ten participants dropped out of the program after the first group session. The number

of participants also fluctuated throughout the program when different participants had to miss a

session due to their work commitments. Therefore, each group session turned out to have eight

out of 10 participants, eight out of nine participants, five out of nine participants, and nine out of

nine participants. Despite the absences, the absent participants asked to access the recording to

catch up on sessions they had missed and watched those sessions. Furthermore, I examined the

quality of the intervention process by doing a content analysis of the delivered program and

participants' reflections. I used a priori codes based on the planned program, the literature about ITC, CRT, and ELLs to analyze the delivered program. The combination of the quantitative and qualitative data analysis for each PD session and coaching activity helped reveal the delivery process of the PL program, informing the researcher whether and how the intervention process converged with the original plan.

Outcome evaluation data analysis. The outcome evaluation data analysis followed an explanatory sequential design by analyzing the quantitative data before the qualitative data. Firstly, I analyzed the descriptive statistics of the pretest and posttest survey data for the whole group. Secondly, I did a Wilcoxon signed rank test of the pre-intervention and post-intervention survey data for the group. After collecting the qualitative data through focus group interviews, I started the qualitative data analysis through two iterations: a priori coding based on the survey items and emergent coding. Furthermore, I referred to my researcher's journal for triangulation of the participants' responses in reference to my notes.

Limitations of the Design

Despite the strengths of the sequential explanatory mixed-methods design and pretest and posttest quasi-experimental design, the design also presented its limitations. For example, the quasi-experimental design limited the power of the causal relationship due to non-randomization in the assignment of participants into the intervention group. Therefore, the design used pre-intervention and post-intervention measurements to evaluate the change in participants' efficacy beliefs. Furthermore, participants may confound the PL program objectives with my expectancies for socially acceptable responses, causing a threat to the results' validity. Thus, I kept a researcher's journal for records of thoughts and approaches visible and explicit throughout

the intervention process, allowing triangulation of the participants' responses against my data (Patton, 1999) and reflexivity.

Additionally, the intervention study operationalized the outcomes as changes in teachers' efficacy beliefs and teaching practices, limiting the evaluation to teacher changes rather than student changes. Therefore, the evaluation does not indicate how effectively the intervention can impact student engagement, social-emotional development, or outcomes. Future studies should consider measuring the longer-term effects of this PL intervention.

Additionally, de-identifying the data that helped mitigate the likelihood of any individual's willingness to give socially favorable responses. Lastly, the quasi-experimental design limited the study's external validity. The context of the study, a group of international schools in China and Singapore, means that intercultural living and working is the norm for the participants. Compared to another intercultural teaching context, e.g., teaching international students in an American mainstream classroom, this context has multiple intercultural encounters, ranging from classroom teaching, school community to the social context. Therefore, I need to exercise caution when generalizing the evaluation findings and explaining the context and the elements causing the outcome.

Trustworthiness and Researcher Positionality

Given the efforts to collect and analyze qualitative data in this intervention study, I intended to protect the trustworthiness of the results (Guba, 1982; Miles et al., 2014). Therefore, this study involved thick descriptions of the context and quoting participants' original words (Braun & Clarke, 2006). Additionally, throughout the recruitment process, interactions with the participants, and data analysis, I was conscious of the researcher's role within the context and possible perceptions of the researcher. For example, my role as the Director of Academics of the

three schools can increase the likelihood of socially accepted responses during the intervention and the evaluation. Therefore, I kept detailed experimenter's and researcher's notes as process records, emphasized the anonymity of the study to participants, and deidentified all the data. Furthermore, I engaged a peer EdD student to check my coding to increase the trustworthiness of my analysis.

Conclusion

In summary, the evaluation of the overall study followed an explanatory sequential design and a pretest and posttest quasi-experimental design. The intervention, i.e., a 31-hour PL program, included three RPD sessions and post-session coaching activities. The research design allowed a purposeful sampling process and collecting and analyzing quantitative data before qualitative data, benefiting from purposeful collection and analysis of qualitative data and increased richness of data. Additionally, I addressed the study's limitations by using a researcher's journal and a detailed description of the context.

Chapter 5

Findings and Discussion

This chapter presents the intervention study's findings and conclusions, including results from the study's process and outcome evaluations. The intervention study measured the extent to which the PL program changed teachers' overall efficacy beliefs about using culturally responsive teaching techniques with ELLs. Hence, this chapter consists of the following six sections, including the process of implementation, findings, discussion of findings, implications of the study's findings, limitations and strengths of the study, and conclusions.

Process of Implementation and Evaluation

The intervention took place between November 2021 and June 2022. On October the 29th, I presented an overview of the PL program to the Heads of College, Director of High Schools, and Principals of Bilingual Schools at a group-wide leadership meeting. Following the presentation, I emailed the recruitment materials to the leaders, who then circulated those materials to their teaching staff. After hearing from sixteen teachers who expressed interest in the PL program, I organized a taster session on the 22nd of November, during which I shared an overview of the program, including its content, structure, approaches, and the expected commitment. The group sessions started in January 2022. Teachers who decided to take part in the intervention attended four whole-group reflective professional development (RPD) sessions in January, March, April, May, and June. Within one or two weeks following each whole-group session, the participants signed up for a small-group coaching session. The small groups varied in size, ranging from three participants, two participants, to one participant, depending on the individual sign-ups. All group RPD and coaching sessions occurred on Zoom, partly due to the

COVID lockdowns and the physical locations of all the participants, including Beijing, Shanghai, and Suzhou in China and Singapore.

Data collection for the evaluation study occurred simultaneously with the PL program. After the taster session, I sent a recruitment email, consent form, and the pre-intervention survey to the sixteen participants, ten of whom signed up for the PL program and nine of whom responded to the survey anonymously. The pre-intervention survey measured the participants' overall efficacy beliefs about using culturally responsive teaching techniques with ELLs before their participation in the PL program. After each whole-group RPD session and each small-group coaching session, I emailed the feedback survey to the participants, collecting their qualitative feedback on how they perceived the objective of the session they just attended. Meanwhile, I kept a researcher's log of the number of participants in each session, with reflections shared by the participants. During the PL program, I kept a researcher's journal with notes about the participants' engagement and reflections. At the end of the last whole-group session, I reminded the participants of the focus group interview at the conclusion of the PL program. When I emailed a list of twelve interview slots for sign-up after the session, I re-attached the recruitment email as a reminder. Nine out of nine participants signed up for the focus group interview, after which I sent a Zoom invitation for each of the scheduled slots. The nine participants ended up in five focus group interviews, and the size of each group varied, ranging from one participant, two participants to four participants. At the end of the PL program, each participant received a plaque to certify their participation.

After finishing the last small-group coaching session on June 1st, I sent the post-intervention survey to the participants. In the end, I received nine responses to the post-intervention survey, which measured the participants' overall efficacy beliefs about using

culturally responsive teaching techniques with ELLs after their participation in the PL program. Then I analyzed the descriptive statistics of the pretest and posttest survey data for the whole group before a Wilcoxon signed rank test of the pre-intervention and post-intervention survey data for the group. Furthermore, the quantitative data analysis helped inform the focus group interview questions. For example, the comparison between the pre-intervention and post-intervention survey results indicated that the participants' self-efficacy increased and that their outcome expectancy decreased slightly. Besides, all respondents scored the statement of "using a learning preference inventory to gather data about how my students like to learn" the lowest on the CRTOE subscale. Therefore, the focus group interviews included clarifying questions with focus on the following aspects alongside the originally designed guiding questions: why their self-efficacy increased, why their outcome expectancy decreased, and what was the thinking process when they scored the statement about learning preference inventory.

During the focus group interviews, I followed the interview protocol to ask the participants to describe their planning and teaching practices with ELLs after participating in the intervention, collecting qualitative data on their perceived impacts of the PL program. Besides, my interviews involved questions about how the participants perceived their engagement during the PL program, focusing on qualitative data about the intervention process, i.e., reach and participant responsiveness. I recorded all the five focus group interviews on Zoom, after which I used Otter.ai to transcribe the audio files.

Findings

The evaluation operationalized two constructs to measure the participants' efficacy beliefs about CRT, including teachers' self-efficacy, i.e., how confident they are about using CRT techniques with ELLs, and outcome expectancy, i.e., their confidence about predicting the

outcomes resulting from any teacher's using CRT techniques with ELLs (Bandura, 1986, 1997, 2006). Using two scales that Siwatu (2007) developed to measure efficacy beliefs, this study operationalized the construct of efficacy belief with 40 items and that of outcome expectancy with 26 items. Therefore, the participants responded to the same set of 66 survey questions at the beginning and the end of the intervention. I sent the survey to each participant in the PL program with the consent form. All of the nine participants responded to the survey before the intervention started, and eight out of nine participants responded to the survey after the intervention ended. Hence, the response rates were 100% for the pre-intervention survey and 89% for the post-intervention survey. Furthermore, each respondent completed all the 66 questions in the two surveys, the average completion time of which was approximately 24 minutes for the pre-intervention survey and approximately 14 minutes for the post-intervention survey.

Descriptive Statistics

As I measured each respondent's efficacy beliefs on scales of zero to 100, the aggregated scores of the 66 questions are discrete numeric variables (Lockmiller & Lester, 2017), ranging between zero representing *no confidence* or *no certainty* to 100 representing *full confidence* or *full certainty*. The two steps of the quantitative data analysis included descriptive statistical and inferential analysis. As the foundation of the inferential analysis, the descriptive statistics below show the mean and standard deviation within the two scales. I used SPSS to process the survey data collected via Qualtrics in this study. Nine participants responded to the pre-intervention survey, and nine participants responded to the post-intervention survey. However, as one respondent answered only 32 out of the 66 questions, I considered the response invalid and excluded it from the statistical analysis.

In the pre-intervention survey, six out of the nine participants answered the questions about the number of years they have taught in a bilingual or multilingual context. ($n = 6$, $M = 4.88$, $SD = 6.20$, $max = 17$ years, $min = 0.3$ years). In the post-intervention survey, all the eight participants answered the questions about the number of years they have taught in a bilingual or multilingual context ($n = 8$, $M = 8.47$, $SD = 6.23$, $max = 18$ years, $min = 0.75$ years). The post-intervention demographics present a better representation of the participants' teaching experience interculturally than the pre-intervention survey because of the full response rate to the above question. Besides, the lack of responses to the demographic question made it impossible to conduct comparison between the pre- and post-intervention data for all the individual participants.

Generally, the descriptive statistics (Table 10) showed that the nine teachers reported a group efficacy belief at a level of $M = 79.92$, $SD = 9.06$ at the beginning of the intervention and that the eight teachers reported a group efficacy belief at a level of $M = 82.72$, $SD = 7.61$ at the conclusion of the intervention, indicating that the nine teachers were 79.92% efficacious about culturally responsive teaching before the PL program and 82.72% so after the PL program. Furthermore, the nine teachers reported a group mean of self-efficacy at $M = 72.67$, $SD = 12.78$ and a group mean of outcome expectancy at $M = 91.00$, $SD = 7.59$, suggesting that the nine participants were 72.67% confident about their use of culturally responsive teaching strategies with ELLs before attending the PL program and 91% certain that culturally responsive teaching strategies can support ELLs. In comparison, the eight teachers reported a group mean of self-efficacy at $M = 81.30$, $SD = 8.03$ and a group mean of outcome expectancy at $M = 84.90$, $SD = 8.79$, showing that they were 81.30% confident about their use of culturally responsive teaching

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strategies with ELLs before attending the PL program and 84.90% certain that culturally

responsive teaching strategies can support ELLs.

Table 10

Descriptive Statistics

Survey	n	Variables	M	SD	Skew ness	Kurtosis	Shapiro-Wilk Significance
Pre-PL	9	Teachers' Self-Efficacy (40 Items)	72.67	12.78	-0.66	0.32	0.75
		Teachers' Outcome Expectancy (26 Items)	91.00	7.59	-0.57	0.10	0.67
		Teachers' Efficacy Belief (66 Items)	79.92	9.06	0.01	-0.93	0.84
Post-PL	8	Teachers' Self-Efficacy (40 Items)	81.30	8.03	0.71	0.15	0.81
		Teachers' Outcome Expectancy (26 Items)	84.90	8.79	0.19	-1.09	0.89
		Teachers' Efficacy Belief (66 Items)	82.72	7.61	0.61	0.01	0.73

The descriptive statistics in Table 10 also show that the mean difference between the two

subscales, CRTSE and CRTOE, is 18.33 in the pre-intervention survey and 3.6 in the post-

intervention survey. Therefore, the difference between the participants' self-efficacy and

outcome expectancy before the PL program is meaningful because the size of the difference is

larger than one SD. In comparison, the difference between the participants' self-efficacy and

outcome expectancy after the PL lacks meaning because it is smaller than one SD. Furthermore,

the preliminary analysis explored the normality of the aggregate scores in each subscale and each

survey. As all the Shapiro-Wilk significance values are larger than 0.05, none of the data

distribution is normal.

Quantitative Data Analysis

As the preliminary statistical analysis showed that the data distribution of the subscales in the two surveys is nonnormal, I decided to continue to analyze the two surveys' data with a Wilcoxon signed rank test and predetermine the level of significance to be α = .05. The valid sample size for the Wilcoxon signed rank test also decreased to n=5 partly because only six participants responded to the question about the number of years teaching interculturally, the only indicator to track individual responses, and partly because one participant dropped out of the intervention after the first group session. Hence, I conducted the Wilcoxon signed rank test for five individuals whose pre-intervention and post-intervention survey responses (Table 11) helped inform whether and how their efficacy belief changed.

Table 11

Aggregate Scores (n=5)

Participant	Intercultural Teaching Experience	Pre-PL Self-Efficacy	Post-PL Self-Efficacy	Pre-PL Outcome Expectancy	Post-PL Outcome Expectancy	Pre-PL Efficacy Belief	Post-PL Efficacy Belief
1	9 months	74.43	89.1	89.62	94.27	80.41	91.14
2	2 years	48.33	79.25	100	89.42	68.68	83.26
3	5 years	67.63	70.68	84.81	76.69	74.39	73.05
4	6 years	73.53	95.7	92.88	98.12	81.15	96.65
5	18 years	72.33	79.88	87.04	80.27	78.12	80.03

The Wilcoxon signed rank test of the above pre-PL and post-PL scores (Table 11) revealed the following three results. Firstly, the test rejected the null hypothesis about the difference in participants' self-efficacy scores before and after the intervention as the test indicated that the pre-PL self-efficacy (mean rank = 3) was rated more favorably than the post-PL self-efficacy (mean rank = 0, Z = -2.02, p = 0.04), indicating that the participants' self-

efficacy significantly increased after the PL program. Secondly, the test failed to reject the null hypothesis about the difference in participant's outcome expectancy scores before and after the intervention. The test showed that the pre-PL outcome expectancy (mean rank = 4) was not rated more favorably than the post-PL outcome expectancy (mean rank = 1.5, Z = -1.21, p = 0.23), suggesting that the participants' outcome expectancy scores did not change significantly after the PL program. Thirdly, the test failed to reject the null hypothesis about the difference in participant's efficacy belief scores before and after the intervention. As the test showed that the pre-PL efficacy belief (mean rank = 1) was not rated more favorably than the post-PL outcome expectancy (mean rank = 3.5, Z = -1.75, p = 0.08), the participants' efficacy belief about culturally responsive teaching did not evolve significantly after the PL program. Hence, the quantitative data analysis revealed a significant increase of participants' self-efficacy, but not one of their outcome expectancy or efficacy belief.

