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Curriculum Bridging across Chinese and English Instructional Time in a Dual Language

Education Program

A dissertation submitted in partial satisfaction of the

requirements for the degree Doctor of Philosophy

in Education

by

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ABSTRACT

Curriculum Bridging across Chinese and English Instructional Time in a Dual Language

Education Program

by

Tiange Wang

Driven by a monoglossic ideology, bilingual speakers are often treated and seen as “two monolinguals in one” (Grosjean, 1985). Accordingly, the “two solitudes” approach is commonly adopted in Dual Language Education (DLE) programs, which fosters a strict separation of the two instructional languages by time, teacher, or content. In the two-teacher-two-language model, when partner teachers are assigned different subject matters, there are two layers of separation, language and academic content. Oftentimes accustomed to working in their separate realms of language or content teaching, the English teacher and the partner language teacher are largely unaware of each other’s curriculum. Students’ learning is cut into two separate processes in two classrooms, and it is very difficult for teachers to get a whole picture of students’ linguistic and academic development. This dissertation examines a unique case of teachers in a one-way Chinese English DLE program involved in creating a curriculum bridging process to enable continuity and reinforcement of content and language learning across two linguistic spaces.

Guided by principles of Sociocultural Theory, Communities of Practice Framework, and standards of interdisciplinary curriculum, this study explores the

processes of curriculum bridging including its benefits and challenges as well as the ways in which curriculum bridging influences students' learning. Through an ethnographic research design, data were collected by observing classroom interactions, interviewing teachers, and attending curriculum planning meetings over a 16-month period.

By coding and analyzing teacher discourses, classroom interactions, and teacher interview responses, the study found that teachers' curriculum bridging group constitutes a community of practice as a localized response to the sociocultural realities of siloed teaching in the two-teacher-two-language model. As a community of practice, they constructed their own repertoire for the bridging process and collaboratively moved towards a more continuous bridging model where the two hands of the classroom are talking to each other more, and there is continuous learning across the English and Chinese instructional time. One prominent benefit is the increased accountability in Ms. Liu's, a novice Chinese teacher, instructional design. Her collaboration with the other three teachers enabled her to revise her views towards teaching and learning and engage in the process of learning by becoming through the interactions with more capable peers.

However, despite teachers' positive attitudes towards this joint enterprise, there are challenges involved in the curriculum bridging process, which includes 1) the lack of theoretical consideration for the design of the bridging point, and 2) limited linguistic bridging due to typological differences between Chinese and English and teachers' lack of linguistic knowledge in these two languages. Other issues include 1) unidirectional bridging from English to Chinese, but not vice versa, 2) untranslatable concepts between the two languages, with the linguistic subtleties and cultural nuances unattended, and 3)

power dynamics between the teachers that are not conducive to the construction of a safe and balanced relationship of collaboration.

In the actual implementation of the bridged curricula in class, mixed results were found. There was evidence showing that students took what they acquired in English as a base, acquired additional information in Chinese, and utilized both knowledge sources to make their own analysis and complete their ideas. However, due to the lack of detailed coordination between the two teachers' curricula, there were instances that students misaligned the concepts and expressions that were instructed across the two linguistic spaces. Also, there were missed teachable moments to retain the relatedness recognized by students due to Ms. Liu's unfamiliarity with the expressions and materials used in the English classroom. In addition, the teaching team all held an assumption that students would not be able to learn at a desired level of academic rigor in an emergent language; thus, there was an imbalanced allocation of the cognitive demands across the English and Chinese instructional time.

Despite needing more refinement, the curriculum bridging model constructed by the teachers presents another way to approach the issues of teacher separation and content separation in today's educational context and offers the possibility to reconcile the arbitrary divide between languages and content found in dual language immersion programs. Based on the findings, effective bridging requires theoretical guidance, authentic collaboration and detailed coordination to support the continuity of content and skills development for all students. There is a need to broaden the community of practice for curriculum bridging to include multiple perspectives from researchers, teachers and

students to further explore the potential of curriculum bridging that may lead to more effective practices in DLE programs.

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Chapter 1 Introduction

Teaching has long been practiced as a lonely profession, and the teachers are isolated spatially by the structure of the school buildings, temporally by individualized schedules and psychologically by the overwhelming workload (Fullan & Hargreaves, 1996). For teachers who work in dual language education (DLE), they are further isolated by their designated linguistic spaces. In this dissertation, DLE is used as a general term to refer to an enrichment bilingual model that uses two languages to instruct mainstream curricula (Collier & Thomas, 2009; Gómez, Freeman, & Freeman, 2005; Tedick, Christian, & Fortune, 2011). Driven by the monoglossic ideology, bilingual speakers are seen as two monolinguals in one (García, 2009; Grosjean, 1985). Accordingly, the “two solitudes” approach is commonly adopted in DLE programs (Cummins, 2007), which encourages strict separation of the two instructional languages by time, teacher, or content areas (Baker, 2011; Christian, 1996; de Jong, 2016; Genesee, 1984; Lindholm-Leary, 2001). In the two-teacher-two-language model, when the partners are assigned different subject matters, there are two layers of separation, language and academic content. This separation may keep each teacher accountable for her/his assigned language and content teaching. Yet, oftentimes accustomed to working in their separate realms of teaching, the English teacher and the partner language teacher are largely unaware of each other’s curriculum (Gunning, White, & Busque, 2016; Lyster, Collins, & Ballinger, 2009; Lyster, Quiroga, & Ballinger, 2013). In other words, there is seldom cross-linguistic or cross-curricular collaboration between the partner teachers (Lyster et al., 2009; Sánchez, García, & Solorza, 2018).

In general education, isolated teaching prevents teachers from exposure to new knowledge and innovative ideas, seeking support from colleagues or sportifying areas to improve instead of letting them persist in teaching (Creese, 2005; Little, 1990; Lortie, 1975). In DLE, when two partner teachers of the same group of students work in isolation, it means teachers may not have a whole picture of students' academic and linguistic development (Gunning et al, 2016; Lyster et al, 2009; Sánchez et al., 2018), or employ students' full linguistic repertoire to engage them in learning (García, 2009; Palmer, Martínez, Mateus, & Henderson, 2014). Further, students who are instructed in two languages for different subjects may not become bilingual or biliterate in content areas due to the lack of transferability of some vocabulary and expressions between the partner languages (Rodríguez-Valls, Solsona-Puig, & Capdevila-Gutiérrez, 2017). For example, students may not know the terms in English for what they have learned in science or math classes that are instructed in Chinese or Japanese, and vice versa (Met, 2000).

Yet, the question is how teachers in DLE crack the boundaries of teaching and better facilitate students to achieve the goals of becoming bilingual and biliterate. This dissertation presents and analyzes a counter example to the isolated teaching contexts that may be present in DLE. A second/third-grade English teacher in a one-way DLE program initiated a collaboration with her partner Chinese¹ teacher to plan their curricula aiming to support each other's teaching and sustain continuity and reinforcement of students' content and language learning across the Chinese and English instructional time. One Special Education (SE) teacher and one English Language Learner (ELL) teacher also joined this endeavor. The teachers named the process "curriculum bridging." This self-

¹ In this dissertation, Chinese is used to refer specifically to Mandarin Chinese, which is to be consistent with participants' choice of words, but they are aware that Chinese can refer to a larger language family.

initiated curriculum bridging process provides me as a researcher with a great opportunity to study how teachers counter the isolated teaching culture in DLE and explore alternative ways of bilingual instruction.

Since the DLE model has been implemented, various studies have shown the effectiveness of DLE programs of different types and of different language combinations in developing students' bilingualism and biliteracy (Bae, 2007; de Jong & Bearse, 2011; Lindholm-Leary, 2001, 2016; Thomas & Collier, 2002). However, as Lyster (2007) puts it, immersion and other content-based programs "have not yet necessarily reached their full potentials" (p. 3). Coyle (2007) suggests that one possible way forward is to set up an inclusive research agenda, which situates research in communities of practice and engages practitioners in the process of co-constructing theories that are derived from and work for classroom practices.

Building communities of practice involves cooperation, collaboration and partnerships for learning. They involve content and language teachers working together, subject and language trainers sharing ideas and supporting classroom enquiry with networks of CLIL [Content-Language Integrate Learning] teachers and their learners, working on joint curricular links. There is a shared belief that for CLIL theories to guide practitioners, they must be 'owned' by the community, developed through classroom exploration and understood *in situ*-theories of practice developed for practice through practice. [Italics in original] (Coyle, 2007, p. 557)

In this study, the four teachers are viewed as a community of practice that aims to move one step away from the "two solitudes" approach (Cummins, 2007) to transform their own pedagogical practices. Three research questions are addressed in this dissertation.

Research Question 1: How do teachers define curriculum bridging, and how do they bridge both the content and language learning across the English and Chinese instructional time?

Research Question 2: What are the benefits and challenges of curriculum bridging?

Research Questions 3: How does curriculum bridging influence students' learning?

This study takes up Coyle's stance and aims to contribute to the field of DLE by exploring practitioner-constructed ways to reconcile the arbitrary divides between languages and content areas set up in DLE programs, and the potential contributions researchers can make in this process. Further, specifically focusing on the language combination of Chinese and English, the present study uniquely examines the implementation of curriculum bridging between subjects that are taught in typologically different and non-cognate languages, as well as to provide implications for possible ways of collaboration that teachers can engage in to support students' bilingual development.