Qualitative Data Analysis

I conducted the qualitative data analysis through two steps: using a priori coding and emergent coding. Besides, I used the statements on the CRTSE and CRTOE scales as the a priori codes for the qualitative analysis before I summarized themes emerging from the focus group interview transcripts. As my focus group interview questions covered primarily three areas, engagement, perceived impacts, and feedback on the PL program, the emergent coding encompasses a wider range of content than the a priori coding process as the a priori codes included only the perceived impacts of the PL program. Besides, the a priori coding process involved responses to my clarification questions to explain the outstanding responses to the survey explicitly. Furthermore, I invited a peer EdD student to read through my codes on Atlasti and give me feedback to increase their trustworthiness.

Step One: a priori coding. The analysis process involved transforming the statements on the CRTSE and CRTOE scales into a priori codes (Table 12) and annotating the participants' response during the focus group interviews with these codes. Broadly speaking, the focus group interview responses reflected the statements partially, with 23 of the 40 CRTSE statements mentioned and 18 of the 26 CRTOE statements mentioned. Therefore, the participants mentioned a total of 41 of the 66 statements on the CRT survey. Additionally, the participants mentioned codes from the CRTSE scale 55 times and codes from the CRTOE scale 44 times cross the responses. The following themes emerged from the a priori coding process.

Table 12

A Priori Codes

	A Priori Statements	Mentions
CRTSE	Adapt instruction to meet the needs of my students	3
	Obtain information about my students' academic strengths	0
	Determine whether my students like to work alone or in a group	1
	Determine whether my students feel comfortable competing with other students	0
	Identify ways that the school culture (e.g., values, norms, and practices) is different from my students' home culture	6
	Implement strategies to minimize the effects of the mismatch between my students' home culture and the school culture	9
	Assess student learning using various types of assessments	2
	Obtain information about my students' home life	1
	Build a sense of trust in my students	1
	Establish positive home-school relations	0
	Use a variety of teaching methods	0

A Priori Statements	Mentions
Develop a community of learners when my class consists of students from diverse	4
Use my students' cultural background to help make learning meaningful	1
Use my students' prior knowledge to help them make sense of new information	1
Identify ways how students communicate at home may differ from the school norms	2
Obtain information about my students' cultural background	2
Teach students about their cultures' contributions to the subject area	1
Greet English Language Learners with a phrase in their native language	0
Design a classroom environment using displays that reflects a variety of cultures	2
Develop a personal relationship with my students	0
Obtain information about my students' academic weaknesses	0
Praise English Language Learners for their accomplishments using a phrase in their native language	0
Identify ways that standardized tests may be biased towards linguistically diverse students	0
Communicate with parents regarding their child's educational progress	0
Structure parent-teacher conferences so that the meeting is not intimidating for parents	0
Help students to develop positive relationships with their classmates	0
Revise instructional material to include a better representation of cultural groups	4
Critically examine the curriculum to determine whether it reinforces negative cultural stereotypes	1
Design a lesson that shows how other cultural groups have made use of the subject	0
Model classroom tasks to enhance English Language Learners' understanding	1
Communicate with the parents of English Language Learners regarding their child's achievement	0
Help students feel like important members of the classroom	1
Identify ways that standardized tests may be biased towards culturally diverse students	0

	A Priori Statements	Mentions
	Use a learning preference inventory to gather data about how my students like to learn	7
	Use examples that are familiar to students from diverse cultural backgrounds	2
	Explain new concepts using examples that are taken from my students' everyday lives	1
	Obtain information regarding my students' academic interests	1
	Use the interests of my students to make learning meaningful for them	0
	Implement cooperative learning activities for those students who like to work in groups	0
	Design instruction that matches my students' developmental needs	1
CRTOE	A positive teacher-student relationship can be established by building a sense of trust in my students.	2
	Incorporating a variety of teaching methods will help my students to be successful.	1
	Students will be successful when instruction is adapted to meet their needs.	1
	Developing a community of learners when my class consists of students from diverse cultural backgrounds will promote positive interactions between students.	4
	Acknowledging the ways that the school culture is different from my students' home culture will minimize the likelihood of discipline problems.	1
	Understanding the communication preferences of my students will decrease the likelihood of student-teacher communication problems.	4
	Connecting my students' prior knowledge with new incoming information will lead to deeper learning.	2
	Matching instruction to the students' learning preferences will enhance their learning.	6
	Revising instructional material to include a better representation of the students' cultural group will foster positive self-images.	1
	Providing English Language Learners with visual aids will enhance their understanding of assignments.	1
	Students will develop an appreciation for their culture when they are taught about the contributions their culture has made over time.	0
	Conveying the message that parents are an important part of the classroom will increase parent participation.	0

A Priori Statements	Mentions
The likelihood of student-teacher misunderstandings decreases when my students' cultural background is understood.	2
Changing the structure of the classroom so that it is compatible with my students' home culture will increase their motivation to come to class.	0
Establishing positive home-school relations will increase parental involvement.	0
Student attendance will increase when a personal relationship between the teacher and students has been developed.	0
Assessing student learning using a variety of assessment procedures will provide a better picture of what they have learned.	6
Using my students' interests when designing instruction will increase their motivation to learn.	0
Simplifying the language used during the presentation will enhance English Language Learners' comprehension of the lesson.	2
The frequency that students' abilities are misdiagnosed will decrease when their standardized test scores are interpreted with caution.	1
Encouraging students to use their native language will help to maintain students' cultural identity.	1
Students' self-esteem can be enhanced when their cultural background is valued by the teacher.	2
Helping students from diverse cultural backgrounds succeed in school will increase their confidence in their academic ability.	0
Students' academic achievement will increase when they are provided with unbiased access to the necessary learning resources.	7
Using culturally familiar examples will make learning new concepts easier.	1
When students see themselves in the pictures that are displayed in the classroom, they develop a positive self-identity.	0

In general, the participants focused more on individual teachers' or their personal practices of using culturally responsive teaching when describing their confidence or certainty about statements on the CRTSE and CRTOE sub-scales. The participants dismissed discussions

about changing or planning to change the current practices if they considered them their school's vision and decisions. Furthermore, the participants barely mentioned any responsive practice to involve parents from a different cultural background. Hence, the following section presents three major impacts of the PL program.

   Strong confidence about identifying the home-school cultural differences. Most participants expressed their confidence that they can 'identify ways that the school culture (e.g., values, norms, and practices) is different from my students' home culture.' The prevalence of cultural differences in the participants' responses reflects their understanding of cultural differences as a significant factor in their students' schooling experience. For example, Participant Three described the difference as a potential 'cultural shock within an educational setting' to students.

   The impact of the PL program was conspicuous. Participant One described his changed attitude to culture by bringing it from the backdrop to the forefront, saying

>   For me, it was always you know, content must come first, then your
>
>   communication, then the cognition. And culture is probably something I brushed
>
>   aside a little bit or dismissed. After doing this, I try and perceive it from the
>
>   Chinese culture [by asking myself] 'how would Chinese students or even
>
>   Chinese staff perceive something?'

Therefore, he recognized that the PL program brought culture as an element in the backdrop to the forefront of his mind in his approach to teaching. Similarly, Participant Two started to use culture as a lens to understand her students' behavior. She said

>   My children really struggle with walking in a straight line through the school.
>
>   And I just kind of understand that for not all of the children, that [behavior] may

not has been the norm, and I just realized that they might need some specific

teaching about it and things like that.

According to my researcher's notes about participants' actions from the small-group coaching

sessions, Participant Two developed a unit to teach her students how to acquire collaboration

skills as she identified that her students come from a background in which working

independently is the norm and that they need to learn how to collaborate explicitly.

Apart from the enhanced understanding that culture plays a crucial role in students'

development, the participants also showed strong empathy in interpreting students' behaviors

that used to be challenging for them to understand. For example, Participant Five described her

high school Chinese students' sleepiness as a behavior that originally bothered her as 'there is no

more napping after kindergarten' in Australia, her home country. After discussing her concerns

with her Chinese colleagues, she realized that 'even in late Secondary School, Chinese students

have nap time during the day' and 'now completely understand(s) why students are so sleepy.'

It is worth noting that all the participants who mentioned their increased confidence about

identifying how their students' home culture differs from the school culture came from either the

international bilingual schools or the international high schools, two sub-contexts that feature a

full population of Chinese students, whose full curriculum or half curriculum delivery is through

English as their second language. The connection between the teachers' confidence about

identifying the home-school cultural differences and their students' background needs further

explanation in two ways. Firstly, teachers with a full population of students from a different

cultural background can access professional learning about intercultural competence more easily

than teachers from contexts where only a proportion of their students come from cultures

different from the teachers', as the conspicuousness of culture and the prevalence of culture-

related conversations vary. Secondly, the homogeneity of students' cultural background in the above two sub-contexts might also contribute to the easiness in identifying home-school cultural differences.

Hence, most participants reported their confidence about identifying how students' home culture can differ from the school culture. Their confidence accompanies the awareness of foregrounding culture in their approach to teaching and planning and the empathy that some practices are a result of culture. Furthermore, there might be a link between teachers' intercultural competence development and their school's context, especially the conspicuousness of cultural differences and the homogeneity of students' cultures.

Emphasis on communication and a sociocultural constructivist approach to a learning community. Across the responses, two participants expressed confidence about identifying the differences in communication between students' home and school norms, and six participants admitted that 'understanding the communication preferences of [their] students will decrease the likelihood of student-teacher communication problems.' To the participants, the word *communication* encompasses interactions inside and outside classrooms. For example, Participant Four described communication as 'simple greeting', whereas Participant Five commented on her students' being 'reticent to talk' in her classroom. Therefore, the participants considered culture's impacts on communication to be far-reaching.

Despite the recognition that students' different communicative styles derived from culture, all the participants expressed strong willingness to support their students in adapting to the school norms. For example, Participant Six, whose students come from mixed backgrounds such as China, Japan, Taiwan, the United States of America, Holland, and the United Kingdom,

not only shared commented on his Asian students' communication styles but also proposed that the school should teach them how to challenge authority professionally. He commented,

> I think, you know, the idea from the course, such as the matching exercise of, you know, the sort of different cultural approaches to, for example, questioning authority or you know, taking on a leadership role or that sort of thing. I thought that was really, really good. That really made me think. You know, we talk and we practice a bit blasé on our website that we want children who professionally challenge. But we can't make an assumption that that happens. And if you come from certain cultures, that's, that's an absolute taboo, really. So, I think, I think that was a good eye opener and sort of left me thinking, well, how can we, you know, actualize that, and actually what, you know, what are the concrete strategies we can do to develop kids who perhaps come from Japan, in terms of challenging the teacher, or from Taiwan or from China and how they would, you know, think creatively, you know, or bring a little bit of the sort of disturber into them, you know, not all the time, obviously, but, you know, and then having an understanding that that's okay. And that's probably why their parents signed up for an international education.

In this quote, Participant Five wanted to address the mismatch in students' home and school approaches to communication as a learning need and align students' communication with the school norms because of the international nature of the school.

In addition to identifying the differences in communication between students' home and school, the participants also analyzed the contributors to students' home approach to communication. For instance, Participant Six considered communication with caregivers at home

impacted her students' work during a period of online learning. Furthermore, Participant Three felt that grandparents influenced their grandchildren's communication during online learning as students' parents were absent.

The participants' focus on students' communication is intertwined with the ideal of 'developing a community of learners' through a sociocultural constructivist lens. That is, the participants emphasized that students work together to construct knowledge and their learning experience as a 'community of learners.' Participant Four recalled a third graders' unit about explorers with his Chinese students and commented

> I think that (inquiry) naturally provides a way for students to embed their own interest areas and themes. So there are one of my students this year in year 13. She chose her theme. The larger thing was activities and lifestyles, which is really broad. And we allowed students to look at anything within that broader theme. And one of my students, she just loves being at home and doing homework on her bed. And she loves the comfort of soft furnishings. Her entire theme was her bedroom. So her artwork was all about slippers and pillows and textures. So she literally bought her home environment into her work. And I'm really pleased that she was confident enough to do that perhaps. It wasn't traditionally a cultural idea, but it's her own culture, it's how she lives.

Hence, Participant Five created room for his students' voice to drive their learning, leading to the inclusion of diverse interests and cultural expressions, manifesting the philosophy that learning is a social and cultural practice in which students construct their meanings.

Participant Six commented on creating a community of learners through an adaptive environment.

> I've got them looking at a source on the iPads, or website, I've tried to pair up
> different language abilities, so that so that they can learn from each other. And
> so, yeah, more than anything, it's not having a fixed sort of seating arrangement
> and a fixed dynamic to the class, kind of thinking about the purpose of the task,
> and how, how it can sort of move kids around so that they can learn from each
> other.

Participant Six designed his classroom environment with varied learning tools and grouping plans to make peer learning possible. Therefore, his practices also reflected the pedagogy that social and cultural interactions sit at the core of learning.

Hence, differences in communication between school and home drew a decent amount of attention from the participants. For example, the participants made comments about communication inside and outside of classrooms, developing students' communication skills to fit the school's norms, and analysis of students' home communication. These comments reflected an emphasis on the role of culture in affecting communication and the participants' efficacy beliefs about responding to the home-and-school communication differences. Furthermore, the participants designed learning experiences for the students around communication and interactions between and across individuals, showing a sociocultural constructivist approach to education.

The imbalance between the moderate certainty level about varied assessment strategies and the low confidence about using varied strategies for unbiased assessment. The topic of assessment is prevalent in the participants' responses, but the participants expressed nuanced feelings about varied assessment strategies between theory and practice. In theory, the participants perceived the role of assessment variety as crucial and expressed certainty that

students benefit from varied assessment strategies mostly. For example, Participant Five commented, 'I know for certain they (can work, but the uncertainties in they can't work for everyone.' Nonetheless, they expressed more concerns about the challenges than confidence about using varied assessment strategies in practice.

Participant Three expressed his views about why varied assessment strategies are necessary, saying

> it (assessment) continues to be a challenge that I observe as I have some very bright students in the class this year. And it's been the case in previous years as well. And on a conceptual level, they understand perfectly well and beyond at the level that we're trying to engage them, but they don't have the language there to do that. And when you combine that with then something that's culturally not in sync with them, and a way of teaching, which is something that they're not used to, it culminates into this into this real problem that can hinder pupil engagement and progress, and in quite a significant way, for set, you know, not for everyone, but for certain types of students.

His analysis of the assessment process for his English language learners involved language and culture as combined barriers to allowing ELLs to demonstrate their cognitive understandings fully. Furthermore, he offered the solution of designing assessments that could lead students' application of their learning in the future.

In addition to Participant Three's broad analysis of potential barriers to accessible assessment, Participant Seven and Participant Eight brought up specific examples in the challenges they come across in making assessments just for ELLs. Participant Seven, a Secondary School math teacher, shared that the wording of a math problem in her school's end-

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of-year exam could cause 'cognitive conflict' because the use of a Welsh name could create a cognitive overload for ELLs. Besides, Participant Eight, an Early Years practitioner, pointed out that the school uses New Group Reading Test, a UK-centric reading assessment, with its ELLs, making the assessment data questionable because some questions' contexts derive from life in the United Kingdom.

Despite the above strong voices about the current assessments' irrelevance to ELLs' cultural backgrounds, the participants barely mentioned how they would change the situation otherwise. The lack of engagement in discussions about the solution to biased assessment might result from the fact that assessment decisions are usually beyond individual teachers. On the contrary, contextual factors, such as the educational program at the school, the local educational authority, and the marketable value of an educational product offered by a for-profit group, take away teachers' agency of making their assessment decisions.

Consequently, the participants expressed strong certainty that varied assessment strategies can benefit students, especially when they come from diverse linguistic and cultural backgrounds. Their analysis of the current assessment showed their concerns about overloading students with irrelevant language and cultural backgrounds, leading to inaccurate data that might impede teachers' instructional interventions and ELLs' confidence. Despite the voices about how certain they were about using unbiased assessments, the participants demonstrated much weaker confidence that they could plan to solve the assessment problems.

In summary, the above three themes were evident in my analysis using the a priori codes based on the CRTSE and CRTOE subscales. The participants attributed their confidence about identifying students' home-school cultural differences and focusing on communication and building a learning community through social and cultural interactions to their professional

development during the PL program. Although they were certain about how varied assessment strategies can benefit students, they lacked the confidence about changing the existing problems in their school's assessments.

Step Two: emergent coding. After conducting a prior coding in my qualitative analysis, I analyzed the focus group interview transcripts again and noticed the two themes emerging from the responses. The first theme emerged from the participants' evaluation of their engagement during the PL program, and the second one emerged from the comments about responsiveness. The following two themes added another layer of meaning-making to the qualitative data.

Contrasting evaluation of the key features of the PL program. The participants expressed opposite views about two essential features of the PL programme. Firstly, the participants disagreed with each other on the inclusion of teachers from three different types of schools and teachers of all age groups in the context. I recruited participants for the PL program from across my context because the mismatch between teachers' and students' cultural backgrounds is not uncommon in any of the school types, making almost all the teachers in the context eligible for the intervention. Nonetheless, some participants perceived the diverse teacher backgrounds a strength because the diversity gave them an opportunity to see cultural responsiveness in a similar but different context. Nonetheless, others commented on the diversity as an area for improvement because they perceived the diverse educational contexts as irrelevant and distracting. Therefore, the feature of including different schools

Secondly, the participants perceived the small-group coaching setup with different feedback. Only five out of the nine participants participated in the small-group coaching sessions continuously. The actions from the coaching were evident, ranging from a unit of work to teach the second graders how to collaborate, to incorporate a unit of intercultural competence in the

International Baccalaureate Career-Related Program, and to a school-wide intercultural communication policy. Furthermore, the participants perceived the 'intensity' of the small-group coaching sessions as more output than input than their engagement in the whole-group sessions, making possible active thinking and planning. The main contributor to this 'intensity' is the much higher level of active reflection, setting goals, assessing progress, and planning from each participant during the small-group coaching sessions than the whole-group PD sessions due to the group size and the nature of coaching. Nonetheless, Participant Nine pointed out that the small-group setup defies the personal and confidential nature of coaching. As he reflected on his personal struggles with his journey as a culturally responsive teacher, the waiting time when other participants talked and the fact that his conversation was being listened to made him uncomfortable. Therefore, these participants emphasized different facets of the small-group coaching sessions in their comments.

Responsiveness to elements beyond culture. Although the intervention focused on culturally responsive teaching and intercultural teaching competence, the participants brought up factors beyond culture in their reflection on the program's impacts. Participant Seven brought up the concept of gender in her description of subconscious stereotypes, which responded to her comment during a small-group coaching session that there is a spectrum between individuality and culture. Participant Five felt that different personalities can manifest cultural traits quite differently, some quiet and some active in interactions. Hence, the participants' responsiveness was by nature effective diagnosis of individual students' needs and intervene accordingly.

Mix-Methods Data Analysis

As this study followed the exploratory design of the mixed-method approach, the qualitative data analysis surfaced information that complements the quantitative data with

clarification and addition. The exploratory design included adding questions to the focus group interviews based on the survey results and the analysis of the focus group interview responses against the quantitative results. Therefore, mixed-methods data analysis revealed the following two themes, helping explain the quantitative data from the survey.

Confirmed increase in self-efficacy. Firstly, the qualitative data further consolidated the result of the increase in participants' self-efficacy. One conspicuous result from the quantitative data analysis was the increase of the participants' self-efficacy scores. As shown by the Wilcoxon signed ranks test of comparing five participants' pre-PL and post-PL scores, the participants' self-efficacy significantly increased after the PL program (mean rank $= 0$, $Z = -2.02$, $p = 0.04$). Furthermore, the participants testified their growing self-efficacy in their responses during the focus group interviews, as demonstrated in the first two themes in the a priori analysis section that the participants showed strong confidence about identifying home-school cultural differences and developing a community of learners. Besides, the participants admitted the role of the PL program in their professional growth. For example, Participant Four, a participant who showed the most reservation about the PL program, explicitly commented that the PL program at least changed him from being 'peripherally aware of' cultural mismatch to 'more aware of [it] every day.' Hence, the focus group interview responses reinforced the quantitative analysis results.

Secondly, the qualitative data analysis shed light on the causes for the increase in participants' self-efficacy. The participants showed readiness for using culture as a lens and adopted different approaches to gather insights about cultural differences. Some involved their local colleagues as a culture translator. For example, Participant Two commented, 'one of the things we've started to do a lot more is working more closely with our Chinese colleagues in

planning. And by having them in the planning process, we get more of this cultural awareness.' Participant Six gathered the cultural insight about Chinese Second School students taking a nap during their school day from her Chinese colleague. Therefore, the qualitative data disclosed full stories about how and why the participants felt increased confidence about using culturally responsive teaching strategies.

Decreased outcome expectancy. The participants' scores on the CRTOE subscale dropped from the pre-PL to the post-PL survey although the difference was insignificant. The qualitative data analysis produced some insights about the possible reasons for the decrease in the participants' outcome expectancy. Given the increased familiarity with culturally responsive teaching strategies over the PL program, the participants gained an enhanced level of understanding of what each statement on the CRTSE and CRTOE subscales, allowing them to notice the nuances in applying and interpreting the strategy in each statement.

On the one hand, the participants felt constraints from their context and commented that any judgement of some CRTOE statements should be dependent on the context. For example, Participant Four mentioned that the application of CRT strategies needs 'to be very specific to the class, to the context to what you encounter with those specific children.' On the other hand, the participants expressed nuanced interpretations of the survey statements, making them uncertain about how to score themselves and so low scores. For example, the statement 'Use a learning preference inventory to gather data about how my students like to learn' caused the most uncertainties amongst the participants as they interpreted the phrase 'learning preference inventory' differently. Some understood this phrase as an established tool and commented that they never come across this inventory; some understood the phrase as a self-created inventory and perceived their practices of gathering students' learning preferences to be not as formal; and

one participant explicitly explained that he used this inventory in a previous context. Therefore, some of the CRTOE statements' openness to different interpretations led to unsureness about how to score one's certainty level, causing low scores of these statements.

In summary, the qualitative data analysis complemented the quantitative data results. The qualitative analysis not only cemented the results from the quantitative data with the participants' words but also provided insights about why the participants' self-efficacy increased. Furthermore, the increased familiarity with CRT strategies may have led to nuanced understandings of what CRT strategies look like in real life and of what each statement means. Therefore, the participants seemed to be more reserved in their scoring of the CRTOE statements at the end of the PL program than they were at the beginning of the PL program.

Discussion of Findings

The above data analysis results and findings followed the explanatory approach to the mixed-methods design. The qualitative data complement the quantitative data in multiple ways and revealed insights into the intervention implementation and the teachers' efficacy beliefs about using CRT strategies. Hence, the following section presents how the findings answered the research questions, including those about the process evaluation and those about the outcome evaluation.

Process Evaluation

This evaluation study involved three aspects of the intervention: the fidelity of implementation, reach, and participant responsiveness (Baranowski & Stables, 2000; Dusenbury et al., 2003). I collected and analyzed the quantitative data using my researcher's notes and checklists and the qualitative data through the group session transcripts, focus group interview

transcripts, and my researcher's notes. Therefore, the process evaluation addressed the process evaluation questions as below.

RQ 1: fidelity of implementation. The first process-related research question about the fidelity of implementation asks, "to what extent was the PL program implemented in adherence to the established content?" The quantitative data consisted of the number of sessions, and the qualitative data came from the participants' responses to the survey question at the end of each PD and coaching session. There was alignment between the number of PD and coaching sessions and the original design as I delivered four PD sessions and four small-group coaching sessions throughout the PL program. Furthermore, my researcher's notes and the participants' responses to the post-session surveys showed an alignment between the objectives of each implemented session and the intended objectives. For example, the third PD session focused on the curriculum design competencies of the intercultural teaching competency, and all participants recognized the objective to be developing culturally responsive curriculum. Besides, the participants in the small-group coaching sessions shared that the objectives included 'identifying personal goals', 'developing a timeline', and 'investing ways to move forward in the future.' Therefore, the fidelity of the implementation during the PL program was in strong adherence to the established content.

RQ 2: reach. The second process-related research question asks, "to what extent did international English-speaking teachers take part in the PL program?" The quantitative data about this indicator came from the number of participants in each PD and coaching session recorded in my attendance logs. The attendance rates in the PD session fluctuated from 80%, 88.89%, 55.56% to 100% for each session. By comparison, the attendance rates in the small-group coaching session were much lower, with 70%, 66.67%, 66.67%, and 66.67% for each

round. Overall, five out the nine participants attended all the PD and coaching sessions throughout the PL program, making the full attendance rate 55.56%. The qualitative data came from the perceived engagement shared by the participants during the focus group interviews. The participants who missed the small-group coaching sessions explained that their multiple commitments competed for time and that they considered the coaching optional. Hence, the intervention partially reached the participants at a rate of 55.56%, leaving much room for reflection on how to organize the PL program for better participation.

      RQ 3: participant responsiveness. The last process-related research question asks, "what were international English-speaking teachers' experiences with the PL program?" I analyzed the data from my field notes about the participants' reflective discussions during the PD session and their progress against their personal goals shared in each coaching session. From my perspective as the experimenter, the teachers participated in the PD sessions with active reflections and discussions, and those attending the coaching sessions completed the PL program with a finished product, being a unit of work or an intercultural communication policy. From the participants' perspective, all but one participant described their engagement as 'active' and the PD sessions as something they 'looked forward to' although one participant expressed feelings about disengagement because of his plan to depart his school and China. Hence, those who participated in the PL program showed high levels of engagement.

      In summary, the process evaluation involved three indicators: fidelity of implementation, reach, and participant responsiveness. Based on the quantitative and qualitative data analysis, the intervention implementation adhered to the original design with fidelity. Despite the partial rate of 55.56% at which the intervention reached the participants, those who attended the PD sessions and coaching sessions showed high level of engagement.

Outcome Evaluation

The outcome evaluation questions addressed the two types of efficacy belief, self-efficacy and outcome expectancy, and measured the participants' pre-intervention and post-intervention efficacy belief through quantitative and qualitative data. The quantitative data analysis compared the participants' scores on the CRTSE and CRTOE sub-scales separately and collectively. Then the qualitative data analysis confirmed the quantitative results and explained the quantitative data. The section below shows how the study answered the outcome evaluation questions.

RQ 1a: teachers' self-efficacy. The first research question about the outcome evaluation asks, "to what extent does participation in the intervention increase teachers' self-efficacy for using culturally responsive teaching techniques with ELLs?" Firstly, the quantitative data answered the question with an affirmative answer as the Wilcoxon signed rank test revealed a significant increase in five participants' self-efficacy after the intervention (mean rank = 0, Z = -2.02, p = 0.04). Secondly, the qualitative data confirmed that the participants were particularly confident about identifying students' home-school cultural differences and taking a sociocultural constructivist approach to building a community of learners through intercultural communication. Thirdly, the qualitative data revealed contributors to the participants' self-efficacy increase, including their readiness for using culture as a lens to analyze behavioral and learning issues and their use of local colleagues as cultural ambassadors to gain cultural insights. Therefore, the teachers' self-efficacy increase was substantial.

RQ 1b: teacher's outcome expectancy. The second research question about the outcome evaluation asks, "to what extent does participation in the intervention increase teachers' outcome expectancy for using culturally responsive teaching techniques with ELLs?" Firstly, the

quantitative data failed to show significant increase in the participants' outcome expectancy (mean rank = 1.5, Z = -1.21, p = 0.23), indicating that the intervention was unable to change the participants' certainty level about how CRT strategies can be effective in classrooms generally. Secondly, the qualitative data helped explain the lack of significant change from two angles: increasingly nuanced understandings of the survey statements and the contextualization of each statement in varied educational setups, both leading to uncertainties about how to interpret the statements themselves rather than uncertainties about what the statements claim. Therefore, the participants put more thoughts into their reading of the CRTOE statements in the post-intervention survey than they did in the pre-intervention survey, causing the insignificant decrease in their outcome expectancy scores, which may not represent an actual decrease of the participants' outcome expectancy after the intervention.

RQ 2: teacher's self-perceived impacts. The third research question about the outcome evaluation asks, "how do the participants describe the results of their use of culturally responsive teaching practices with ELLs after participating in the intervention?" The qualitative data collection and analysis opened a window for teachers' self-perceived impacts of the PL program. The following four themes emerged from the a priori coding and emergent coding process. Firstly, the PL program contributed to the participants' strong confidence about identifying students' home-school cultural differences. Secondly, the PL program helped the participants develop a sociocultural constructivist approach to building a community of learners via communication. Thirdly, the PL program was unable to boost the participants' confidence about using varied strategies for unbiased assessment because the participants felt different school-level decisions can limit their autonomy to do so. Lastly, the PL program brought to the participants' attention that responsive teaching follows individual students' needs, including

factors beyond culture, for example, gender and personality. Hence, the participants perceived multiple impacts of the PL program according to their responses to the focus group interview questions.

Implications of the Study's Findings

This study evaluated a PL program with the focus on ITC and CRT in which a group of international English-speaking teachers participated. The evaluation of the intervention's process and outcome shed light on any future intervention that aims to support teachers' intercultural competence development or teachers' learning of culturally responsive teaching strategies. Therefore, this following section presents the implications of the study's findings from two angles: the implications for practice and the implications for research.