To situate this study in the academic context, in the next chapter I will provide a literature review on the language separation debate that leads to the discussion of cross-linguistic and cross-curricular collaborations between teachers in the prevalent context of language and content separation in DLE. It is followed by a review on Chinese-English DLE that discusses its characteristics and challenges, which provides background information for the exploration of curriculum bridging in Chinese-English DLE programs. Chapter 3 focuses on theoretical frameworks that guide the design and analysis of this study based on the Sociocultural Theory (Vygotsky, 1978), Communities of Practice (Wenger, 1998) and principles and criteria for the design of interdisciplinary curriculum (Ackerman, 1989; Fogarty, 2009). Following that, I will discuss the research methods of data collection and analysis in Chapter 4. The findings on teachers' definition of and approaches to curriculum bridging, benefits, and challenges involved in the collaborative process and how curriculum bridging influences students' learning are presented in

Chapter 5, 6, and 7 respectively. Chapter 8 will close this dissertation with a summary of conclusions and a discussion of implications for theory, policy, and practice in DLE.

Chapter 2 Literature Review

In this chapter, I first focus on the language separation principle in DLE programs and synthesize arguments against and for this approach in the research field, and then I present different counter approaches to language or content separation to situate the research topic of curriculum bridging in the pertinent literature and identify the research gap. Considering the research context of the present study is a Chinese-English one-way DLE school, in which the two partner languages are of great typological differences, I discuss the characteristics of Mandarin Chinese and challenges faced by Chinese-English DLE, and why bridging is needed in Chinese-English DLE programs.

2.1 DLE and Language Separation Debate

DLE refers to “any program that provides literacy and content instruction to all students through two languages” (Howard et al., 2018, p. 3). Based on student compositions, DLE programs can be categorized as two-way or one-way. In two-way DLE programs, two language groups of students are purposefully integrated to receive instruction in two languages and serve as language models to each other; while one-way DLE programs serve students of the same dominant language (Baker, 2011; Collier & Thomas, 2009; Gómez et al., 2005; Lindholm-Leary, 2001, Tedick et al., 2011). Despite the differences in student population, both two-way and one-way DLE programs aim for students 1) to develop bilingualism and biliteracy, 2) to attain grade-level or above grade-level academic achievement, and 3) to foster positive cross-cultural attitudes and behaviors (Christian, 1996; Collier & Thomas, 2009; Gómez et al, 2005; Howard & Christian, 2002; Howard et al., 2018; Lindholm-Leary, 2001). In recent years, a fourth program goal has been called for by Cervantes-Soon et al. (2017), which is to raise

students' critical consciousness to counter social inequality in DLE programs and the larger society. In order to achieve the program goals, several guidelines have been proposed, including but not limited to:

1) A duration of at least 6 years' participating in DLE programs is necessary for students to achieve higher outcomes in language and academic development (Howard et al., 2018).

2) The target language should take up a significant portion in instruction, ranging from 50% to 90% or even 100% depending on different program designs (Christian, 1996; Howard & Christian, 2002; Howard et al., 2018; Lindholm-Leary, 2001, 2005; Lindholm-Leary & Howard, 2007).

3) Core academic curriculum adopted in DLE programs should be the same with that in other types of programs, for example, English-only schools (Howard et al., 2018; Lindholm-Leary, 2001).

4) The two instructional languages should be kept distinct, which means that only one language is encouraged to be used in specific periods of instruction (Baker, 2011; Genesee, 1984; Lindholm-Leary, 2001).

It is the last principle that has generated much debate in the DLE research field (Ballinger, Lyster, Sterzuk, & Genesee, 2017; Hamman, 2018; Sánchez et al., 2018).

Separation of languages for instruction was proposed, on the one hand, to promote monolingual instruction in contrast to language mixing in lesson delivery. Both teachers and students are discouraged from language mixing, code-switching or translating to guarantee that students have enough language exposure and practice in each language (Lindholm-Leary, 2001). On the other hand, it is to keep the two partner languages in

different territories aiming to protect the partner language from being taken over by the dominant language (Baker, 2011; Cloud, Genesee, & Hamayan, 2000; Genesee, 1984; Gómez et al., 2005; Lindholm-Leary, 2001). However, as the understanding of bilingualism evolves, scholars started to question this language separation approach that has been implemented as one of the axiomatic principles in DLE programs (Cummins, 2007).

2.1.1 Argument against Language Separation

The language separation approach has been called *dual monolingualism* (Fitts, 2006), *parallel monolingualism* (Heller, 1999) and *separate bilingualism* (Creese & Blackledge, 2011) in the bilingual education context in the U.S., French immersion in Canada, and heritage language education in the U.K. respectively. These labels reflect the underlying assumption in the advocacy of monolingual instruction in bilingual education, that is, languages are bounded and compartmentalized in the bilingual's mind and the bilingual person is two monolinguals summed up in one (Ballinger et al., 2017; García, 2009; Grosjean, 1985). The criticism to the language separation approach is twofold. First, it does not reflect the linguistic reality of the bilinguals as dynamically interacting systems (Kroll, Bobb, & Hoshino, 2014; Kroll, Dussias, Bogulski, & Kroff, 2012), and second, it neglects the role of this linguistic reality in building learners' bilingual skills and identity (Lee, Hill-Bonnet, & Gillispie, 2008).

Research has shown that the two languages in a bilingual's mind are always active and interact at the lexical, phonological, grammatical and other linguistic levels, which exerts cross-linguistic competition on the bilingual's identification of interlingual homographs or sentence processing (Kroll et al., 2012; Kroll et al., 2014). This means

that bilinguals' two languages are not compartmentalized, nor work in parallel without influencing each other. Based on empirical studies on immigrant children's first language (L1) and second language (L2) development, Cummins (1979) proposed that there was an interdependent relationship across languages, and the development of L1 may predict the development of L2. In sociolinguistics, languages are not seen as a pre-given entity but "are a product of the deeply social and cultural activities in which people engage" (Pennycook, 2010, p.1). Sociolinguists' study of code-switching shows that bilinguals are able to tell when, where, and with whom to code switch to fulfill different purposes without violating the linguistic rules and communicative conventions of either language (Gumperz, 1977; Romaine, 1995), which also indicates that bilingual speakers' linguistic practices are not on two separate tracks of L1 and L2 or random mixing of the two languages but dynamically interacting with each other. Socio-politically scholars argue that named languages are social constructions as bounded entities that associate with the boundaries of nation-states, which does not reflect how bilingualism is processed in bilinguals' mind or how bilingualism is practiced in reality (Gafaranga, 2005; Li, 2018; Otheguy, García, & Reid, 2015).

In the last decade, one influential construct that counters the monoglossic conceptualization of bilingualism is translanguaging. Translanguaging is a term coined by Cen Williams (1996; cited in Baker, 2011) to refer to a pedagogical practice adopted in Welsh-English programs where the two instructional languages were systematically switched for different learning activities so that students could process information in both languages (Lewis, Jones, & Baker, 2012a). García (2009) expanded this notion and used translanguaging to refer to "multiple discursive practices in which bilinguals engage

in order to make sense of their bilingual world” (p. 45). Translanguaging emphasizes that bilinguals’ mental grammars are structured but unitary, and there is a full linguistic repertoire instead of two distinct linguistic systems for bilinguals to deploy (Otheguy et al., 2015). Seeing translanguaging as the linguistic reality of bilinguals, scholars maintain that the language separation approach in DLE is not aligned with bilingual learners’ cognitive processing of languages or their actual bilingual practices (García, 2009; Li, 2018; Palmer et al., 2014). For example, studies showed that when educated under the language separation approach, students who were proficient in both Spanish and English chose to speak in one language instead of both in class or even on the playground, which distanced them from the reality that using both languages to communicate is a norm in non-educational settings (Lee et al., 2008). Lee et al. (2008) argue that the strict separation of languages inhibits students from drawing on both languages as resources for problem-solving or indexicality, and more importantly, it “leads to a thickening of identities of the teachers and students as speakers of either Spanish or English, rather than bilingual speakers of two languages” (p. 90).

The reconceptualization of bilingualism and bilingual practices led to the second argument against the “two solitudes” approach (Cummins, 2007). Based on the language separation principle, students are taught monolingually in two languages, and there is no place of the mixing of L1 and L2 in teaching and learning (Cummins, 2007). In actual classroom practices, Martin-Beltrán’s (2010) analysis of students’ discourse in a Spanish-English two-way immersion program found that students’ simultaneous use of two languages when they interacted with their peers created multiple learning opportunities, including but not limited to bridging linguistic gaps for one another, raising

metalinguistic awareness, clarifying understanding of academic language, and drawing on each other's linguistic expertise. In this process, both languages served as mediational tools and objects of study. In Canadian French immersion programs where English is most students' first language, Swain & Lapkin (2000) found that students' use of L1 had specific functions for "moving the task along," "focusing attention," and "interpersonal interactions" in completing their tasks. They also found that students whose task completion quality was lower tended to use their L1 more, so Swain and Lapkin (2013) specifically emphasized, "[w]hat we do not know is if any use of the L1 by the students is essential; if it expedites the learning process or is simply the easier route to take" (p. 110). Despite this question, tying to Turnbull, Cormier, and Bourque's (2011) research findings that students' use of L1 and language mixing was correlated with complex turns, they suggested that students should be allowed to use their L1 when working on complex ideas, considering the potential function that L1 served for students to mediate the learning process.

The counter approach to the prevalent language separation principle proposed by scholars who view bilinguals' linguistic system as one entire repertoire and advocate the benefits of using L1 or language mixing in bilingual development mostly centers around translanguaging (e.g. Canagarajah, 2011; Creese & Blackledge, 2010, 2011; Duarte, 2016). The following are two examples. Drawing on identity theory, Palmer et al. (2014) analyzed two Spanish-English two-way immersion teachers' and their students' bilingual practices and proposed three translanguaging pedagogical strategies, such as the following: 1) teachers model and encourage dynamic bilingual language practices, 2) regardless of proficiency, all students should be positioned as bilinguals, and 3) when

language crossing occurs in class, teachers should mirror, celebrate and draw attention to it. According to Palmer et al. (2014), these strategies could encourage students to engage in sensitive topics and make attempts to practice their weaker language, but at the same time, the authors also acknowledged that they did not have evidence to show that dynamic bilingual practices was superior to the language separation approach in achieving linguistic and academic goals. Sánchez et al. (2018) proposed a translanguaging allocation policy in dual language bilingual programs. This policy consisted of three components: 1) translanguaging documentation, a process that both language teachers collaboratively document students' lived experiences and gain a holistic view of the learner, 2) translanguaging ring, a bilingual space that provides scaffolded instruction when students need assistance with the learning through their weaker languages, and 3) translanguaging transformation, a space that raises students' sociopolitical consciousness of the linguistic hegemony in society and builds new and positive bilingual subjectivities towards themselves. This translanguaging allocation policy does not intend to uproot the preserved space for each named language but calls for the acknowledgement of students' unitary language system and calls attention to the strict language separation approach that is harmful to students' bilingual development and education in general (Sánchez et al., 2018). Since this model is relatively new, to my knowledge there are no empirical studies yet to test its effects on bilingual students' language learning or academic outcomes.

2.1.2 Argument for Language Separation

Scholars who argue for keeping the language separation principle also embrace and celebrate the reconceptualization of bilingualism from a dynamic and holistic view

(Ballinger et al., 2017). However, Ballinger et al. (2017) cautioned researchers not to advocate rashly the increased use of students' home language in the instructional time allocated to the partner language before there is clear empirical research evidence. Their major concern comes from the consideration of the specific sociolinguistic contexts of different bilingual programs in the world. Ballinger et al. (2017) maintain that the notion of translanguaging and its pedagogical implications are mainly derived from the Spanish-English two-way immersion programs (García, 2009) or the heritage language teaching context in the U.K. (Creese & Blackledge, 2010, 2011), where at least half of the students are from the minority groups and their home language is not the societally dominant language. However, in contexts such as the French immersion programs in Canada, Irish-English programs in Ireland, and one-way immersion for English-speaking children in the U.S., students have much more opportunities to access English both at home and in the larger society, but only have a very limited time using the partner language at school. In these contexts, the increased use of students' L1 or home language means the increased use of English, the benefits of which are questionable (Ballinger et al., 2017). Concerning the original aim of protecting and promoting minority languages in Welsh immersion programs, Cenoz and Gorter (2017) also cautioned against the random or unsustainable use of the majority language and translanguaging, which could be a threat to the maintenance of the minority language due to the imbalanced power status between the minority language and English, and studies already showed that students in immersion programs tended to use more English in higher primary grades even under the language separation principle (Tarone & Swain, 1995; Potowski, 2007). Another argument for keeping the language separation approach is that there is no direct evidence showing that

the translanguaging approach is more effective than the currently proven effective models (Ballinger et al., 2017).

As mentioned above, although arguing for a protected space for the minority language, such scholars as Ballinger et al. (2017) also embrace the holistic view towards bilingualism, but they are skeptical of the effectiveness of the increased use of the majority language, for example, in Canadian French immersion programs. They proposed the immersion-appropriate, cross-linguistic pedagogy as a counter approach to parallel monolingualism, that is, to make explicit connections between the two instructional languages but not necessarily increase the use of the majority language (Ballinger et al., 2017). The following are some examples of the cross-linguistic pedagogy.

Beeman & Urow (2013) proposed the notion of “Bridge” to Spanish-English dual language teachers to promote students’ biliteracy development. During the bridging stage, teachers strategically put Spanish and English side by side, the language focus of which derives from the academic content, and teachers guide students to compare and contrast the similarities and differences between the two languages. Then extension activities are employed for students to apply the language that has been bridged. The main purpose of the Bridge is to help students raise metalinguistic awareness and transfer Spanish and English academic language bi-directionally, which allows students to access knowledge in both languages. In the same vein, Gómez et al. (2005) integrate vocabulary enrichment activities in their design of the 50/50 immersion model in which the instructional time is divided by subject, that is, teachers design contextualized activities to introduce in English specialized content vocabulary that has been taught in Spanish. The purpose of

this activity is also to help students transfer knowledge learnt in one language to the other language and to enable students to perform well in tests in either language.

Empirical studies have shown the effects of collaboration between partner teachers who engaged in the cross-linguistic pedagogy (Ballinger, 2015; Lyster et al., 2009; Lyster et al., 2013). For example, Lyster et al. (2013) explored the effects of biliteracy instruction on developing second-graders' morphological awareness. Under the guidance of the researchers, three pairs of French and English partner teachers co-designed and implemented literacy tasks that focused on derivational morphology. The target words were derived from illustrated storybooks that were read-aloud in both languages. The literacy activity continued across the French and English classes. Morphological awareness measures before and after intervention showed that students who received the cross-linguistic biliteracy instruction performed significantly better than those who did not. In the study of Gunning et al. (2016) on L1-L2 teacher collaboration, the French and English partner teachers adopted similar reading strategies with equivalent terminology and collaboratively taught these strategies in a consistent approach during their respective instructive time. It was found that this collaborative approach increased learner awareness and their use of reading strategies in reading. This study reported that teachers were convinced of the benefits of cross-linguistic collaboration, and they expanded their joint effort to create transferrable instructional practices across other disciplines, for example, teachers of different subject matters addressing related topics or themes in their respective classes. However, since the cross-curricular collaboration was not the focus of their study, the authors did not illustrate its implementation processes and effects.

2.1.3 Discussion on the Language Separation Debate

The language separation debate originates from the reconceptualization of bilingualism from “two monolinguals in one” (Grosjean, 1985) to an integrated and holistic repertoire (de Jong, 2016; García, 2009; Otheguy et al., 2015; Pennycook, 2010), which transformed and advanced the understanding of how bilinguals process and learn languages. This reconceptualization also provided the research field with opportunities to experiment with new pedagogies to maximize the potential of DLE programs in enhancing students’ language and academic learning as well as their cross-cultural understanding and sociopolitical awareness. One major divergence between the two sides of the debate is that if we wish students employ their full linguistic repertoire (including their L1) to learn, then shall we allow the use the L1 and L2 alongside each other in DLE programs? The translanguaging side argues that students’ mixed use of language should be regarded as a linguistic norm and be used as a resource (e.g. Palmer et al, 2014), while the cross-linguistic pedagogy side argues that in contexts where English is already the majority language, the minority language should have a protected space from the intrusion of English, while there are other ways to make connections between the two partner languages and to enable students to access their full linguistic repertoire (e.g. Ballinger et al., 2017).

Then the question is for educators in DLE programs, which side should they pick? It depends on the sociolinguistic contexts of specific programs and the possibility to strive for an eclectic approach to draw from the advantages of both sides. What is certain is that there might not be a one-size-fits-all approach, no matter if it is the translanguaging pedagogy or the cross-linguistic pedagogy. Translanguaging has been a

hot topic in the research field in the last decade and has expanded its influence from academia to the practitioners and the public (Lewis et al., 2012a). Yet, how to transfer translanguaging from a theory or ideological position to a sustainable and applicable pedagogy whose effectiveness can be assessed is a great challenge (Li, 2018). I agree with Cenoz and Gorter (2017) that without an in-depth understanding and systematic planning, a random and superficial application of translanguaging may threaten the minority language or reproduce linguistic imbalance. However, the great potentials of employing translanguaging as a pedagogy are worth exploration and experimentation.

As for the cross-linguistic pedagogy, although it argues for keeping the language separation approach, it calls for making connections between the two partner languages across the instructional time (Ballinger et al., 2017). Yet, the problem is that these scholars might have neglected the potential benefits of using students' L1 or the fluid use of L1 and L2 in mediating the learning process. Further, there is no elaboration on cross-curricular pedagogy that not only links the languages but also bridges the languages and other subject matters.

In the present study, engaging with the language separation debate is to better understand how teachers' curriculum planning reflects their conceptualization of bilingualism and their beliefs of how students learn in DLE programs. My research context is a one-way Chinese-English immersion program in which the majority of the students are from English-speaking families. This context is similar to the Canadian French immersion programs, and the teacher participants' teaching approach was similar to cross-linguistic pedagogy (Ballinger et al., 2017). Although these teachers did not have

previous knowledge of the language separation debate, their self-initiated curriculum bridging approach could add to the knowledge base of this scholarly debate.

2.2 Chinese-English DLE in the U.S.

The recognition of the educational, cultural and social benefits of bilingualism provides different linguistic communities around the world with multiple incentives for acquiring a second or foreign language. With the rising economic and political power of China and the increasing number of Chinese immigrants, Chinese-English DLE programs have gained popularity in the U.S. (Fortune, 2012), and the number of Chinese-English DLE schools has increased to 278 in early 2019 (Parents of Kids in Mandarin Immersion Education, 2019). Figure 2.1 shows the distribution of the 278 Mandarin-English DLE schools in the U.S. The green dot represents the Mandarin program in each state; eighty-seven programs are located in California, and forty-six are in Utah, presenting a cluster of Mandarin programs in those two states.