Implications for Practice: Teachers, School Leaders, and PL Implementers

The implications for teachers working with students from a different cultural background or with a student body of diverse cultural backgrounds include using reflections and collaborations in their everyday practices and a sociocultural constructivist approach to teaching and planning. Firstly, teachers must reflect on their assumptions about multiple areas in their everyday practices, for example, their professional identity as a teacher, the interactions between teachers and students, how different people consider learning, how they approach communication, including sharing their expectations and solving conflicts, and assumptions they make about other cultures. These assumptions deriving from one's values, beliefs, perceptions, and attitudes drive teachers' instructional decisions. Therefore, teachers must check their assumptions to ensure their responsiveness to students' real needs rather than their assumed needs. Secondly, teachers must collaborate with their colleague, especially those from students' cultural background who can share their 'insider's knowledge' and bridge the cultural gap.

Thirdly, teachers must adhere to the sociocultural constructivist approach to teaching and learning, ensuring that they value diverse voices and create room for varied approaches to communication. This approach can then guarantee diversity, equity, and inclusion for all students in joining a community of learners when constructing their learning. Therefore, teachers must consider reflection and collaboration as part of their everyday work and focus on the sociocultural constructivist aspect of their students' learning journey.

The first implication for school leaders is the resources guaranteed for any professional development for teachers' intercultural teaching competence and CRT strategies development. As this study showed, the indicator of reach in the process evaluation can cause concerns about how much the PL program reach its participants, and the participants explained the lack of engagement with the small-group coaching sessions as their struggle with time. Therefore, leadership support to guarantee the full implementation and participation of any PL program is indispensable for teachers' engagement.

The other implication for school leaders is to review their school's approach to assessment. This evaluation study showed that the participants demonstrated low efficacy beliefs about CRT strategies that they considered beyond their control. For example, they showed low self-efficacy about using varied assessment strategies despite their certainty that varied assessment strategies can benefit students. Also, they perceived the weaknesses in the assessment approaches were government-level, school-level or department-level decisions. Therefore, school leadership teams should engage teachers in school-wide and department-based discussions about assessment strategies to serve students' needs better.

The implications for PL implementers are multifold. Firstly, implementers need to obtain support and resources early in their design and implementation of their PL program. Schools are

busy with different activities competing for resources such as time. Therefore, any PL program about ITC and CRT strategies must get to a school's priority list for strategic development with protected time and resources. Secondly, implementers should consider collecting participants' feedback on joining the program with participants from different contexts and using their feedback to design the program. The consideration of participants' preferences can maximize their engagement during the program. Thirdly, PL implementers should consider elements in this study's PL program because the evaluation proved the significant impacts of the PL program on teachers' self-efficacy growth with CRT strategies.

Implications for Research

Researchers can learn about the following messages from this study. Firstly, the development of CRT strategies through the ITC framework is possible. Despite being two separate frameworks, this PL program integrated ITC and CRT and used ITC as the program framework. Therefore, the findings about the intervention impacts contribute to the existing literature about the links between ITC and CRT. As the significant increase of participants' self-efficacy as proved by the evaluation study, researchers may further explore the specific interconnectedness between the ITC framework and teachers' self-efficacy with CRT strategies. Secondly, the differentiation between the sub-contexts involved in this study, i.e., international colleges with students from diverse cultural backgrounds and international high schools and bilingual schools where students come from the same cultural background, can be a potential area for further exploration. That is, heterogenous student population and homogeneous student demographics may present different challenges to teachers. Hence, researchers should consider comparing the use of CRT strategies or the development of ITC between contexts. Thirdly, researchers using the Siwatu's (2007) CRT scale should consider increasing the clarity of the

statements on the CRTOE subscale, especially the use of the phrase 'learning preference inventory.' A consistent understanding of the statements can help reduce nuanced interpretations when participants complete the survey.

In summary, teachers, school leaders, PL implementers, and researchers may perceive this study's findings meaningful. The implications for teachers are the application of CRT strategies in their practice through reflection, collaboration, and a sociocultural constructivist approach to building a community of learners. For school leaders and PL implementers, the guarantee of resources for an ITC and CRT PL program is crucial. Besides, school leaders must consider school-wide initiatives to review the responsiveness of assessment tasks. PL implementers should replicate the core elements of this intervention while adapting to their participants' feedback on mixing participants from diverse contexts. Lastly, researchers should explore the connections between ITC and teachers' self-efficacy about using CRT strategies and the differentiated use of CRT and development of ITC between contexts with heterogeneous and homogeneous student populations. Besides, researchers should increase the clarity of statements on the CRTOE subscale for consistent understanding.

Limitations, Strengths, and Researcher's Positionality

As this study consists of two parts, an intervention and its evaluation, the limitations to the study manifest in the intervention process and the evaluation. Hence, the following section will present the limitations from these two angles. Furthermore, I will discuss the strengths in the intervention and evaluation alongside with my reflection on the researcher's positionality.

The limitations to the intervention resulted from the lack of resources. Firstly, insufficient time resources strained the organization of the intervention. The PL program ran for a total of 13 hours, although Guskey and Yoon (2009) posit that the ideal amount of PL input is a minimum of

30 hours. The multiple PL programs in the context compete for individual teachers' time allocation for PL participation, making any program demanding too many hours a less attractive option than others. Therefore, I compromised by reducing the input hours to 13 to make the ITC and CRT PL program a competitive option amongst all the PL provisions for international English-speaking teachers in the context. Furthermore, the slots available for organizing the ITC and CRT PL program were limited because how busy the school communities were and misalignment of the school calendars across the schools in my context. Hence, the 13-hour PL program occurred across seven months, with at least one month in between the group RPD sessions, making it necessary to remind the participants of the prior learnings at the beginning of each session. Although the long breaks between sessions created adequate time for linking theory to practice, the participants could easily lose the momentum and forget about their learnings. Consequently, any future PL programs with the same focus on ITC and CRT can benefit from larger input dose or a shorter timeline of implementation than the current intervention design in this study.

Secondly, two factors impacted the content of the small-group coaching activities. The first factor was the different locations across five cities between two countries in which the participants work, and the second factor was city lockdowns that hit five out of the six schools at different times during the PL program, when these schools changed to online learning and the researcher worked from home. These two factors limited the coaching activities to online conversations, ruling out the opportunities for co-teaching or classroom visits. Therefore, the current PL program was unable to support the participants' teaching practices through collaboration or sharing feedback on their teaching practices, which future PL programs on ITC

and CRT should consider integral as mastery experience serves as a source of efficacy beliefs (Goddard, Hoy, & Hoy, 2004).

Alongside the above two limitations to the intervention program, this study also faced the following limitations to its evaluation. The first and most salient limitation is the sample size. Despite the efforts to recruit, I ended up enrolling nine participants to the evaluation study as the maximum number of participants was ten. This small sample size directly impacted the external validity of the study's findings. Furthermore, the specificities of the context as a group offering an international education decreased the study's external validity as international schools comprise a small proportion of all types of schools. Therefore, I introduced the context and the sample with rich description so that further discussion and application of the findings in this study benefit from the contextualization (Lockmiller & Lester, 2017).

The second limitation to the evaluation is the validity of the quasi-experimental design. The pre- and post-intervention design of a quasi-experiment aimed to disclosed how the participants' efficacy beliefs changed because of the PL program. However, their teaching and other PL activities continued throughout the ITC and CRT PL program, making it impossible to isolate the impacts of the PL program from other sources of development. For example, over seven months of the intervention, the participants' experience of working in an intercultural context increased, and this time factor alone could have brought growth to the teachers' efficacy belief change. Hence, the triangulation between the quantitative and qualitative data, especially the focus group interview questions about the participants' perceived impacts of the intervention, and that between the participants' data and the researcher's notes played a crucial role in ensuring the validity.

Another limitation is the reliability of the participants' self-judged efficacy scores on the scales of CRTSE and CRTOE. The survey administration was anonymous to protect privacy and encourage the participants' honest self-evaluation. Nonetheless, the potential risk that the participants overestimated the impacts of the intervention and scored themselves higher than their true efficacy belief levels are still existed. Therefore, the mixed-methods design helped ensure that I can triangulate the quantitative survey responses against the participants' focus group interview responses. With the analysis of their description of the practice changes, the qualitative data confirmed and consolidated the quantitative results. Furthermore, as the study design focused on teachers' self-reported scores of their efficacy belief, the medium-term impacts of any change in their classroom practices were yet to be examined. Hence, any future research about the impact of PL on teachers' practices of using CRT strategies and applying ITC should consider involving classroom observations or measuring student perceptions.

The limiting factors to the intervention process offer a lesson for similar programs in the future, and the limitations to the evaluation can be references for researchers who may be interested in replicating the study. Despite the above limitations, the intervention and its evaluation have the following strengths. Furthermore, my reflection on my positionality as a researcher helps identify factors contributing to the strengths and limitations.

Firstly, the intervention benefited from my cross-cultural background. As an individual and a professional who studied, lived, and worked across Chinese-speaking and English-speaking cultures, I could build into the PL program mechanisms to provoke intercultural awareness and examples from Chinese and English-speaking cultures familiar to most participants. Besides, my interactions with the participants involved my readiness to probe further into their reflection because my insider's knowledge allowed me to understand,

empathize, and relate with the participants and their students. Therefore, my personal and professional background added value to the intervention design and implementation. Nonetheless, this strength can limit the replicability of the intervention as the knowledge construction during the PL program relied heavily on my interactions with the participants (Merriam, Johnson-Bailey, Lee, Kee, Ntseane, & Muhamad, 2001). Any future design of a similar program focusing on intercultural teaching competence or culturally responsive teaching by facilitators from a relatively homogeneous cultural background must consider their culture's impacts on participants' engagement.

Secondly, the duration of the PL program provided space for participants to apply their learnings to practice between sessions. In particular, the participants actively identified goals and developed plans during the small-group coaching sessions. Two participants developed a whole-school intercultural communication protocol, one designed a unit of work on intercultural competence for her high school students, and one devised a unit on developing her elementary students' collaboration skills as collaboration is new to Chinese students who are used to working independently. The off-time between sessions, lasting from three weeks to a month, ensured enough time for these personal projects' development. Hence, the timeline of the PL program brought benefits to the participants' learning.

Thirdly, this program highlighted the need for intercultural competence, offering strategic directions for talent recruitment and development. As COVID caused demographic changes across international schools in Asia, especially in China, international schools enrolled an increasing population of non-English-speaking children. Hence, how to recruit and develop talents that can support these children's developmental needs must be a top priority. Whereas

language need is already in the spotlight, meeting the cultural differences should also become a strategic focus, as highlighted by this intervention.

Fourthly, the evaluation study benefited from using triangulation on multiple levels. The mixed-methods design allowed me to triangulate the quantitative data with the qualitative data. The qualitative data provided a window to explain the increased self-efficacy as the participants' confidence about foregrounding cultural differences and elucidate the decreased and generally lower-than-self-efficacy outcome expectancy with the participants' in-depth understanding of CRT and contextualization of the CRT statements. Another triangulation occurred between my analysis of the focus group interview transcripts and an EdD peer's independent analysis during the qualitative analysis. These two rounds of analysis enhanced the intercoder reliability of the qualitative results. The last triangulation was between participants' responses to the survey and interview questions and the researcher's notes during the PL program. As I recorded the contributions and reflections from the participants throughout the PL program, I was able to contextualize the quantitative and qualitative results against the notes in my analysis. Hence, the above three-level triangulation strengthened the evaluation study's reliability.

Furthermore, I was cognizant of my role within the context and its potential impact on the trustworthiness of the results (Guba, 1982; Miles et al., 2014) and its implications. As the context's Education Director, the participants may perceive me as sitting higher on the organizational hierarchies than merely a PL facilitator, potentially leading to an overly positive reception of the PL program. For example, the most critical feedback I received on the intervention design and China's political culture was from a participant leaving the organization and the country. Accordingly, the actual need for intercultural teaching competence and culturally responsive teaching may be either less salient than highlighted by the study or more

vital regarding the political factors than other perspectives on culture. Besides, the increase of self efficacy, as indicated in the quantitative and qualitative data, could have resulted from the participants' socially favorable responses to the power imbalance between the researcher and the participants (Johnson-Bailey, 1999; Merriam et al., 2001). Also, my cross-cultural experience and insider knowledge can be a double-edged sword in the intervention and evaluation. My position that is too close to the context and cultures of the participants' experiences can limit my evaluation study's openness and depth of inquiry despite its potential role in creating participants' access to the study (Merriam et al., 2001). Hence, my representation of Chinese culture and the organizational culture may have led to responses that favored the organizational norms over students' home cultures and those that emphasized more heavily on culture than the participants' practice. Thus, it would be essential to triangulate this study's results with future ones that involve student data, e.g., classroom observations, student surveys, and student interviews.

Conclusions

The population of English language learners has been growing fast around the globe (British Council, 2006). Nonetheless, their academic achievement seems to be concerning. For example, achievement gaps in science converge with diverse students' backgrounds (Abedi, 2004; Lee, 2005; Lee & Luykx, 2006; National Center for Education Statistics, 2020; Schleicher, 2019). This study aimed to address ELLs' needs in an international context with a PL program with the focus on ITC and CRT.

This study presented findings that international English-speaking teachers' experienced significant increases in their self-efficacy about using CRT strategies after participating in the aforementioned PL program. The PL program combined strategies such as reflection, coaching, collaborative inquiry, modeling, and engaging participants' emotions. The program engaged

participants from six schools across two countries through online PD sessions and small-group coaching sessions. The findings contributed to the literature that PL programs can enhance teachers' self-efficacy with CRT strategies, especially their confidence about identifying students' home-school cultural differences and taking a sociocultural constructivist approach to building a community of learners through intercultural communication. The participants also shared their methods of using their local colleagues to bridge the cultural gap between themselves and their students.

Furthermore, the study revealed that school-level and department-level decisions about assessments can be barriers to teachers' self-efficacy development. Although teachers were certain about the difference varied assessment strategies can make, they were unable to articulate a high level of confidence about using varied assessment strategies without a change in their school or department. Besides, the study disclosed teacher beliefs that students backgrounds should go beyond culture and that responsive teaching should address individual students' needs such as their gender and personality.

This study provided an intervention to enhance teacher's efficacy beliefs about CRT strategies and their ITC development. Teachers with intercultural interactions in their classroom and school play a crucial role in engaging ELLs in their academic progress and social and emotional development. Although this study's context is international, where intercultural interactions make up the teachers' everyday reality, the findings are meaningful for any context with the mismatch between teachers' and students' cultural backgrounds. As ELL populations will continue to increase in national and international schools worldwide in coming years, supporting teachers of ELLs must become a priority on any school's strategic development plan.

It is only through the empowerment of teachers that schools can engage ELLs meaningfully in

their schooling experience and then enhance their academic achievement.