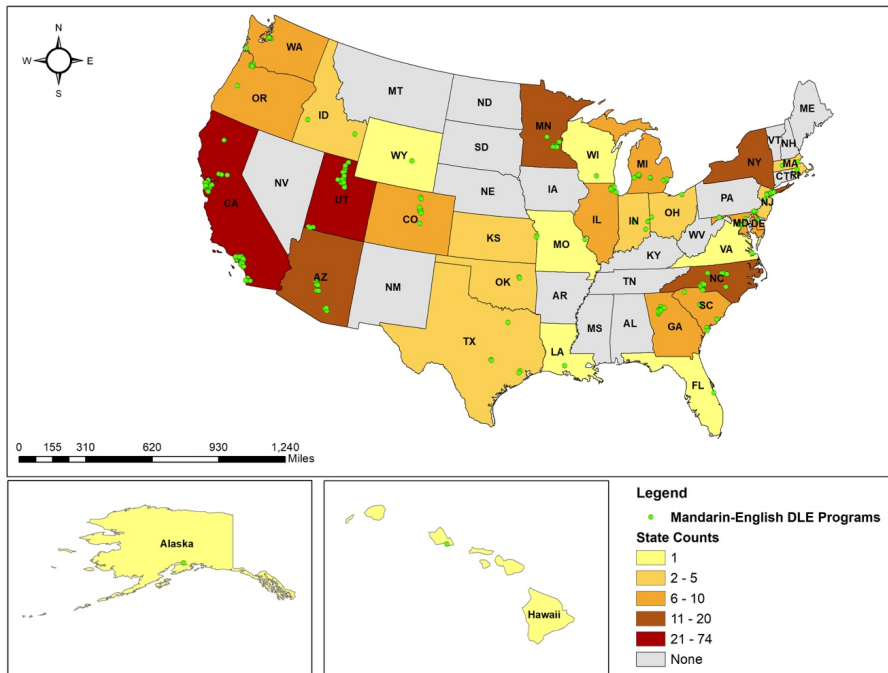


Figure 2.1. Distribution of Mandarin-English immersion programs in the U.S.

Among the 278 schools, there are two-way and one-way immersion programs. In recent years, there has been an increase of one-way Chinese-English DLE programs that mainly serve English-speaking children, such as in Utah and Minnesota (Asia Society, 2012). Chinese-English DLE programs are established with the same general goals as DLE programs of other language combinations and in its own wake of development, have benefited from the theoretical constructions that guide the Spanish and French immersion programs (Genesee & Lindholm-leary, 2013; Lyster, 2007; Met, 1998; Snow, Met & Genesee, 1989) At the same time, Chinese-English DLE programs also face some unique challenges in achieving the stated program goals, which could be ameliorated by a collective endeavor of the partner teachers as argued by Met (2000) and Zhou and Li (2015b).

2.2.1 Characteristics of the Chinese Language

To talk about the potential cross-linguistic collaboration between the Chinese and English teachers, we need to discuss the unique characteristics of the two languages first. Chinese and English belong to two distinct language systems, the Sino-Tibetan and Indo-European language family respectively (Li & Thompson, 1981). Different language families entail different linguistic systems. This section will limit the literature review to the introduction of the Chinese orthography and the comparison of the phonological and morphological systems in English and Chinese. The unique logographic orthography system is one of the most challenging aspects for learners of Chinese to acquire (Everson, 2011). As for the phonological awareness and morphological awareness, they are key predictors of reading among English-speaking children and Chinese-speaking children

respectively (Tong & McBride-Chang, 2010), which could be important factors that impact DLE students' Chinese-English bilingual development.

According to Hanley (2005), written Chinese is a logographic system if its definition expands to include the primary correspondences between characters and morphemes instead of words, because each Chinese character maps onto a morpheme, which could be a stand-alone word or it requires to be combined with other morphemes to form a word, a smallest free form that can function syntactically (Packard, 2000). The basic building blocks of Chinese characters are strokes that make each character into a basic square shape (Siok & Fletcher, 2001; Wang & Yang, 2008), and the visual complexity is reflected by the number of strokes ranging from one to over twenty (Li, 2014). Because of the composition of a Chinese character, visual-orthographic skills are a key factor predicting Chinese-speaking children's reading ability (Huang & Hanley, 1995; Perfetti & Tan, 1998; Tong & McBride-Chang, 2010; Wang, Perfetti, & Liu, 2005). Sets of strokes make up radicals. Based on the structure of a Chinese character, there are single-component characters that cannot be segmented into smaller meaningful radicals and multiple-component or compound characters that are decomposable into two or more radicals. In Chinese, over 80% of the characters are compound characters, and 80% to 90% of which are phonetic-semantic characters (Li, 2014). Radicals that carry the phonetic information are phonetic radicals, and those that carry the semantic information of a character are semantic radicals. In other words, these radicals provide important clues to the pronunciation and meaning of a character. The semantic radicals are more reliable in predicting the meaning than the phonetic radicals in predicting the pronunciation, and Zhou's (1978) corpus study of Modern Standardized Chinese Characters showed that

about 39% of the phonetic radicals could provide accurate or near accurate cues to the pronunciation of a new character. These linguistic features of radicals can provide important implications for Chinese instruction for Chinese native speakers as well as learners of Chinese as a second or foreign language, and there is the need of explicit instruction of the components and structures of characters to develop learners' intra-character analytical skills (Everson, 2011; Xiao, 2011).

Phonologically, the basic speech unit of Mandarin Chinese is the syllable. Different from the grapheme-phoneme correspondences in English, in Chinese the correspondences are between character and syllable (Shu, Anderson, & Wu, 2000; Siok & Fletcher, 2001). There are four types of syllable structures in Chinese: V (vowel), CV (consonant-vowel), VC (vowel-consonant), and CVC (consonant-vowel-consonant) (Wang & Yang, 2008). Chinese is a monosyllabic language, which means that each character mostly is pronounced as one syllable (few exceptions, for example, 千瓦, *qiānwǎ*, kilowatt). Each syllable is traditionally further segmented into *onsets* (the initial consonant) and *rimes* (the rest part of the syllable after the initial consonant), or in Li and Thompson's (1981) term *initials* and *finals*. In mainland China, Pinyin is taught in the forms of onsets and rimes instead of separate phonemes as in alphabetic languages. For example, the nasal final /an/ is taught as a whole unit of a rime and students are not instructed that it can be further segmented into phonemes /a/ and /n/. This is because Chinese does not have the grapheme-phoneme correspondence, and the need of fine-grained segmentation of the phonemes is not salient (Shu, Peng, & McBride-Chang, 2008; Siok & Fletcher, 2001). Further, there are no consonant clusters in all Chinese dialects; the onsets are always a single consonant, if it is not a structure of zero initial (Li &

Thompson, 1981). As for the end consonant in the structures of VC and CVC, there are only two, that is, /n/ and /ng/ (Siok & Fletcher, 2001). Therefore, with similar numbers of consonants and vowels in Chinese Mandarin and English, Chinese has a smaller number of unique syllables and simpler syllable structures than English (Hanley, 2005; Wang & Yang, 2008). Ho and Bryant's (1997) study found that Mandarin-speaking children developed their phonemic awareness later than their English counterparts, but their phonemic awareness could be enhanced by explicit learning of Pinyin and English (Huang & Hanley, 1995; Shu et al., 2008). Another prominent feature of the Chinese language is that it is a tonal language, which means that with the change between the tones, the meaning associated with the pronunciation changes (Li & Thompson, 1981). According to Linnell (2001), grasping the four tones in Mandarin Chinese is one of the most challenging areas for Chinese language learners to overcome.

In Chinese morphologically a character corresponds to a single morpheme, which can be a word alone or form a word with another one or more morphemes. Different from languages such as English, French and Spanish, in which inflection and derivation are the major methods for word formations, in Chinese the majority of words are formed through compounding (Li & Thompson, 1981; Packard, 2000; Pasquarella, Chen, Lam, Luo, & Ramirez, 2011). Although there are no grammaticized inflections that indicate gender, case, and number (Li & Thompson, 1981), derivation happens in Chinese, although it is not as salient as in English (Packard, 2000). For example in the word 探险家, (explorer), 探险 (explore) is the root, and 家 (-er) is the derivational affix. We can see from this example that the forms of Chinese morphemes remain constant and do not undergo morphophonemic changes when they appear with other morphemes in a word (Packard,

2015; Wang & Yang, 2008). Despite these differences, studies found that there could be morphological transfer between English and Chinese among bilinguals of these two languages (Ke & Xiao, 2015; Pasquarella et al., 2011). For example, Pasquarella et al.'s (2011) research on cross-linguistic transfer of compound awareness in Chinese-English bilinguals showed that English compound awareness was a significant predictor of Chinese vocabulary acquisition, but not vice versa. The researchers attributed this result to the reason that compound awareness is not a prominent feature in English vocabulary development, so there is no need for transfer from Chinese to English. Further, they specifically pointed out that since Chinese and English are not cognate with each other, what transfers is not the concrete vocabulary, but it is the abstract metalinguistic understanding. These conclusions could offer implications to DLE programs to use morphological awareness as a resource to promote students' bilingual development, but if the teachers are not aware of the characteristics of Chinese and English morphological features, it may be challenging for them to identify potential bridging points, which is not as straightforward as in Spanish- or French-English immersion programs that could focus on the inflectional and derivational awareness (e.g. Lyster et al., 2013).