References

Abedi, J. (2004). The No Child Left Behind Act and English language learners: Assessment and accountability issues. *Educational Researcher, 33*(1), 4 –14. doi:10.3102/0013189X033001004

Abedi, J., Hofstetter, C., & Lord, C. (2004). Assessment accommodations for English language learners: Implications for policy-based empirical research. *Review of Educational Research, 74*(1), 1–28. doi:10.3102/00346543074001001

Adamson, K., Santau, A., & Lee, O. (2013). The impact of professional development on elementary teachers' strategies for teaching science with diverse student groups in urban elementary schools. *Journal of Science Teacher Education, 24*(3). 553–571. doi:10.1007/s10972-012-9306-z

Adler, P. S., & Kwon, S. (2002). Social capital: Prospects for a new concept. *The Academy of Management Review, 27*(1), 17–40. Retrieved from https://journals.aom.org/journal/amr

Aikenhead, G. S. (2001). Integrating Western and Aboriginal sciences: Cross-cultural science teaching. *Research in Science Education, 31*, 337-355. doi:10.1023/A:1013151709605

Allen, I. & Seaman, C. (2007, July). *Likert scales and data analyses*. Quality progress. http://rube.asq.org/quality-progress/2007/07/statistics/likert-scales-and-data-analyses.html

Ardasheva, Y., Norton-Meier, L., & Hand, B. (2015). Negotiation, embeddedness, and non-threatening learning environments as themes of science and language convergence for English language learners. *Studies in Science Education, 51*(2), 201–249. doi:10.1080/03057267.2015.1078019

Arkoudis, S., Watty, K., Baik, C., Yu, X., Borland, H., Chang, S. Lang, I., Lang, J., & Pearce, A. (2013). Finding common ground: enhancing interaction between domestic and international students in higher education. *Teaching in Higher Education, 18*(3), 222–235. doi:10.1080/13562517.2012.719156

Atwater, M., Freeman, T., Butler, M., & Draper-Morris, J. (2010). A case study of science teacher candidates' understandings and actions related to the culturally responsive teaching of "Other" students. *International Journal of Environmental and Science Education, 5*(3), 287–318. Retrieved from https://www.ijese.com/

Aydoğan, H., & Akbarov, A. A. (2014). The four basic language skills, whole language & integrated skill approach in mainstream university classrooms in Turkey. *Mediterranean Journal of Social Sciences*, *5*(9), 672–680. doi:10.5901/mjss.2014.v5n9p672

Bandura, A. (1978). The self system in reciprocal determinism. *American Psychologist, 33*(4), 344-358. doi:10.1037/0003-066X.33.4.344

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.

Bandura, A. (1998). Personal and collective efficacy in human adaptation and change. In J. G. Adair, D. Belanger, & K. L. Dion (Eds.), *Advances in Psychological Science (*pp. 51–71). Hove, UK: Psychology Press.

Bandura, A. (2000). Exercise of human agency through collective efficacy. *Current Directions in Psychological Science, 9*(3), 75–78. doi:10.1111/1467-8721.00064

Bandura, A. (2006). Guide for constructing self-efficacy scales. In F. Pajares & T. Urdan

    (Eds.), *Self-efficacy beliefs of adolescents* (Vol. 5, pp. 307-337). Greenwich, CT:

    Information Age Publishing.

Baranowski, T. & Stables, G. (2000). Process evaluations of the 5-a day projects. *Health*

    Education and Behavior, 27. 157-166. doi:10.1177/109019810002700202

Bascia, N., & Jacka, N. (2001). Falling in and filling in: ESL teaching careers in changing

    times. *Journal of Educational Change, 2*(4), 325–346. doi:10.1023/A:1014668925172

Bastos, M. & Araújo e Sá, H. (2015). Pathways to teacher education for intercultural

    communicative competence: teachers' perceptions. *Language Learning Journal, 43*(2),

    131–147. doi:10.1080/09571736.2013.869940

Becker, G. (1964). *Human Capital*. Chicago and London: The University of Chicago Press.

Bennett, M. J. (1993). Towards ethnorelativism: A developmental model of intercultural

    sensitivity. In R. M. Paige (Ed.), *Education for the intercultural experience* (pp. 21–27).

    Yarmouth, ME: Intercultural Press.

Berkowitz, R., Moore, H., Astor, R. A., & Benbenishty, R. (2017). A research synthesis of the

    associations between socioeconomic background, inequality, school climate, and

    academic achievement. *Review of Educational Research, 87*(2), 425–469.

    doi:10.3102/0034654316669821

Biasutti, M., Concina, E., & Frate, S. (2019). Social sustainability and professional development:

    Assessing a training course on intercultural education for in-service

    teachers. *Sustainability (Switzerland), 11*(5), 1–12. doi:10.3390/su11051238

Bradshaw, C. P., Pas, E. T., Bottiani, J. H., Debnam, K. J., Reinke, W. M., Herman, K. C., &

    Rosenberg, M. S. (2018). Promoting cultural responsivity and student engagement

through double check coaching of classroom teachers: An efficacy study. *School Psychology Review, 47*(2), 118–134. doi:10.17105/SPR-2017-0119.V47-2

Brezicha, K., Bergmark, U., & Mitra, D. L. (2015). One size does not fit all: Differentiating leadership to support teachers in school reform. *Educational Administration Quarterly, 51*, 96–132. doi:10.1177/0013161X14521632

British Council. (2006). *A review of the global market for English language courses*. https://www.britishcouncil.org/sites/default/files/a-review-of-the-global-market-for-english-language-courses.pdf

Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design.* Cambridge, MA: Harvard University Press.

Bronfenbrenner, U. (1994). Ecology models of human development. In T. N. Postlewaite & Husen, T. (Eds.), *International encyclopedia of education* (2nd ed., Vol. 3, pp. 1643-1647). Oxford, England: Elsevier.

Bronfenbrenner, U., & Morris, P. A. (2006). The biological model of human development. In W. Damon & R. M. Lerner (Eds.), *Handbook of child psychology*: *Theoretical models of human development* (6th ed., Vol. 1, pp. 793-828). Hoboken, NJ: John Wiley & Sons. doi:10.1002/9780470147658.chpsy0114

Brown, J. (2017). A metasynthesis of the complementarity of culturally responsive and inquiry-based science education in K-12 settings: Implications for advancing equitable science teaching and learning. *Journal of Research in Science Teaching, 54*(9), 1143–1173. doi:10.1002/tea.21401

Brown, J. C., & Crippen, K. J. (2016). Designing for culturally responsive science education

through professional development. *International Journal of Science Education, 38*(3),

470–492. doi:10.1080/09500693.2015.1136756

Bunch, G. C. (2013). Pedagogical language knowledge: Preparing mainstream teachers for

English learners in the new standards era. *Review of Research in Education, 37*(1), 298–

341. doi:10.3102/0091732X12461772

Butler, Y. (2015). Parental factors in children's motivation for learning English: A case in

China. *Research Papers in Education, 30*(2), 164–191.

doi:10.1080/02671522.2014.891643

Byrd, C. (2016). Does culturally relevant teaching work?: An examination from student

perspectives. *SAGE Open, 6*(3). doi:10.1177/2158244016660744

Callaway, R. (2017). A correlational study of teacher efficacy and culturally responsive teaching

techniques in a southeastern urban school district. *Journal of Organizational and

Educational Leadership, 2*(2). Retrieved from https://digitalcommons.gardner-webb.edu/

Calvert, L. (2016). *Moving from compliance to agency: What teachers need to make professional

learning work*. Oxford, OH: Learning Forward and National Commission on Teaching &

America's Future. Retrieved from https://nctaf.org/wp-content/uploads/2016/03/NCTAF-

LearningForward_Moving-from-Compliance-to-Agency_What-Teachers-Need-to-Make-

ProfessionalLearning-Work.pdf

Canterford, G. (2009). *Segmented labor markets in international schools (Unpublished doctoral

dissertation)*. University of Bath, Bath.

Cartledge, G., Singh, A., & Gibson, L. (2008). Practical behavior-management techniques to

close the accessibility gap for students who are culturally and linguistically

diverse. *Preventing School Failure: Alternative Education for Children and Youth, 52*(3), 29–38. doi:10.3200/psfl.52.3.29-38

Cavendish, L. M. (2011). *Stories from international teachers: A narrative inquiry about culturally responsive teaching* [Unpublished doctoral dissertation]. The University of Iowa, Iowa.

Cebula, R., Mixon, F., & Montez, M. (2015). Teachers' salaries and human capital, and their effects on academic performance: An institution-level analysis of Los Angeles County high schools. *Journal of Economics and Finance*, *39*, 347–356. doi:10.1007/s12197-013-9261-3

Cenoz, J. (2003). The additive effect of bilingualism on third language acquisition: A review. *International Journal of Bilingualism, 7*(1), 71–87. doi:10.1177/13670069030070010501

Coleman, J. (1986). Social theory, social research, and a theory of action. *The American Journal of Sociology, 91*(6):1309–35. Retrieved from http://www.jstor.org/stable/2779798

Coleman, J. S. (2009). Social capital in the creation of human capital. *Knowledge and Social Capital*, *94*, 17–42. doi:10.1086/228943

Cooksy, L. J., Gill, P., & Kelly, P. A. (2001). The program logic model as an integrative framework for a multimethod evaluation. *Evaluation and Program Planning, 24*(2), 119–128. doi:10.1016/S0149-7189(01)00003-9

Cramer, E. D., & Bennett, K. D. (2015). Implementing culturally responsive positive behavior interventions and supports in middle school classrooms. *Middle School Journal, 46*(3), 18–24. doi:10.1080/00940771.2015.11461911

Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches* (3rd ed.). Sage Publications, Inc.

Creswell, J. & Plano-Clark, V. (2018). *Designing and conducting mixed methods research.* Los Angeles: SAGE.

Cuevas, P., Lee, O., Hart, J., & Deaktor, R. (2005). Improving science inquiry with elementary students of diverse backgrounds. *Journal of Research in Science Teaching, 42*(3), 337–357. doi:10.1002/tea.20053

Daly, A. J., Moolenaar, N., Der-Martirosian, C., & Liou, Y-H. (2014). Accessing capital resources: Investigating the effects of teacher human and social capital on student achievement. *Teachers College Record*, *116*(7), 1-42. Retrieved from https://www.tcrecord.org/

Deardorff, D. K. (2011). Assessing intercultural competence. *New Directions for Institutional Research, 2011*(149), 65–79. doi:10.1002/ir.381

DeJaeghere, J. & Cao, Y. (2009). Developing U.S. teachers' intercultural competence: Does professional development matter? *International Journal of Intercultural Relations, 33*(5), 437-447. doi:10.1016/j.ijintrel.2009.06.004

DeJaeghere, J. G., & Zhang, Y. (2008). Development of intercultural competence among US American teachers: Professional development factors that enhance competence. *Intercultural Education, 19*(3), 255-268. doi:10.1080/14675980802078624

Desimone, L. M., & Garet, M. S. (2015). Best practices in teachers' professional development in the United States. *Psychology, Society, & Education, 7*, 252–263. doi:10.25115/psye.v7i3.515

Desimone, L. M., & Stuckey, D. (2014). Sustaining teacher professional development. In L. E. Martin, S. Kragler, D. J. Quatroche, & K. L. Bauserman (Eds.), *Handbook of professional development in education: Successful models and practices, PreK-12* (pp. 467–482). New York, NY: Guilford Press.

Deveney, B. (2007). How well-prepared do international school teachers believe themselves to be for teaching in culturally diverse classrooms? *Journal of Research in International Education, 6*(3), 309–332. doi:10.1177/1475240907083198

Dimitrov, N., & Haque, A. (2016). Intercultural teaching competence: a multi-disciplinary model for instructor reflection. *Intercultural Education, 27*(5), 437–456. doi:10.1080/14675986.2016.1240502

Dobbs, C., Ippolito, J., & Charner-Laird, M. (2017). Scaling up professional learning: technical expectations and adaptive challenges. *Professional Development in Education, 43*(5), 729–748. doi:10.1080/19415257.2016.1238834

Dumay, X., & Galand, B. (2012). The multilevel impact of transformational leadership on teacher commitment: Cognitive and motivational pathways. *British Educational Research Journal, 38*(5), 703–729. doi:10.1080/01411926.2011.577889

Drago-Severson, E. (2012). New opportunities for principal leadership: Shaping school climates for enhanced teacher development. *Teachers College Record, 114*(3), 1–44. Retrieved from http://www.tcrecord.org

Duran, E., Ballone-Duran, L., Haney, J., & Beltyukova, S. (2009). The impact of a professional development program integrating informal science education on early childhood teachers' self-efficacy and beliefs about inquiry-based science teaching. *Journal of Elementary Science Education, 21*(4), 53–70. doi:10.1007/bf03182357

Dusenbury, L., Brannigan, R., Falco, M., & Hansen, W. B. (2003). A review of research on

fidelity of implementation: Implications for drug abuse prevention in school settings.

Health Education Research, 18, 237–256. doi:10.1093/her/18.2.237

Ebe, A. (2010). Culturally relevant texts and reading assessment for English language

learners. *Reading Horizons: A Journal of Literacy and Language Arts, 50*(3), 193-210.

Retrieved from https://scholarworks.wmich.edu/

Edwards, S. & Edick, N. (2013). Culturally responsive teaching for significant

relationships. *Journal of Praxis in Multicultural Education, 7*(1), Article 4.

doi:10.9741/2161-2978.1058

Estrella, G., Au, J., Jaeggi, S., & Collins, P. (2018). Is inquiry science instruction effective for

English language learners?: A meta-analytic review. *AERA Open*, *4*(2), 1–23.

doi:10.1177/2332858418767402

Fataar, A. (2012). Pedagogical justice and student engagement in South African schooling:

Working with the cultural capital of disadvantaged students. *Perspectives in Education,*

30(4), 52–63. Retrieved from https://journals.ufs.ac.za/index.php/pie

Fetterman, H., Ritter, C., Morrison, J. Q., & Newman, D. S. (2020). Implementation fidelity of

culturally responsive school-wide positive behavior interventions and supports in a

Spanish-language magnet school: A case study emphasizing context. J*ournal of Applied*

School Psychology, 36(1), 89–106. doi:10.1080/15377903.2019.1665607

Fowler, S.M., and Blohm, J. (2004), An analysis of methods for intercultural training. In D.

Landis, J.M. Bennett, & M.J. Bennett (Eds.), *Handbook of Intercultural Training* (pp. 37-

84). Thousand Oaks, CA: Sage.

Franke, M., Carpenter, T., Levi, L., & Fennema, E. (2001). Capturing teachers' generative

   change: A follow-up study of professional development in mathematics. *American*

   Educational Research Journal, 38(3), 653–689. doi:10.3102/00028312038003653

Gay, G. (2001). Preparing for culturally responsive teaching. *Journal of Teacher Education,*

   53(2), 106–116. Retrieved from https://journals.sagepub.com/home/jte

Gay, G. (2002). Preparing for culturally responsive teaching. *Journal of Teacher Education,*

   53(2), 106-116. Retrieved from https://journals.sagepub.com/home/jte

Gay, G (2010). *Culturally responsive teaching: Theory, research, and practice.* New York:

   Columbia.

Gay, G. (2015). The what, why, and how of culturally responsive teaching: International

   mandates, challenges, and opportunities. *Multicultural Education Review, 7*(3), 123–139.

   doi:10.1080/2005615X.2015.1072079

Gee, J. P. (2008). A sociocultural perspective on opportunity to learn. In P. A. Moss, D. C. Pullin,

   J. P. Gee, E. H. Haertel, & L. J. Young (Eds.), Assessment, equity, and opportunity to

   learn (pp. 76-108). New York, NY: Cambridge University Press.