In summary, Mandarin Chinese is a morphosyllabic language; it is tonal in phonology and logographic in orthography without grapheme-phoneme correspondences. In morphology, the language lacks grammaticized inflection for, for example, tense, case, voice, and gender. The seemingly drastic differences in the linguistic systems of Chinese and English, especially in the aspect of writing, may make the cross-linguistic connections between the two languages less apparent to teachers and present extra

challenges for Chinese-English DLE programs to achieve the program goals, which will be further discussed in the following section.

2.2.2 Challenges Faced Chinese-English DLE Programs

Due to the complexity of the linguistic system, it requires years of learning for children to become proficient and literate in Chinese, including for Chinese native speakers (Li, 2014). For English native speakers who learn Chinese as a foreign language, it is estimated that 2,200 class hours, with at least 1,100 hours spent in immersion study are needed for the learners to become proficient enough to use Chinese in a professional setting, which is about four times of the time required to reach the same proficiency level in Spanish and French (Foreign Service Institute, n.d., cited in Xu & Padilla, 2013). Although this estimation might not be accurate to all learners of Chinese, in a way it reflects the level of difficulty in learning this language.

According to the guidelines for DLE programs, at least six years are needed for DLE students to achieve high bilingual and academic outcomes (Howard et al., 2018), and the original suggested time was four to six years (e.g. Howard & Christian, 2002; Lindholm-Leary, 2001). However, the stated program goal of achieving high levels of proficiency in both languages in about six years did not specify which level of proficiency students were supposed to reach. With the introduction of the ACTFL Proficiency Guidelines (ACTFL, 2012) and standardized assessment based on the guidelines, there is the possibility to compare immersion students' target proficiency levels across different immersion programs as shown in Table 2.1. In the ACTFL Proficiency Guidelines, there are three broad levels of proficiency, Novice, Intermediate, and Advanced, and under each category, there are three sublevels, Novice Low, Novice

Mid, and Novice High to describe what learners can do with the language (ACTFL, 2012).

Table 2.1

Summary of DLE Students' Partner Language Attainment in Grade 5 or Grade 6

(Authors, year)	Partner Languages Tested	Fifth/Sixth Proficiency Level	Grade/Mean Level attained	Program Type/NO. of Ss tested	Assessment	State
(Xu, Padilla, & Silva, 2015)	Mandarin	G5 <u>Mandarin</u> Reading, Writing & Speaking: Intermediate Low		80/20 to 50/50 two-way Mandarin immersion/30	STAMP ²	CA
(Burkhauser et al., 2016)	Mandarin Japanese Spanish	G5 <u>Mandarin</u> Reading & Writing: Intermediate Low Speaking: near Intermediate Low Listening: Intermediate Mid <u>Japanese</u> Reading & Writing: Intermediate Low Speaking & Writing: Novice High <u>Spanish (Estimated model based on Tests in 4th, 7th, and 8th grade; one-way and two-way aggregated)</u> Reading & Writing: Intermediate Mid Listening: Intermediate Mid Speaking: Intermediate Low		50/50 one-way Mandarin immersion/237 50/50 one-way Japanese immersion/324 90/10 to 50/50 two-way Spanish immersion/503; 50/50 one-way Spanish immersion/225	STAMP	OR
(Watzinger-Tharp, Rubio, & Tharp, 2018)	Mandarin French Spanish	G6 <u>Mandarin</u> Reading & Speaking: High Listening: near Intermediate Mid <u>French</u> Reading: near Intermediate High Speaking: near Intermediate Mid		50/50 one-way Mandarin immersion/260 50/50 one-way French immersion/215	AAPPL ³	UT

² STAMP stands for Standards-Based Measurement of Proficiency. It is a proficiency test of world language knowledge and skills in listening, speaking, reading and writing in real-world situations.

³ AAPPL stands for Assessment of Performance toward Proficiency in Languages. It is a performance test of learnt and practiced language knowledge and skills in the modes of interpersonal listening/speaking, presentational writing and interpretive reading in familiar contexts.

Listening: Intermediate Mid	
<u>Spanish one-way</u>	50/50 one-way
Reading: between Intermediate Mid and Intermediate High	Spanish immersion/355
Speaking: Intermediate Mid	
Listening: Intermediate High	
<u>Spanish two-way</u>	50/50 two-way
Reading: Intermediate Mid	Spanish immersion/225
Speaking: near Intermediate Mid	
Listening: near Intermediate High	

In order to make the research results relatively comparable, I only listed the test results in Grade 5 and 6, although the original studies all covered two or more grades. What is to be noted is that these studies employed different assessments, STAMP and AAPPL. Both of tests are designed based on the ACTFL Proficiency Guidelines, although the scores of the two assessments are not directly comparable. All the researchers aligned the scores with the specific sublevels in The ACTFL Proficiency Guidelines, which makes the following comparison possible. Cross-linguistically, Burkhauser et al.'s (2016) study demonstrated that Mandarin and Spanish listening, speaking and writing results in Grade 5 showed a similar pattern, about one sublevel higher than the Japanese results in each language skill. However, students' reading level in Mandarin was one sublevel lower than that in Spanish. Watzinger-Tharp et al. (2018) found that French and Spanish immersion students in Grade 6 reached at least the level of Intermediate Mid across the language skills of listening, speaking and reading, while Mandarin learners' speaking and reading results were about two sublevels lower than the results in French and Spanish. There is discrepancy between the results of the first two studies and Watzinger-Tharp et al. (2018), but reading in Mandarin seemed consistently to be the area that presented more challenges to students than speaking and listening.

According to the more positive results as in Xu et al.'s (2015) and Burkhauser et al.'s (2016) studies, by Grade 5 Mandarin immersion students' reading level was at Intermediate Low, indicating that students "are able to understand some information from the simplest connected texts dealing with a limited number of personal and social needs" (ACTFL, 2012). If sixth graders' reading level in Mandarin only reaches Novice high as shown in Watzinger-Tharp et al. (2018), then they will be able to understand key words and formulaic phrases in highly contextualized texts (ACTFL, 2012).

The key concern here is that "[s]uch limited literacy skills can affect the integrity of the curriculum and academic rigor" (Met, 2000, p. 142), considering the significant role of literacy skills in acquiring knowledge. Empirical studies have shown positive results that Mandarin immersion students' achievement in English literacy, math and science is at least on par with their grade-level non-immersion peers (Fortune & Song, 2016; Lindholm-leary, 2011; Padilla, Fan, Xu, & Silva, 2013); however, there is still the need to further explore potential ways to enhance students' literacy development and seek better bilingual and biliterate practices in Chinese-English DLE programs.

Aside from the challenges that come from the level of difficulty in learning Chinese, Chinese-English DLE programs also face the challenges that are common to other programs of different language combinations. First, there is the lack of standards for the Chinese curriculum (Ke & Li, 2011), the situation of which has been ameliorated by the introduction of the ACTFL Proficiency Guidelines (ACTFL, 2012) and Standards for Chinese Language Learning (The National Standards Collaborative Board, 2015), but how to familiarize teachers with these guidelines is still a challenge. Second, there is a shortage of Chinese instructional materials that are suitable to use in DLE immersion

programs, especially language-level and age-appropriate materials (Lindholm-Leary, 2011). As Chinese-English DLE programs gain popularity in the U.S. and in the world, more materials, such as leveled books and bilingual science curricula are available, but the amount is limited, and translating or creating instructional materials is still a common practice of immersion teachers (Lin, 2012). Third, there is insufficiency of qualified Chinese teachers. Research has shown that Chinese immersion teachers often have to cope with the cultural mismatches between teachers' and students' different expectations of classroom behaviors (Zhou & Li, 2015a) and instructional practices (Chang, 2011; Fortune, 2012) and the challenges of teaching content areas in a language that students are not proficient in (Zhou & Li, 2015b).

To address the challenges discussed above, Met (2000) suggested flexibility in immersion programs of less commonly taught languages. One way is that instead of strictly allocating certain subjects to a specific language, dividing subjects by units or even tasks and activities, and the English teaching time can provide support for content that is difficult to teach in Chinese. This strategy requires cross-linguistic collaboration that ties back to the language separation debate. Such explorations of cross-linguistic pedagogy in Spanish and French DLE programs, in which the partner languages are cognate with English, have revealed positive effects in promoting positive cross-linguistic transfer and content knowledge bridging across the two instructional languages (Beeman & Urow, 2013; Gunning et al., 2016; Lyster et al., 2009, 2013). As for languages that do not share cognates with English, what aspects can be transferred between the two instructional languages are comparatively less straightforward to teachers. Thus, bringing the two partner teachers together and breaking “the barriers of

isolated teaching” while working towards best practices for immersion students becomes a challenge (Gunning et al., 2016, p. 79). Zhou and Li (2015b) also called for collaboration between Chinese and English teachers in immersion programs for better curriculum design and faster professional growth of the Chinese teachers. However, there are few empirical studies exploring topics such as how the partner teachers in Chinese immersion programs collaborate and what the benefits and limitations of their collaboration are. The purpose of the present study is to bridge this research gap and address these questions.