Georgia Department of Education. (2017). *PBIS classroom observation tool PreK through 12th*

   grade classes. Retrieved from https://www.gadoe.org/Curriculum-Instruction-and-

   Assessment/Special-

   EducationServices/Documents/PBIS/201718/PBIS%20Chat%20Docs/

   PBIS%20Classroom%20Observation%20Tool.pdf Goh, M. (2012). Teaching with

   cultural intelligence: Developing multiculturally educated and globally engaged

   citizens. *Asia Pacific Journal of Education, 32*(4), 395–415.

   doi:10.1080/02188791.2012.738679

Gibson, S., & Dembo, M. (1984). Teacher efficacy: A construct validation. *Journal of Educational Psychology, 76*(4), 569–582. Retrieved from https://www.apa.org/pubs/journals/edu/

Gilakjani, A. P. & Ahmadi, S. M. (2011). The relationship between L2 reading comprehension and schema theory: A matter of text familiarity. *International Journal of Information and Education Technology, 1*(2), 142-149. Retrieved from http://www.ijiet.org/

Goddard, R. D., Hoy, W. K., & Hoy, A.W. (2004). Collective efficacy beliefs: Theoretical developments, empirical evidence, and future directions. *Educational Researcher, 33*(3), 3–13. doi:10.3102/0013189X033003003

Goddard, R. D., & Skrla, L. (2006). The influence of school social composition on teachers' collective efficacy beliefs. *Educational Administration Quarterly, 42*(2), 216–235. doi:10.1177/0013161X05285984

Goh, M. (2012). Teaching with cultural intelligence: Developing multiculturally educated and globally engaged citizens. *Asia Pacific Journal of Education, 32*(4), 395–415. doi:10.1080/02188791.2012.738679

Good, M., Masewicz, S., Vogel, L. (2010). Latino English language learners: Bridging achievement and cultural gaps between schools and families. *Journal of Latinos and Education, 9*(4), 321-339. doi:10.1080/15348431.2010.491048

Greene, J., & Hall, J. (2010). Dialectics and pragmatism: Being of consequence. In A. Tashakkori & C. Teddlie (Eds.), *SAGE handbook of mixed methods in social & behavioral research* (2nd ed., pp. 119–143). Thousand Oaks, CA: Sage.

Griffith, P. L., Ruan, J., Stepp, J., & Kimmel, S. J. (2014). The design and implementation of effective professional development in elementary and early childhood settings. In L. E.

Martin, S. Kragler, D. J. Quatroche, & K. L. Bauserman (Eds.), *Handbook of professional development in education: Successful models and practices, PreK-12* (pp. 189–204). New York, NY: Guilford Press.

Guba, E. G. (1981). Criteria for assessing the trustworthiness of naturalistic inquiries. Educational Technology Research and Development, 29, 75–91. doi:10.1007/BF02766777

Guskey, T. R. (2002). Professional development and teacher change. *Teachers and Teaching, 8*, 381–391. doi:10.1080/135406002100000512

Guskey, T. R. & Yoon, K. S. (2009). What works in professional learning?. *The Learning Edge,* 90(7), 495-500. doi:10.1177/003172170909000709

Hajisoteriou, C., Karousiou, C., & Angelides, P. (2018). INTERACT: Building a virtual community of practice to enhance teachers' intercultural professional development. *Educational Media International, 55*(1), 15–33. doi:10.1080/09523987.2018.1439709 Hammer, M. R. (2005). The Intercultural Conflict Style Inventory: A conceptual framework and measure of intercultural conflict resolution approaches. *International Journal of Intercultural Relations, 29*(6 SPEC. ISS.), 675–695. doi:10.1016/j.ijintrel.2005.08.010

Hammer, M. R., Bennett, M. J., & Wiseman, R. (2003). The Intercultural Development Inventory: A measure of intercultural sensitivity. *International Journal of Intercultural Relations, 27*, 421-443. Retrieved from https://www.journals.elsevier.com/international-journal-of-intercultural-relations

Hanesworth, P., Bracken, S., & Elkington, S. (2019). A typology for a social justice approach to assessment: Learning from universal design and culturally sustaining pedagogy. *Teaching in Higher Education, 24*(1), 98–114. doi:10.1080/13562517.2018.146540

Hargreaves & Fullan, O. C. (2012). *Professional capital: Transforming teaching in every school*. New York, NY: Teachers College Press.

Hayden, M. (2011). Transnational spaces of education: The growth of the international school sector. Globalization, *Societies and Education, 9*(2), 211–224. doi:10.1080/14767724.2011.577203

Hitt, M., Lee, H., & Yucel, E. (2002). The importance of social capital to the management of multinational enterprises: Relational networks among Asian and Western firms. *Asia Pacific Journal of Management*, *19*(2-3), 353-372. doi:10.1023/A:1016247920461

Ho, I. T., & Hau, K. T. (2004). Australian and Chinese teacher efficacy: Similarities and differences in personal instruction, discipline, guidance efficacy and beliefs in external determinants. *Teaching and Teacher Education, 20*(3), 313–323. doi:10.1016/j.tate.2003.09.009

Hollingsworth, H. & Vandermaas-Peeler, M. (2017). 'Almost everything we do includes inquiry': Fostering inquiry-based teaching and learning with preschool teachers. *Early Child Development and Care, 187*(1), 152–167. doi:10.1080/03004430.2016.1154049

Hsu, D. (2007). Experienced entrepreneurial founders, organizational capital, and venture capital funding. *Research Policy, 36*(5), 722–741. doi:10.1016/j.respol.2007.02.022

International School Consultancy. (2020). *Data and intel.* Retrieved from https://www.iscresearch.com/data

Isiksal-Bostan, M., Sahin, E., & Ertepinar, H. (2015). Teacher beliefs toward using alternative teaching approaches in science and mathematics classes related to experience in teaching. *International Journal of Environmental and Science Education, 10*(5), 603–621. doi:10.12973/ijese.2015.257a

Jackson, J. & Ash, G. (2012). Science achievement for all: Improving science performance and closing achievement gaps. *Journal of Science Teacher Education, 23*(7). 723-744. doi:10.1007/s10972-011-9238-z

Jiang, F., & McComas, W. F. (2015). The effects of inquiry teaching on student science achievement and attitudes: Evidence from propensity score analysis of PISA data. *International Journal of Science Education, 37*(3), 554–576. doi:10.1080/09500693.2014.1000426

Johnson-Bailey, J. (1999). The ties that bind and the shackles that separate: Race, gender, class, and color in a research process. *International Journal of Qualitative Studies in Education, 12*(6), 659–670. doi:10.1080/095183999235818

Johnstone, R. (2002). Addressing 'the age factor': Some implications for language policy. Retrieved from Council of Europe website: http://www.coe. int/t/dg4/linguistic/source/JohnstoneEN.pdf

Johnston, A. D., Midgett, A., Doumas, D. M., & Moody, S. (2018). A mixed methods evaluation of the "aged-up" STAC bullying bystander intervention for high school students. The Professional Counselor, 8(1), 73-97. https://doi.org/10.15241/adj.8.1.73

Jokikokko, K. (2005). Interculturally trained Finnish teachers' conceptions of diversity and intercultural competence. *Journal of Intercultural Education, 16*(2), 69–83. doi:10.1080/14636310500061898

Jungert, T., Östergren, R., Houlfort, N., & Koestner, R. (2019). The impact of support on growth in teacher-efficacy: a cross-cultural study. *International Journal of Educational Management, 33*(4), 753–767. doi:10.1108/IJEM-08-2017-0195

Jurasaite-Harbison, E., & Rex, L. (2010). School cultures as contexts for informal teacher learning. T*eaching and Teacher Education, 26*(2), 267–277. doi:10.1016/j.tate.2009.03.012

Kana'iaupuni, S., Ledward, B., & Jensen, U. (2010). *Culture-based education and its relationship to student outcomes*. Retrieved from www.ksbe.edu/spi

Karabenick, S. A., & Noda, P. A. C. (2004). Professional development implications of teachers' beliefs and attitudes toward English language learners. *Bilingual Research Journal, 28*(1), 55–75. doi:10.1080/15235882.2004.10162612

Katz, S., & Stupel, M. (2016). Enhancing elementary-school mathematics teachers' efficacy beliefs: A qualitative action research. *International Journal of Mathematical Education in Science and Technology, 47*(3), 421–439. doi:10.1080/0020739X.2015.1080314

Kennedy, P. (2002). Learning cultures and learning styles: Myth-understandings about adult (Hong Kong) Chinese learners. *International Journal of Lifelong Education, 21*(5), 430–445. doi:10.1080/02601370210156745

Kerrigan, M. R. (2014). A framework for understanding community colleges' organizational capacity for data use: A convergent parallel mixed methods study. Journal of Mixed Methods Research, 8, 341–362. doi:10.1177/1558689814523518

Khalifa, M. A., Gooden, M. A., & Davis, J. E. (2016). Culturally responsive school leadership: A synthesis of the literature. *Review of Educational Research, 86*(4), 1272–1311. doi:10.3102/0034654316630383

Klassen, R. M., Usher, E. L., & Bong, M. (2010). Teachers' collective efficacy, job satisfaction, and job stress in cross-cultural context. *The Journal of Experimental Education*, *78*(4), 464–486. doi:10.1080/00220970903292975

Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development* (Vol. 1). Englewood Cliffs, NJ: Prentice-Hall.

Ladson-Billings, G. (2009). *The dreamkeepers: Successful teachers of African American children*. (2nd edition). San Francisco, CA: Jossey-Bass.

Lai, C., Li, Z., & Gong, Y. (2016). Teacher agency and professional learning in cross-cultural teaching contexts: Accounts of Chinese teachers from international schools in Hong Kong. *Teaching and Teacher Education, 54*, 12–21. doi:10.1016/j.tate.2015.11.007

Lara-Alecio, R., Tong, F., Irby, B. J., Guerrero, C., Huerta, M., & Fan, Y. (2012). The effect of an instructional intervention on middle school English learners' science and English reading achievement. *Journal of Research in Science Teaching, 49*(8), 987–1011. doi:10.1002/tea.21031

Larson, K., Pas, E., Bradshaw, C., Rosenberg, M., & Day-Vines, N. (2018). Examining how proactive management and culturally responsive teaching relate to student behavior: Implications for measurement and practice. *School Psychology Review, 47*(2), 153–166. doi:10.17105/SPR-2017-0070.V47-2

Learning Forward. (2011). *Standards for professional learning*. Oxford, OH: Author.

Lee, O. (2004). Teacher change in beliefs and practices in science and literacy instruction with English language learners. *Journal of Research in Science Teaching, 41*(1), 65–93. doi:10.1002/tea.10125

Lee, O. (2005). Science education with English language learners: Synthesis and research

agenda. *Review of Educational Research, 75*(4), 491–530.

doi:10.3102/00346543075004491

Lee, H., Linn, M., Varma, K., & Liu, O. (2010). How do technology-enhanced inquiry science

units impact classroom learning? *Journal of Research in Science Teaching, 47*(1), 71–90.

doi:10.1002/tea.20304

Lee, O. & Luykx, A. (2006). *Science education and student diversity: Synthesis and research

agenda*. New York: Cambridge University Press.

Lee, O., & Maerten-Rivera, J. (2012). Teacher change in Elementary science instruction with

English language learners: Results of a multiyear professional development intervention

across multiple grades. *Teachers College Record, 114*, 1-42. Retrieved from

http://www.tcrecord.org

Lenneberg, E. H. (1967). *Biological foundations of language*. New York: John Wiley & Sons,

Inc.

Leverson, M., Smith, K., McIntosh, K., Rose, J., & Pinkelman, S. (2019). *PBIS cultural

responsiveness field guide: Resources for trainers and coaches*. OSEP Technical

Assistance Center. https://assets-global.website-

files.com/5d3725188825e071f1670246/5d70468ef10ca28bb416e7b0_pbis%20cultural%

20responsiveness%20field%20guide.pdf

Leviton, L. C., & Lipsey, M. W. (2007). A big chapter about small theories: Theory as method:

Small theories of treatments. *New Directions for Evaluation, 2007*(114), 27–62.

doi:10.1002/ev.224

Lochmiller, C. & Lester, J. (2017). *An introduction to educational research: Connecting methods to practice*. Los Angeles: SAGE.

Lopes-Murphy, S. & Murphy, C. (2016). The influence of cross-cultural experiences and location on teachers' perceptions of cultural competence. *Journal of the Scholarship of Teaching and Learning, 16*(3), 57-71. doi:10.14434/josotl.v16i3.19331

Lotter, C. R., Thompson, S., Dickenson, T. S., Smiley, W. F., Blue, G., & Rea, M. (2018). The impact of a practice-teaching professional development model on teachers' inquiry instruction and inquiry efficacy beliefs. *International Journal of Science and Mathematics Education, 16*(2), 255–273. doi:10.1007/s10763-016-9779-x

Machin, D. (2017). The Great Asian international school gold rush: An economic analysis. *Journal of Research in International Education, 16*(2), 131–146. doi:10.1177/1475240917722276

MacNeil, A. J., Prater, D. L., & Busch, S. (2009). The effects of school culture and climate on student achievement. *International Journal of Leadership in Education, 12*(1), 73–84. doi:10.1080/13603120701576241

MacSwan, J., & Pray, L. (2005). Learning English bilingually: Age of onset of exposure and rate of acquisition among English language learners in a bilingual education program. *Bilingual Research Journal, 29*(3), 653–678. doi:10.1080/15235882.2005.10162857

Martínez, R. (2018). Beyond the English learner label: recognizing the richness of bi/multilingual students' linguistic repertoires. *The Reading Teacher (71)*5, 515-522. doi:10.1002/trtr.1679

Mchugh, M. L. (2013). The Chi-square test of independence. *Biochemia Medica, 23*(2), 143–149. doi:10.11613/BM.2013.018

McLaughlin, J., & Jordan, G. (2010). Using logic models. In J. Wholey, H. Hatry, & K. Newcomer (Eds.), *Handbook of practical program evaluation* (pp. 55-80). Jossey-Bass.

Mellom, P. J., Straubhaar, R., Balderas, C., Ariail, M., & Portes, P. R. (2018). They come with nothing: How professional development in a culturally responsive pedagogy shapes teacher attitudes towards Latino/a English language learners. *Teaching and Teacher Education, 71*, 98–107. doi:10.1016/j.tate.2017.12.013

Menmuir, J., & Adams, K. (1997). Young children's inquiry learning in mathematics. *Early Years: An International Research Journal, 17*(2), 34–39. doi:10.1080/0957514970170207

Merriam, S. B., Johnson-Bailey, J., Lee, M. Y., Kee, Y., Ntseane, G., & Muhamad, M. (2001). Power and positionality: Negotiating insider/outsider status within and across cultures. *International Journal of Lifelong Education, 20*(5), 405–416. doi:10.1080/02601370120490

Mertens, D. M. (2018). Mixed methods design in evaluation. Thousand Oaks, CA: Sage.

Miles, M. B., Huberman, A. M., & Saldana, J. (2014). *Qualitative data analysis: A Methods Sourcebook*. Sage Publications.

Mitchell, R., Mendiola, B., Schumacker, R., & Lowery, X. (2016). Creating a school context of success: The role of enabling school structure & academic optimism in an urban elementary & middle school setting. *Journal of Educational Administration, 54*(6), 626–646. doi:10.1108/JEA-02-2015-0018

National Center for Education Statistics. (2001). *Teacher preparation and professional development: 2000*. Washington, DC: US Department of Education, Office of Educational Research and Improvement.

National Center for Education Statistics. (2020). *The nation's report card: 2015 science assessment.* https://nces.ed.gov/programs/coe/indicator_cgf.asp

National Research Council. (2000). *Inquiry and the National Science Education Standards: A guide for teaching and learning*. Washington, DC: National Academy Press.

Ng, K-Y., Dyne, L., & Soon, A. (2009). From experience to experiential learning: Cultural intelligence as a learning capability for global leader development. *Academy of Management Learning and Education, 8*, 511–526. doi:10.5465/AMLE.2009.47785470

Niehaus, K., & Adelson, J. (2014). School support, parental involvement, and academic and social-emotional outcomes for English language learners. *American Educational Research Journal, 51*(4), 810–844. doi:10.3102/0002831214531323

Ninković, S. R., & Knežević Florić, O. (2018). Transformational school leadership and teacher self-efficacy as predictors of perceived collective teacher efficacy. *Educational Management Administration and Leadership*, *46*(1), 49–64. doi:10.1177/1741143216665842

Onwuegbuzie, A. J., & Leech, N. L. (2006). Linking research questions to mixed methods data analysis procedures. *The Qualitative Report, 11*, 474–498. https://nsuworks.nova.edu/cgi/viewcontent.cgi?referer=&httpsredir=1&article=1663&context= tqr/

Oyerinde, S. A. (2008). *A correlational study of teacher efficacy and culturally responsive teaching techniques in four public middle schools* (Publication No. 3328709) [Doctoral dissertation thesis, University of Missouri-Kansas City]. ProQuest LLC.

Paige, R. M. (1996). *Intercultural trainer competencies.* In D. Landis & R. S. Bhagat (Eds.), *Handbook of intercultural training* (p. 148–164). Sage Publications, Inc.

Panferov, S. (2010). Increasing ELL parental involvement in our schools: Learning from the parents. *Theory into Practice, 49*(2), 106-112. doi:10.1080/00405841003626551

Pas, E., Larson, K., Reinke, W., Herman, K., & Bradshaw, C. (2016). Implementation and acceptability of an adapted classroom check-up coaching model to promote culturally responsive classroom management. *Education and Treatment of Children, 39*(4), 467–492. doi:10.1353/etc.2016.0021

Patton, M.Q. (1999). Enhancing the quality and credibility of qualitative analysis. *Health Sciences Research, 34*, 1189–1208. Retrieved from https://www.hsr.org/

Pearson, P. D., Moje, E., & Greenleaf, C. (2010). Literacy and science: Each in the service of the other. *Science*, *328*(5977), 459–463. doi:10.1126/science.1182595

Price, H. E. (2012). Principal-teacher interactions: How affective relationships shape principal and teacher attitudes. *Educational Administration Quarterly, 48*(1), 39–85. doi:10.1177/0013161X11417126

Putnam, R. (1993). The prosperous community. *The American Prospect, 4*(13):35–42. Retrieved from https://prospect.org/

Reintjes, M. L. (2019). *Exploring the associations of cultural intelligence with culturally responsive teaching self efficacy, relevant experiences, and job satisfaction in a sample of*

White American teachers [Unpublished doctoral dissertation thesis]. University of

Kansas.

Reutzel, D. R., & Clark, S. R., (2014). Shaping the contours of professional development, preK-

12: Successful models and practices. In L.E. Martin, S. Kragler, D. J. Quatroche, & K. L.

Bauserman (Eds.), *Handbook of professional development in education: Successful*

models and practices (pp. 67–81). New York: The Guilford Press.

Roehrig, G., Dubosarsky, M., Mason, A., Carlson, S., & Murphy, B. (2011). We look more, listen

more, notice more: Impact of sustained professional development on Head Start teachers'

inquiry-based and culturally-relevant science teaching practices. *Journal of Science*

Education and Technology, *20*(5), 566–578. doi:10.1007/s10956-011-9295-2

Ruan, J., Nie, Y., Hong, J., Monobe, G., Zheng, G., Kambara, H., & You, S. (2015). Cross-

cultural validation of teachers' sense of efficacy scale in three Asian countries: Test of

measurement invariance. *Journal of Psychoeducational Assessment, 33*(8), 769–779.

doi:10.1177/0734282915574021

Samuels, A. (2018). Exploring culturally responsive pedagogy: Teachers' perspectives on

fostering equitable and inclusive classrooms. *SRATE Journal, 27*(1), 22–30. Retrieved

from http://www.srate.org/journal.html

Sanchez, C. (2017, February 23). *English language learners: How your state is doing.*

NPR. https://www.npr.org/series/502207601/5-million-voices

Savage, C., Hindle, R., Meyer, L. H., Hynds, A., Penetito, W., & Sleeter, C. E. (2011). Culturally

responsive pedagogies in the classroom: Indigenous student experiences across the

curriculum. *Asia-Pacific Journal of Teacher Education, 39*(3), 183–198.

doi:10.1080/1359866X.2011.588311

Savva, M. (2017). Learning to teach culturally and linguistically diverse students through cross-cultural experiences. *Intercultural Education, 28*(3), 269–282. doi:10.1080/14675986.2017.1333689

Schechter, C., & Qadach, M. (2012). Toward an organizational model of change in elementary schools: The contribution of organizational learning mechanisms. *Educational Administration Quarterly, 48*(1), 116-153. doi:10.1177/0013161X11419653

Schleicher, A. (2019). *PISA 2018: Insights and interpretations. Retrieved from* Organization for Economic Cooperation and Development website: https://www.oecd.org/pisa/PISA%202018%20Insights%20and%20Interpretations%20FINAL%20PDF.pdf

Schwartz, R., Lederman, N., Khishfe, R., Lederman, J., Matthews, L., and Liu, S. (Eds.). (2002). *Proceedings of the Annual International Conference of the Association for the Education of Teachers in Science.* https://files.eric.ed.gov/fulltext/ED465622.pdf

Sclafani, S. (2008). *Rethinking human capital in education: Singapore as a model for teacher development*. The Aspen Institute Education and Society Program. www.aspeninstitute.org/education

Scovel, T. (2000). 'The younger, the better' myth and bilingual education. In R. D. Gonzalez and I. Melis (Eds.), *Language ideologies: Critical perspectives on the official English movement*. Mahwah, NJ: Lawrence Erlbaum Associates.

Settlage, J., Madsen, A., & Rustad, K. (2005). Inquiry science, sheltered instruction, and English language learners: Conflicting pedagogies in highly diverse classrooms. *Issues in Teacher Education, 14*(1), 39–57. Retrieved from https://www.itejournal.org/

Shadish, W., Cook, T., & Campbell, D. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. Boston, MA: Houghton Mifflin.

Sheehan, S. (2013). *British Council ELT research papers Volume 1*. British Council. https://www.teachingenglish.org.uk/article/british-council-elt-research-papers-volume-1

Siwatu, K. (2007). Preservice teachers' culturally responsive teaching self-efficacy and outcome expectancy beliefs. *Teaching and Teacher Education, 23*, 1086–1101. doi:10.1016/j.tate.2006.07.011

Song, Y., Higgins, T., & Harding-DeKam, J. (2014). Sweet science for ALL! Supporting inquiry-based learning through M&Ms investigation for English language learners. *Science Activities: Classroom Projects and Curriculum Ideas, 51*(2), 52–65. doi:10.1080/00368121.2014.891563

Steffensen, M. S., Joag-Dev, C. & Anderson, R. C. (1979). A cross-cultural perspective on reading comprehension. *Reading Research Quarterly, 15*(1), 10-29. doi:10.2307/747429

Stoddart, T., Pinal, A., Latzke, M., & Canaday, D. (2002). Integrating inquiry science and language development for English language learners. J*ournal of Research in Science Teaching, 39*(8), 664–687. doi:10.1002/tea.10040

Straker, D. (n.d.). *Assumption-busting*. Creating Minds. http://creatingminds.org/tools/assumption_busting.htm

Supovitz, J., Mayer, D., & Kahle, J. (2000). Promoting inquiry-based instructional practice: The longitudinal impact of professional development in the context of systemic reform. *Educational Policy, 14*(3), 331–356. doi:10.1177/0895904800014003001

Suthers, D. D. (2003). Representational guidance for collaborative inquiry. In J. Andriessen, M. Baker, and D. Suthers (Eds.), *Arguing to learn: Confronting cognitions in computer-*

supported collaborative learning environments (pp. 27-46). doi:10.1007/978-94-017-0781-7_2

Szecsi, T., Lashley, T., Nelson, S., & Sherman, J. (2017). Teachers' perspectives on language assessment and effective strategies for young English language learners in Florida. *International Journal of the Whole Child*, *2*(2), 18–28. Retrieved from https://libjournals.mtsu.edu

Teachers of English to Speakers of Other Languages. (2006). *Pre-K—12 English language proficiency standards*. Alexandria, VA: TESOL International Association.

Teddlie, C., & Tashakkori, A. (2003). Major issues and controversies in the use of mixed methods in the social and behavioral sciences. In A. Tashakkori & C. Teddlie (Eds.), *Handbook of mixed methods in social and behavioral research* (pp. 3-50). Thousand Oaks, CA: Sage.

The Bell Foundation. (2020). *EAL learners in the UK*. https://ealresources.bell-foundation.org.uk/school-leaders/eal-learners-in-uk

Tong, F., Irby, B., Lara-Alecio, R., & Koch, J. (2014). Integrating literacy and science for English language learners: From learning-to-read to reading-to-learn. *Journal of Educational Research, 107*(5), 410–426. doi:10.1080/00220671.2013.833072

Tran, Y. K. (2014). Professional development and teacher efficacy: Contexts of what, when, and how in serving ELLs. *Multicultural Education Review. 6*(2), 81-116. doi:10.1080/2005615X.2014.11102913

Tschannen-Moran, M., & Chen, J. A. (2014). Focusing attention on beliefs about capability and knowledge in teachers' professional development. In L. E. Martin, S. Kragler, D. J. Quatroche, & K. L. Bauserman (Eds.), *Handbook of professional development in*

education: Successful models and practices, PreK–12 (pp. 246–264). New York, NY: Guilford Press.

Tuan, H., Chin, C., Tsai, C., & Cheng, S. (2005). Investigating the effectiveness of inquiry instruction on the motivation of different learning styles students. *International Journal of Science and Mathematics Education, 3*(4), 541–566. doi:10.1007/s10763-004-6827-8

Villegas, A. & Lucas, T. (2002). Preparing culturally responsive teachers: Rethinking the curriculum. *Journal of Teacher Education, 53*(1), 9–16. Retrieved from https://journals.sagepub.com/home/jte

Vincent, C. G., Randall, C., Cartledge, G., Tobin, T. J., & Swain-Bradway, J. (2011). Toward a conceptual integration of cultural responsiveness and schoolwide positive behavior support. J*ournal of Positive Behavior Interventions, 13*(4), 219–229. doi:10.1177/1098300711399765

Voelkel, R. H., & Chrispeels, J. H. (2017). Understanding the link between professional learning communities and teacher collective efficacy. *School Effectiveness and School Improvement*, *28*(4), 505–526. doi:10.1080/09243453.2017.1299015

von Glasersfeld, E. (2005). Introduction: Aspects of constructivism. In C. T. Fosnot (Ed.), *Constructivism: Theory, perspectives, and practice* (2nd ed., pp. 3-7). New York, NY: Teachers College Press.

Vygotsky, L. S. (1978). Mind in society: The development of higher psychological processes. Cambridge, MA: Harvard University Press.

Walker, K. M. (2009). *Using culturally relevant strategies to improve mathematics achievement among "at risk" students* [Unpublished doctoral dissertation thesis]. The University of Memphis.

Webster, N. L., & Lu, C. (2012). "English language learners": An analysis of perplexing ESL-related terminology. *Language and Literacy, 14*(3), 83–94. doi:10.20360/g28593

Whitmore, J. (2010). *Coaching for performance: GROWing human potential and purpose: The principles and practice of coaching and leadership.* Nicholas Brealey Publishing.

Wholey, J., Hatry, H., & Newcomer, K. (2010). *Handbook of practical program evaluation*. Jossey-Bass.

Wood, D. J., Bruner, J. S., & Ross, G. (1976). The role of tutoring in problem solving. *Journal of Child Psychiatry and Psychology*, 17(2), 89-100. Retrieved from https://acamh.onlinelibrary.wiley.com/journal/14697610

Yamato, Y., & Bray, M. (2006). Economic development and the market place for education: Dynamics of the international schools sector in Shanghai, China. *Journal of Research in International Education, 5*(1), 57–82.doi:10.1177/1475240906061864

Young, T. J., & Sachdev, I. (2011). Intercultural communicative competence: Exploring English language teachers' beliefs and practices. *Language Awareness, 20*(2), 81–98. doi:10.1080/09658416.2010.540328

Youngs, P. & Lane, J. (2014). Involving teachers in their own professional development. In L. E. Martin, S. Kragler, D. J. Quatroche, K. L. Bauserman, & A. Hargreaves (Eds.), *Handbook of Professional Development in Education: Successful Models and Practices* (pp. 284–303). New York: Guilford.

Zwiep, S., Straits, W., Stone, K., Beltran, D., & Furtado, L. (2011). The integration of English language development and science instruction in elementary classrooms. *Journal of Science Teacher Education, 22*(8), 769–785. doi:10.1007/s10972-011-9254-z

Appendix A

Interview Guiding Questions

- What do you consider to be the features of effective inquiry science instruction?

- What experiences are necessary for students to become successful in an inquiry science lesson?

- What do you think would be effective instruction for English language learners?

- What experiences are necessary for students to become successful in learning a language?

- What do you think are the most effective strategies for teaching science to English language learners?

- What do you think would be effective strategies to be responsive to English language learners' cultural background?

- What are your thoughts about integrating inquiry science and language instruction?

- Was there a specific lesson integrating inquiry science and language development that you felt particularly benefitted your students?

Appendix B

Survey

(Item 1)	During the last **MONTH**, how often did **YOU** do the following **in your science lessons**?
(Item 2, 3, and 4)	During the last month, how often did you **ASK STUDENTS** to do following **in your science lessons**?
(Item 5)	During the last month, how often did you **ASK STUDENTS** to do the following **in your science lessons for at least 10 min**?

Question	Never or almost never	Some lessons	Most lessons	Every lesson
1 Use students' mistakes to generate class discussion	1	2	3	4
2 Explain the reasoning behind an idea	1	2	3	4
3 Apply science concepts to explain natural events or real-world situations	1	2	3	4
4 Talk about things they do at home that are similar to what we do in science class (e.g., measuring, boiling water, freezing water)	1	2	3	4
5 Discuss their prior knowledge or experience related to the science topic or concept	1	2	3	4

(Item 6, 7, 8)	During the last **MONTH**, how often did you **ASK STUDENTS** to do following **in your science lessons**?
(Item 9, 10)	During the last **MONTH**, how often did you **ASK STUDENTS** to do the following **in your science lessons for at least 10 min**?