2.3 Summary

In this literature review, the first section focuses on the language separation debate on whether DLE should keep the language separation principle that advocates monolingual instruction in the designated linguistic spaces. Both sides of the debate agree that bilingualism should be viewed as an integrated and holistic repertoire instead of two monolinguals in one. However, the two sides differ in terms of whether increased use of students’ home language should be encouraged in the minority language instructional time. Those who believe in the benefits of the use of students’ L1 or language mixing propose translanguaging strategies to either break away from or complement the current language allocation principle (Palmer et al., 2014; Sánchez et al., 2018). Scholars who see the use of students’ L1 as a potential threat to the maintenance of the minority language, especially in contexts where English is most of the students’ home language, propose that the language separation principle should be kept but cross-linguistic pedagogy that is not necessarily in need of translanguaging should be encouraged (Ballinger et al., 2017). The teacher participants in this research took the latter approach

and the analysis of their cross-linguistic collaboration will contribute to the re-consideration of the current language allocation methods in DLE programs.

The second part of the literature review covers the characteristics of the Chinese language and challenges that Chinese-English DLE programs face. In DLE programs, immersion teachers often face such challenges as balancing language and content, lack of teaching materials and “experiencing a growing sense of isolation” to struggle on their own (Cammarata & Tedick, 2012, p. 257). For Chinese immersion teachers, an additional challenge comes from the linguistic complexity and logographic orthography of the Chinese language, due to which it requires longer time of instruction for native-English speakers to become proficient in Chinese compared with languages such as Spanish or French. In order to cope with these challenges, cross-linguistic collaboration between the two partner teachers are suggested (Met, 2000; Zhou & Li, 2015b), but the ways to collaborate are not straightforward due to the linguistic differences between English and Chinese. Further, the current cross-linguistic collaboration examples are mostly from Spanish and French immersion programs, and there is a need to explore such collaboration in Chinese-English DLE programs in which the two partner languages are not cognate with each other.

Chapter 3 Theoretical Framework

Curriculum bridging is a process that requires collaborative efforts among teachers in curricular planning and implementation and a belief in integrated learning. To explore teachers' collaborative endeavor for curriculum bridging, throughout the study, I take a social constructionism approach and see both teachers' collaboration and students' engagement in teachers' curricular design as socially constructed. Specifically, sociocultural theories of mediation and the Zone of Proximal Development (ZPD) are adopted to understand teachers' and students' learning processes. Further, this study draws on the framework of Communities of Practice (CoP). During my observations of the teachers' planning sessions, I gradually realized the need for this framework to help me make sense of the nature of the teachers' collaboration. In the following sections, I will explain why this framework is adopted and how the characteristics of CoP inform the analysis of my research questions. This study is also informed by theories on the design of interdisciplinary curriculum to gauge teachers' integration of curricula.

3.1 Sociocultural Theory

This section will describe the social lens that is taken throughout the dissertation, specifically the sociocultural theory that informs the analysis of teachers' learning in their CoP and students' learning in class. From a sociocultural perspective, learning is socially constructed that takes place in the interplay between individuals and their social environment through social interactions (Lave & Wenger, 1991; Vygotsky, 1978). According to Vygotsky (1978), "[e]very function in the child's development appears twice: first, on the social level, and later, on the individual level" (p. 57). Learning is not solely a siloed cognitive process but originates from dynamic interrelations between

people and then is transformed onto the intrapersonal plane. In the following sections, two important constructs of the sociocultural theory will be discussed and how they are related to the DLE context will be explained.

3.1.1 Mediation

Learning is a social construction, and humans act on the world indirectly through the mediation of physical tools and symbolic tools. The symbolic tools include language, music, and numbers and arithmetic systems, among which language is the most important mediational tool (Lantolf, 2000; Vygotsky, 1978). One form of mediation is regulation and children go through mainly three stages of regulation: object-regulation, other regulation and self-regulation, which refers to the phases of being controlled by concrete objects, being mediated by the assistance and directions of a more mature other, and undertaking tasks without the external support (Lantolf & Thorne, 2006). Moving from the stages of other-regulation to self-regulation, the function of language transforms from the level of social to individual and mediates one's own higher level thinking (Frawley, 1997; Swain & Lapkin, 2013).

Relating back to the language separation debate, does the use of L1 or dual language use, for example, translanguaging have a place in learning a new language or learning content knowledge through a new language? According to Vygotsky (1986), when learning another language, learners use their L1 as a mediator between the new language and the immediate world of objects, and they do not need to go back to the world of objects. Further, one general principle for effective learning that is widely recognized is the incorporation of learners' prior knowledge (Bransford et al., 2000).

One aspect of previous knowledge that is extremely important for understanding learning is cultural practices that support learners' prior knowledge. Effective teaching supports

positive transfer by actively identifying the relevant knowledge and strengths that students bring to a learning situation and building on them (Bransford et al., 2000, p. 78).

The implication provided by this general learning principle to the field of DLE is that if students' previous knowledge is encoded in their L1, then the mediational effect of L1 in the process of activating the prior knowledge cannot be ignored (Cummins, 2007, 2017). In the bilingual context of DLE programs, it is argued that translanguaging can also serve as a mediator in students' mental processes of understanding, communicating and learning (Lewis, Jones, & Baker, 2012b; Martin-Beltrán, 2014). For example, research showed that students use translanguaging to deepen their metalinguistic understanding, expand learning opportunities, and engage in complex meaning making processes (Martin-Beltrán, 2010; 2014; García & Li, 2014). In this dissertation, I take the stance that bilingual students have one integrated repertoire as with both sides of the language separation debate (e.g. Ballinger et al., 2017; Palmer et al., 2014), and that translanguaging is seen as a mediational tool for students to make sense of their bilingual world and engage in language and content learning (García, 2009).

3.1.2 The Zone of Proximal Development

Another important construct in sociocultural theory that is relevant to the current study is ZPD, which refers to “the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers” (Vygotsky, 1978, p. 86). It emphasizes the social nature of learning that results from interpersonal interactions, such as active participation in sociocultural activities and engagement in collaborative learning (Lantolf & Thorne, 2006; Lave &

Wenger, 1991; Wenger, 1998). It has great implications in the field of education, which is not only applicable to children's learning but also to the collaboration between adults (Horn, 2010). Moreover, the construct of ZPD helps teachers delineate the target level of instruction for learning to happen. In other words, if teachers aim too high, students cannot perform at the level even with the help of a more capable other; while if the level of instruction only focuses on what students are already able to do independently, it does not create real learning opportunities (McLaughlin et al., 2005). In this dissertation, the concept of ZPD informs my analysis of how learning takes place among the teacher participants in the curriculum bridging process and among students in the classroom interactions between teachers and students.

3.2 Communities of Practice

“Teaching is not the oldest profession. But it is certainly among the loneliest” (Fullan & Hargreaves, 1996, p. 38). Even today, this quote still in a way reflects the professional state of teachers in the U.S. The culture of individualism and the school system allow teachers to work alone to maintain their autonomy and make decisions for their own students without interferences from the outside, but at the same time it also means that teachers might not be able to get systematic feedback and gain information from their colleagues, combat uncertainty in teaching or seek professional growth collaboratively (Fullan & Hargreaves, 1996; Little, 1990). Although it is not a panacea, teacher collaboration is viewed as a way to solve those problems. During the past three decades, along with the increasing importance of collaboration in society, there is growing effort towards teacher collaboration in the field of education, for example, between special education teachers and classroom teachers (Pratt, Imbody, Wolf, &

Patterson, 2017), between English-as-a-second-language (ESL) teachers, and classroom teachers (Arkoudis, 1994; Creese, 2005; Dove & Honigsfeld, 2010), between teachers of different subject matters (Grossman, Wineburg, & Woolworth, 2001; Horn, 2010; Little, 2002, 2003), and between the language partner teachers in DLE schools (Ballinger, 2012; Gunning et al., 2016; Lyster et al., 2009; Palmer et al., 2016). Teacher collaborations in different contexts are of different meanings and forms, for different purposes and guided by different theoretical frameworks (Kelchtermans, 2006; Vangrieken, Dochy, Raes, & Kyndt, 2015).

When I started the research project, although I had access to various frameworks and studies on teacher collaboration as mentioned above, I kept an open mind and did not initially impose a specific theoretical framework to understand the nature of the participant teachers' collaboration. As the observations continued, I gradually got to know the teachers' motivation and process of curriculum bridging, and the framework of CoP provided me with a social lens to make sense of what was happening in the teachers' collaborative approach to curriculum bridging.

The term CoP was first introduced by Lave and Wenger (1991) in their sociological work that reconceptualizes learning as a process of legitimate peripheral participation in CoP rather than solely an individualistic cognitive process, which emphasizes that there is a dynamic interaction between people and their environment in the learning process. As Wenger (1998) notes, the concepts of legitimate peripheral participation and situated learning were the foci of their work in 1991, while the concept of CoP was not elaborated. Wenger (2011) specifically defines CoP as “groups of people who share a concern or a passion for something they do and learn how to do it better as

they interact regularly” (p. 1). Not all communities constitute CoP. CoP require three crucial characteristics: 1) mutual engagement, 2) a joint enterprise, and 3) a shared repertoire (Wenger, 1998). According to Wenger (1998), people who are simply in the same profession or share similar interest do not form CoP, while the key is that members of CoP regularly interact with and learn from each other. They engage in joint practice in their community by for example, sharing information, providing assistance, holding discussions, and constantly refining each other’s understanding of what their community is about. What is to be noted here is the mutuality in their engagement, which means that CoP involve the competence of all the members to form a mutual relationship that enables members to interact productively, help each other and contribute to the community (Wenger, 2002). However, it does not mean that relationships in CoP are always happy and harmonious. There may be tensions and conflicts in their day-to-day interactions. In this dissertation I use the concept of mutual engagement to inform my analysis of the curriculum bridging practice they engage in as well as the dynamic relationships of the members.

Joint enterprise refers to the enterprise of CoP that responds to their situation and create mutual accountability (Wenger, 1998, 2000). The sense of “joint” does not lie in the agreement among everybody with everything, but the collective process of negotiations that enable people in CoP to engage in their enterprise together, and non-conformity and disagreement could be a momentum for the development of their enterprise (Wenger, 1998). Constructed as a social theory, CoP are shaped by a larger historical, social, cultural, and institutional context that provides both resources and constraints; however, members of CoP have their own ways to respond to their conditions,

which constitute their enterprise and thus “belongs to them in a profound sense, in spite of all the forces and influences that are beyond their control” (Wenger, 1998, p. 77). Further, negotiating a joint enterprise creates mutual accountability among members in the sense that through constant negotiation and daily practice in their community, they get to know for example, what to do and not to do, what matters and what does not, what is good already and what needs to be improved, and thus act accountably to each other as well as to the enterprise. This construct of joint enterprise is adopted in this study to explore how teachers negotiated their collective responses to the language-separation plus content-separation approach and the challenges they faced in their Chinese-English DLE program. It also guides the analysis of how their joint enterprise kept each other accountable in their curriculum planning and implementation process.

The third characteristic Wenger (1998) proposed is the shared repertoire that is created in the joint enterprise, including routines, words, tools, actions and concepts, to name just a few. These resources are generated from the past practice in their communities, and at the same time can be employed in their future. Wenger (2002) emphasized that there is a degree of self-awareness in the community about how the repertoire is developed and its effects on their practice.

The concepts, language, and tools of a community of practice embody its history and its perspective on the world. Being reflective on its repertoire enable a community to understand its own state of development from multiple perspective, reconsider assumptions and patterns, uncover hidden possibilities, and use this self-awareness to move forward (Wenger, 2002, p. 164).

In this study the concept of shared repertoire guides the analysis of the participant teachers’ own construct of the concept of curriculum bridging and the ways of achieving it. Moreover, attention will also be paid to how teachers created and made use of the

resources in their CoP as well as teachers' efforts (or lack of efforts) to reflect on and improve the curriculum bridging practice.

In addition to the social perspective and analytical power that the conceptualization of CoP provides, another reason why the present study adopts it as one of the theoretical frameworks is that CoP is a neutral concept, which does not claim that participating in professional communities promises improvement in teachers' knowledge building, instructional practice or educational reform (Hargreaves, 1994; Little, 2002, 2003; Grossman et al., 2001; Supovitz, 2002). As Wenger (1998) cautioned repeatedly:

Claiming that communities of practice are a crucial locus of learning is not to imply that the process is intrinsically benevolent. In this regard, it is worth repeating that communities of practice should not be romanticized; they can reproduce counter-productive patterns, injustices, prejudices, racism, sexism, and abuses of all kinds. In fact, I would argue they are the very locus of such reproduction. (p. 132)

Although with various potential benefits, teacher collaboration may cause balkanized working environment (Hargreaves, 1994), intrude teachers' autonomy and cause conflicts and tensions among participants (Johnson, 2003; Vangrieken et al., 2015), or not work as productively as anticipated (Hindin, Morocco, Mott, & Aguilar, 2007). As Little (2002) maintains, it is important for researchers to investigate the actual interactions among teachers and how these interactions "open up or close down" possibilities of practice. In this sense, the framework of CoP has broadened my lens to explore teachers' construction of curriculum bridging in the context of DLE and to discuss both its promises and pitfalls as well as both its benefits and challenges in the process.

3.3 Interdisciplinary Design

The framework of CoP is dedicated to the analysis of the meaning and process of curriculum bridging, while principles on interdisciplinary education are adopted to gauge

teachers' decisions on what to bridge and how to bridge. Since the participant teachers' collaborative endeavor involves multiple disciplines, for example, Chinese language arts (CLA), English language arts (ELA), science and social studies, and aims to make connections between what is being taught across the Chinese and English instructional time, their curriculum bridging process implies the approach of interdisciplinary design and instruction. In this dissertation, I adopt a broad definition of "interdisciplinary" that refers to the curriculum design that combines two or more disciplines (Adler & Flihan, 1997) and aims to make connections across disciplines or to real life (Drake & Burns, 2004).

Acknowledging and highlighting the variations of interdisciplinary curriculum design, scholars construct interdisciplinarity on a continuum (Adler & Flihan, 1997; Drake & Burns, 2004; Fogarty, 2009; Jacobs, 1989a) that ranges from "bridge-building" to "restructuring" (Klein, 2006). According to Adler and Flihan (1997), the degree of interdisciplinarity depends on how disciplinary knowledge is represented in teachers' curriculum planning and instructional practice. In the interdisciplinary continuum,

Knowledge moves from being correlated (stage one) to being shared (stage two) to being reconstructed (stage three) along a continuum in which the disciplines move from being distinct and separate, to being combined with boundaries preserved, to being blended until disciplinary distinctions are no longer evident (Adler & Flihan, 1997, p. 5).

At one end of the continuum, fields of knowledge is represented as correlated, and teachers focus on one common topic in different subject areas at the same time without explicit integration being planned, and it depends on the learners to identify potential connections across different subject areas (Adler & Flihan, 1997). This correlated knowledge approach is termed as *multidisciplinary* in other theoretical constructions of interdisciplinary education to demonstrate its feature that it juxtaposes information from

multiple disciplines, but each discipline remains separate and intact and proceeds without real interaction with other disciplines (Beane, 1997; Drake & Burns, 2004; Jacobs, 1989a). One basic model of the multidisciplinary approach is the *sequenced* model in which teachers of different disciplines sequence their units of study to instruct correlated topics simultaneously (Fogarty, 2009). For example, an ELA teacher presents works of Shakespeare while the history teacher teaches the period of Renaissance. In the relatively more integrative *webbed* model, teachers identify a common theme and then web it to each subject area (Fogarty, 2009); however, at this point of the interdisciplinary continuum, dealing with the fields of knowledge is still the primary goal, while understanding the common theme from an integrated perspective is peripheral (Adler & Flihan, 1997). Towards the middle of the continuum, shared knowledge including overlapping concepts and emergent ideas across disciplines becomes an organizing center and each discipline is mutually supportive to one another to address the overlapping concepts and skills (Adler & Flihan, 1997; Fogarty, 2009). Also termed as the *interdisciplinary approach* (Drake & Burns, 2004; Klein, 2006), the shared-knowledge approach makes the connections and relationship between disciplines explicit, although the boundary between different subject areas is preserved. At the other end of the continuum, fields of knowledge is restructured and the disciplinary boundaries are eliminated (Adler & Flihan, 1997). Both the starting point and the end goal of this kind of *transdisciplinary approach* (Jacobs, 1989a; Drake & Burns, 2004) or in other terms *curriculum integration* (Beane, 1997) is a problem, an issue or a concept that is related to students' life rather than the scope and sequence within a subject area, and learning is

actively constructed by drawing on knowledge from diverse areas and moving beyond the learning in each of the subject areas.

Interdisciplinary learning has an intrinsic appeal to researchers and teachers, considering that students can understand an inquiry from multiple perspectives, make connections across disciplines and synthesize information to solve real-life problems (Beane, 1997; Bransford et al., 2000; Drake & Burns, 2004; Fogarty, 2009). Each approach along the interdisciplinary continuum aims to provide students with a broad-field view of knowledge, but it could be challenging for teachers to carry out the interdisciplinary curriculum design and engage students in meaningful conversations in various domains of knowledge. According to Jacobs (1989a), there are two salient problems that may occur in interdisciplinary education. One is the potpourri problem that the instructional content becomes a sampling of a bit of knowledge from each discipline without a coherent view of the topic. The second is the polarity problem that teachers see interdisciplinarity and disciplines as in an either/or relationship. Teachers may either feel that the integrity and the territories of their disciplines are threatened or concern that discipline-based concepts are not foregrounded. Without a thorough understanding and design of the interdisciplinary curriculum, it is possible that the knowledge flow is interrupted for the sake of integrating the curricula (Applebee, Burroughs, & Cruz, 2000), or that the major content gets muddled for the reason that interdisciplinarity is sought as an end (Alleman & Brophy, 1997).

Concerning these problems, Ackerman (1989) proposed both intellectual and practical criteria for successful interdisciplinary curriculum integration. The intellectual criteria include the consideration of 1) validity within the disciplines: if the conceptual

hub or central theme of the interdisciplinary design is significant to all the disciplines involved, 2) validity for the disciplines: if students will learn a concept or theme better through interdisciplinarity than learn it separately, 3) validity beyond the disciplines: aside from allowing students to grasp interdisciplinary concepts, if the interdisciplinary design can provide students with metaconceptual perspectives that transcend the understanding of each part, and 4) contribution to broader outcomes: if the interdisciplinary design helps shape students' ways of thinking, acquiring knowledge, taking up well-rounded perspectives and being a person as a whole. The practical criteria include the considerations of time, budget and schedule, as well as the institutional environment and teachers' willingness. Ackerman's (1989) intellectual criteria focus on the general perspective of an interdisciplinary design, that is, whether students' learning within, for and beyond the disciplines is facilitated. Fogarty (2009) proposed five specific characteristics to examine the quality of an interdisciplinary curriculum, including relevance, richness, relatedness, rigor and recursion. Relevance examines if the learning opportunities created are relevant to students' real-life experiences and thus more meaningful to the students. Richness focuses on whether the lessons are multilayered, robust, and addressing multiple skills. The third characteristic is relatedness that refers to the cohesiveness of the unit and whether the subject matters are related in "genuine and interwoven ways" (Fogarty, 2009, p. 119). Rigor is about the complexity in the unit of study and whether higher-order thinking is involved in teaching and learning. The last characteristic is recursion, which is about the frequency of the central theme recurring in the subject matters and real-life situations.