Question	Never or almost never	Some lessons	Most lessons	Every lesson
6 Use science process skills (e.g., hypothesize, organize, infer, analyze, evaluate, describe patterns, make models or simulations)	1	2	3	4
7 Use basic measurement tools (e.g., ruler, thermometer, scale/balance, timer, graduated cylinder)	1	2	3	4
8 Use everyday household items (e.g., plastic cups or containers, food coloring, light bulbs, batteries)	1	2	3	4
9 Analyze relationships using tables, charts, or graphs	1	2	3	4

Question	Never or almost never	Some lessons	Most lessons	Every lesson
10 Write about what was observed and why it happened	1	2	3	4

During the last **MONTH**, how often did **YOU** do the following **in your science lessons**?

Question	Never or almost never	Some lessons	Most lessons	Every lesson
11 Revise science materials in English to make them accessible to ELL students	1	2	3	4
12 Reduce difficulty language to key science vocabulary in English with ELL students	1	2	3	4
13 Talk with an ELL student one-on-one in English to assess his or her communication of science ideas	1	2	3	4
14 Purposefully create small groups of students with different levels of English language to work together in science class	1	2	3	4
15 Use science vocabulary in Chinese	1	2	3	4
16 Allow ELL students to discuss science using Chinese	1	2	3	4
17 Encourage small groups of students to use Chinese in science class	1	2	3	4
18 Allow ELL students to write about science ideas or experiments in Chinese	1	2	3	4

During the last **MONTH**, how often did **YOU** do the following **in your science lessons**?

	Never or almost never	Some lessons	Most lessons	Every lesson
19 Provide students with examples and materials, which reflect different cultures other than their own	1	2	3	4
20 Employ a variety of teaching styles to meet the learning needs of all students	1	2	3	4
21 Help students to view concepts, issues, themes, and problems from diverse cultural perspectives	1	2	3	4
22 Help students develop more positive cultural attitudes and values	1	2	3	4

Grade Level(s) You Currently Teach: _____ (example 1st, 2nd, and 3rd)

How many years have you been teaching? _____ years

Highest Degree Attained (check only one)

_____ Bachelor's Degree

_____ Bachelor's Degree (in Education)

_____ Master's Degree

_____ Education Specialist Degree

_____ Doctor of Philosophy

_____ Vocational Certification

Appendix C

7th July 2020

Dear Teacher,

Project: *English language learning (ELL) students' science and English language outcomes in an inquiry science program at Chinese international schools*

I am Vicky Lu, a Doctor of Education Student at Johns Hopkins University. I am conducting the following research study: *A needs assessment exploring the contributing factors to the science and English language outcomes of ELL students in an inquiry-based science program*.

You will be invited to respond to a survey that takes 10 to 15 minutes and an individual interview that lasts about 30 minutes. The focus of the survey will be for you to describe your science teaching with ELL students. The focus of the interview will be for you to describe your beliefs about and understanding of effective science teaching with ELL students. The survey and interview will take place between May 2020 and December 2020. Given the current situation in China caused by COVID-19, the survey will be emailed to you, and the interviews will take place on Zoom with only audio recorded. The interviews will be audio recorded with your permission and will be used only to enhance my notetaking.

The risks associated with participation in this study are no greater than those encountered in daily life. You will develop at the end of the study possibly better ways to support the ELL students in your inquiry science classroom. With globalization and immigration, ELL students have become a growing population in many schools around the globe. This study may benefit society if the results lead to a better understanding of the factors that can inform ways in which science teachers support ELL students in classrooms.

Your participation in this project is entirely voluntary, and you can withdraw at any time during the project without any negative consequences. Every effort will be made to minimise any disturbance to your normal teaching. All data obtained will only be accessible by the researcher and will only be used for this study. A guarantee of confidentiality of the data and complete anonymity for the school and the participants. Pseudonyms will be used in place of names to protect identity. Any publication resulting from the research will not identify individuals or schools. All the data collected will be stored securely on my hard drive (password protected) in a locked cabinet and on my cloud account linked to my JHU account (password protected). The data will not contain any personal identifiers such as names or ID. The data will be kept for 3 years.

If you have any questions about the research, please feel free to contact me at + 86 1502 1010 793, wlu14@jhu.edu. If you want to know more about the rights as a research participant, please contact the Homewood Institutional Review Board, Johns Hopkins University. Should you wish to speak to my advisers, please contact Dr. Laura Quaynor (lquayno1@jhu.edu). Please kindly reply to this email to indicate your willingness to participate in this study.

Linguistically and Culturally Responsive Teaching

Your help is very much appreciated.

Yours sincerely,

Vicky Lu
Doctor of Education
Johns Hopkins University

Appendix D

Culturally Responsive Teaching Self-Efficacy Scale (CRTSE)

Number	Items
1	Adapt instruction to meet the needs of my students
2	Obtain information about my students' academic strengths
3	Determine whether my students like to work alone or in a group
4	Determine whether my students feel comfortable competing with other students
5	Identify ways that the school culture (e.g., values, norms, and practices) is different from my students' home culture
6	Implement strategies to minimize the effects of the mismatch between my students' home culture and the school culture
7	Assess student learning using various types of assessments
8	Obtain information about my students' home life
9	Build a sense of trust in my students
10	Establish positive home-school relations
11	Use a variety of teaching methods
12	Develop a community of learners when my class consists of students from diverse
13	Use my students' cultural background to help make learning meaningful
14	Use my students' prior knowledge to help them make sense of new information
15	Identify ways how students communicate at home may differ from the school norms
16	Obtain information about my students' cultural background
17	Teach students about their cultures' contributions to the discipline
18	Greet English Language Learners with a phrase in their native language
19	Design a classroom environment using displays that reflects a variety of cultures
20	Develop a personal relationship with my students

Number	Items
21	Obtain information about my students' academic weaknesses
22	Praise English Language Learners for their accomplishments using a phrase in their native language
23	Identify ways that standardized tests may be biased towards linguistically diverse students
24	Communicate with parents regarding their child's educational progress
25	Structure parent-teacher conferences so that the meeting is not intimidating for parents
26	Help students to develop positive relationships with their classmates
27	Revise instructional material to include a better representation of cultural groups
28	Critically examine the curriculum to determine whether it reinforces negative cultural stereotypes
29	Design a lesson that shows how other cultural groups have made use of mathematics
30	Model classroom tasks to enhance English Language Learners' understanding
31	Communicate with the parents of English Language Learners regarding their child's achievement
32	Help students feel like important members of the classroom
33	Identify ways that standardized tests may be biased towards culturally diverse students
34	Use a learning preference inventory to gather data about how my students like to learn
35	Use examples that are familiar to students from diverse cultural backgrounds
36	Explain new concepts using examples that are taken from my students' everyday lives
37	Obtain information regarding my students' academic interests
38	Use the interests of my students to make learning meaningful for them
39	Implement cooperative learning activities for those students who like to work in groups
40	Design instruction that matches my students' developmental needs

Appendix E

Culturally Responsive Teaching Outcome Expectancy Scale (CRTOE)

Number	Items
1	A positive teacher-student relationship can be established by building a sense of trust in my students.
2	Incorporating a variety of teaching methods will help my students to be successful.
3	Students will be successful when instruction is adapted to meet their needs.
4	Developing a community of learners when my class consists of students from diverse cultural backgrounds will promote positive interactions between students.
5	Acknowledging the ways that the school culture is different from my students' home culture will minimize the likelihood of discipline problems.
6	Understanding the communication preferences of my students will decrease the likelihood of student-teacher communication problems.
7	Connecting my students' prior knowledge with new incoming information will lead to deeper learning.
8	Matching instruction to the students' learning preferences will enhance their learning.
9	Revising instructional material to include a better representation of the students' cultural group will foster positive self-images.
10	Providing English Language Learners with visual aids will enhance their understanding of assignments.
11	Students will develop an appreciation for their culture when they are taught about the contributions their culture has made over time.
12	Conveying the message that parents are an important part of the classroom will increase parent participation.
13	The likelihood of student-teacher misunderstandings decreases when my students' cultural background is understood.
14	Changing the structure of the classroom so that it is compatible with my students' home culture will increase their motivation to come to class.
15	Establishing positive home-school relations will increase parental involvement.
16	Student attendance will increase when a personal relationship between the teacher and students has been developed.
17	Assessing student learning using a variety of assessment procedures will provide a better picture of what they have learned.
18	Using my students' interests when designing instruction will increase their motivation to learn.
19	Simplifying the language used during the presentation will enhance English Language Learners' comprehension of the lesson.
20	The frequency that students' abilities are misdiagnosed will decrease when their standardized test scores are interpreted with caution.

Number	Items
21	Encouraging students to use their native language will help to maintain students' cultural identity.
22	Students' self-esteem can be enhanced when their cultural background is valued by the teacher.
23	Helping students from diverse cultural backgrounds succeed in school will increase their confidence in their academic ability.
24	Students' academic achievement will increase when they are provided with unbiased access to the necessary learning resources.
25	Using culturally familiar examples will make learning new concepts easier.
26	When students see themselves in the pictures that are displayed in the classroom, they develop a positive self-identity.

Appendix F

Intercultural Teaching Competence (ITC; Dimitrov & Haque, 2016)

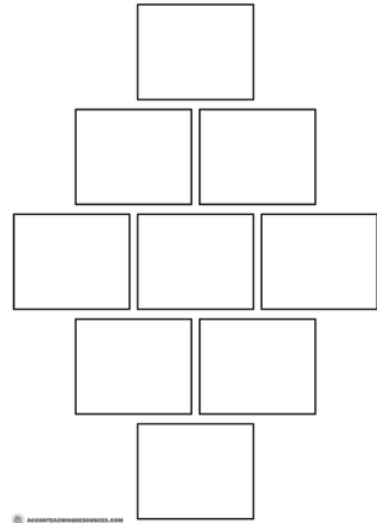| ITC	Items
Foundational Competencies	Developing an awareness of one's own cultural and disciplinary identities and positionality in the classroom
	Anticipate, value, and accept differences among learners and ways of learning: create cultural safety and trust
	Model and encourage perspective taking in the classroom
	Model and encourage non-judgmental approaches to exploring differences
Facilitation Competencies	Facilitate discussion among students with a variety of communication styles
	Provide feedback across cultures in a variety of ways
	Tailor messages to audiences with different levels of linguistic ability
	Recognize the barriers students may face in participating in class
	Identify risk factors for learners that might surface during classroom activities
	Create opportunities for peer learning and interaction among diverse learners
	Build and navigate relationships with students who have different perceptions of power distance
	Articulate and mediate differences in the roles of teachers and learners across cultures
	Mentor students during their transition to new cultures and disciplines
	Articulate the meaning of academic integrity in one's own discipline
Curriculum Design Competencies	Include concrete learning outcomes related to intercultural or global learning at the course and curriculum levels
	Incorporate content and learning resources that represent diverse perspectives, paradigms, or disciplinary approaches
	Create learning activities that allow students to explore difference and practice perspective-taking
	Design assessments that recognize and validate cultural differences in writing and communication styles.
	Provide opportunities for students to reflect on and gain a better understanding of their own multiple cultural, personal, and disciplinary identities

Appendix G

Diamond Nine

- Remove five words from the following 14 words/phrases
- Put the remaining nine words/phrases into a diamond in order of importance to you as an educator

  - Knowledgeable
  - Good communicator
  - Patient
  - Role model
  - Having strong beliefs
  - Lifelong learner
  - Flexible
  - Having high moral standards
  - Reflective
  - Creative
  - Holding high expectations
  - Promoting a love of learning
  - Effective goal-setting
  - Caring

Appendix H

Web links to video clips of cultural perspectives and intercultural teaching strategies

- Cultural differences: https://youtu.be/2xJ_hbD4TQA

- Culturally responsive teaching: https://verse.com/video/856-what-is-culturally-responsive-teaching

- Culturally responsive classroom: https://youtu.be/_uOncGZWxDc

Linguistically and Culturally Responsive Teaching

Appendix I

School Development Plan Template

	Where is your community now? What strengths can you build on?	What one thing can you do to move this in the right direction?
Include concrete learning outcomes related to intercultural or global learning at the course and curriculum levels		
Incorporate content and learning resources that represent diverse perspectives, paradigms, or disciplinary approaches		
Create learning activities that allow students to explore difference and practice perspective-taking		
Create learning activities that allow students to explore difference and practice perspective-taking		
Design assessments that recognize and validate cultural differences in writing and communication styles		
Provide opportunities for students to reflect on and gain a better understanding of their own multiple culture, personal, and disciplinary identities		

Appendix J

Reflection Questions

- Reflective Activity: Diamond Nine

  - Which words did you remove? Why?

  - How did you make your decisions to prioritize?

  - Are there any similarities/differences between people in your breakout room?

  - How might your diamond look differently from a different culture?

- Reflective Activity: Professionalism

  - Choose one concept: Security, Responsibility, Order, Accomplishment

  - 1. What does … mean to you as an educator?

  - 2. What does … mean to different students?

  - 3. Why are there alignments/misalignments?

- Reflective Activity: Culturally Responsive Teaching

  - What would be your main ingredients?

  - What would you see?

  - What would you hear?

  - What would people be thinking?

  - What would people be feeling?

- Reflective Activity: One-Size-Fit-All Medicine VS. Precision Medicine

  - What am I like?

  - What are my values?

  - What makes me different?

  - What is my purpose?

- What is the role of the doctor in my community?

- Reflective Activity: On a scale from 1 (one-size-fit-all) to 10 (precision), where is your classroom/school?

- Reflective Activity: Universal Design of Learning: Eliminating Unnecessary Hurdles

    - What role does culture play as a hurdle to learning in your context?

    - What role can culture play as an aid in eliminating hurdles in your context?

- Reflective Activity: What teaching and learning behaviors are rewarded?

    - Reflective Activity: What role does language play in behavior management?

Appendix K

GROW model of coaching (Whitmore, 2010)

GOAL	REALITY

What are your Goals for this year in your PRD?
 Which one would you like to focus on for this session?
 What do you want from this Goal?
 Over what time frame?
 Imagine you have achieved it:
    • What will it look like?
    • How will you feel?
    • What are the benefits?
    What can you now do?
 How could you say your goal in a few words?
 Given the time we have today, what is the most important thing that you and I should be talking about?
 What is the ideal outcome?
	What is happening at the moment in relation to your goal?
	 How important is this goal to you?
	 What have you done so far in relation to this goal?
	 What's getting in the way of your goal?
	 How do you know that is true?
	 What other perspectives could there be?
	 What if nothing changes? So what?
	What are the implications?

OPTIONS	WILL
What are your options? What else? What has worked in the past? Who could help you with this? What have you done in the past that might be useful? What might someone else do?	What will you do? How? When? Where? Who with? How committed are you to doing this? What will it take for you to fully commit? How will you know your goal has been achieved?