In this study, the theoretical construction of the interdisciplinary continuum (Adler & Flihan, 1997), Ackerman's (1989) and Fogarty's (2009) criteria for good interdisciplinary design are adopted to analyze teachers' curriculum bridging approach and acknowledge that despite the potential benefits, there are challenges and pitfalls involved in the process, which at the same time also presents opportunities for improvement. Moreover, specific step-by-step guidelines for designing interdisciplinary curriculum were not adopted in this paper (e.g. Drake & Burns, 2004; Jacobs, 1989b) in order not to constrain the description and analysis of teachers' bottom-up approach to integrate students' learning

3.4 Summary

In this chapter, I present the theoretical frameworks that inform the analytical approach to the three research questions. I first provide a brief description of two important constructs from the sociocultural theory that locates the present study in the social realm to understand how both the partner teachers and students learn in the bottom-up curriculum bridging process. Then the social theory of CoP was discussed, which guides the analysis of how participant teachers engage in their curriculum bridging process, what it is like, and what results from their collaborative curriculum planning. Following that, the interdisciplinary continuum and the criteria for successful interdisciplinary design were introduced to guide my analysis of the curriculum bridging model constructed by the teachers and gauge their decisions on what to bridge.

Chapter 4 Research Methods

Consistent with the nature of the research questions that focus on the ways in which the teachers and students socially construct the curriculum bridging process, this study employs ethnographic methods to get an intimate and covert understanding of the participants' perspectives (Walford, 2005). I was in the research context for about 16 months to explore “what is going on” in the research context, and a “frame clash” occurred when I found that the teachers were coping with the language and content separation approach in their own ways, which provided anchors for the current study that aims to provide a detailed account of what curriculum bridging means and how it is achieved from an insider's perspective (Green, Skukauskaite, & Baker, 2012). In order to answer the research questions, multiple sets of data were collected via fieldwork including participant observation, doing interviews and collecting historic records of the school for triangulation (Heath, 1982). The processes of data collection and data analysis were dynamically interactive (Green, Dixon, & Zaharlick, 2005). In this chapter, I will first describe in detail the research setting and participants. Then the discussion will focus on the data sources and the data analysis methods.

4.1 Research Setting

At the beginning of the 2017-2018 academic year, I contacted the principal, Ms. Brown, at New Generation Elementary School (NGES) for potential research opportunities to investigate how teachers select, plan and implement their curricula. At that time, the research questions were not quite clear yet, and my aim was to seek an opportunity to observe what is happening in an actual Chinese-English dual language classroom, or in other words, what teachers' practices are like both in classroom and

during preparation time. Ms. Brown set up an interview with me to ask about my background, my research interests and the research methods I would use. I explained that my role would mainly be a participant observer and would not interfere with teachers' curriculum planning or implementation. As Ms. Brown strongly believed in the benefits of teacher-researcher collaboration, she granted me permission to conduct research at NGES. Yet, she hoped that my presence in her school could be a mutual learning opportunity. For example, if the teachers encountered difficulties in understanding terms or principles in any policy document, I could help explain, and I agreed. After getting consent from the school district and teachers through an informational session, I visited the school once or twice a week (each time for a whole school day) from October 2017 until February 2019.

NGES is a one-way K-5 Chinese-English DLE school in the Midwest. It is a public charter school established by a group of parents who strongly believed in the effectiveness of dual language immersion. Choosing Chinese as the partner language was a deliberate decision. According to one of the founders, they read from research that learning Chinese could improve kids' mathematical thinking and brain development. Further, as China continues to be an emerging economic power, they saw potential job opportunities for local kids who could gain fluency in Chinese, a most widely spoken language in the world. Another reason was that they believed that it was best to learn the tones and Chinese characters at an early age, and if kids became interested in other languages, for example, Spanish, various in-school or after-school programs were available to them, but there were relatively few opportunities for kids to learn Chinese. These founders, through consultation with scholars in the field and observation of other

one-way and two-way Chinese-English DLE programs, decided to adopt the two-teacher, 50/50 immersion model. Half of students' day is instructed in English, and the other half is instructed in Chinese. There is an English teacher and a partner Chinese teacher who teach the same groups of students. The instructional time at NGES is further divided by subject. Currently there is one class in each grade from K-5. In order to allow the teachers to maintain a full-time employment status, unless required by teachers, each pair of the Chinese and English partner teachers teach two grades, which almost doubles their workload in curriculum planning, although they usually teach the same topics to two grades but at different levels of depth. In the grades 2 and 3 that the participant teachers teach, science, social studies, and CLA classes are assigned to be taught in Chinese, while mathematics and ELA classes are assigned to be taught in English.

Overall there are about 100 students at NGES. The majority of the students are white English dominant speakers, and the rest of them are from other ethnicities such as Asian American, Hispanic and African American. About 7% of the students participate in the free or reduced lunch program. In addition to the development of Chinese proficiency, students at NGES score at the top in all subjects in the school district based on the public statistics in the state. Considering that most NGES students are from upper-middle class families, which is an important factor affecting students' academic achievement, I compared the public data of NGES report cards with that of an English-only public school in the same district that has similar student composition in terms of socio-economic status and ethnicity but has higher teacher-student ratio, and the results showed that NGES scored higher in almost every subject across all grades. However, NGES also faces its own challenges. There was frequent teacher turnover at NGES, especially the

Chinese teachers. Since I have not met those teachers who worked at NGES before, I cannot assume the reasons why they decided to leave, but according to the current teachers, heavy workload and lack of institutional support could be the possible reasons. After Ms. Brown was designated as principal in 2016, the teaching staff were quite stable, which was also one of the reasons why I could do research with the same group of teachers for about one and a half years.

4.2 Participants

There are two major groups of participants in this study, teachers and students. I see myself as a participant, too, as a participant observer to document what is happening at NGES as well as a member of NGES to acquire an emic perspective to understanding teachers' practices (Anderson-Levit, 2006).

4.2.1 Teachers

When I started my research in 2017, there were no clear research questions yet. I just immersed myself in the research setting and got enculturated at NGES. At that time, the principal, Ms. Brown, and all but one teacher opened their classroom doors to me and granted me permission to interview them and observe their classes. As the research focus became clearer, which is on teachers' curriculum bridging practices, two classroom teachers (Grades 2/3, Mr. Liu and Ms. Wilson), one SE teacher (Ms. Jones) and one ELL teacher (Ms. Davis) became my focal teacher participants. Table 4.1 presents the backgrounds and teaching experiences of the teacher participants and the principal.

Table 4.1
Backgrounds of the Focal Teachers and the Principal

Teachers	Roles	Years of teaching experiences (at time of study)	Years at NGES (at time of study)	Languages spoken	Teacher credential
Ms. Liu	Grade 2/3 Chinese teacher	1 year as a classroom teacher	1 year	Chinese & English	No
Ms. Wilson	Grade 2/3 English teacher	1 year as a classroom teacher; 3.5 years as a SE assistant	0	English	Yes
Ms. Jones	Special Ed teacher	13 years as a SE teacher	3 years	English	Yes
Ms. Davis	ELL teacher	14 years as a bilingual teacher; 3 years as an ELL teacher	3 years	English, Spanish, Russian & Turkman	Yes
Ms. Brown	Principal	About 21 years as a classroom teacher	1 year	English	Yes

Ms. Liu. The Chinese teacher, Ms. Liu, is a native Chinese speaker from China and a Chinese-English bilingual. Based on my observation, her conversational English is good, but she sometimes encounters difficulties in discussing academic terms or concepts during the meetings with the partner teachers. She got her teacher certificate in math and did student teaching in China before she came to the United States for graduate studies. She obtained a master’s degree in Curriculum Studies at a University in the Midwest in 2016 and joined NGES immediately after her graduation. She chose NGES because she saw it as an opportunity, but she did not have a good knowledge or a strong belief in the DLE model. Without formal teacher training in the United States, she was enrolled in a

teacher education program at a local university after she was hired and has been taking classes to get her teacher credential.

Ms. Liu has been struggling with multiple challenges from the first day of teaching and keeps seeking help and learning opportunities from whoever is more experienced and willing to help, no matter they are English teachers or Chinese teachers, no matter they are her colleagues or work in other schools. At first, due to the lack of K-12 educational experiences and teacher training, Ms. Liu experienced a lot of difficulties in managing her students and setting up routines for her day, so she went to observe classes of other teachers at NGES and her neighbor school. She also asked more experienced teachers like Ms. Jones and Ms. Davis to share and demonstrate teaching strategies in her class. During her spring and summer breaks, she went to observe classes of a DLE school in another state and attended training sessions provided by Center for Advanced Research on Language Acquisition (CARLA). Both Ms. Jones and Ms. Davis told me that Ms. Liu was eager to learn and open-minded to suggestions, and they thought Ms. Liu had a lot of growth in teaching in her second and third year at NGES. Aside from these difficulties, like many other Chinese teachers working in DLE programs, Ms. Liu had to deal with such challenges as working with insufficient teaching materials in Chinese and balancing students' advanced cognitive ability and slow development of the Chinese language proficiency (Fortune, 2012).

Ms. Wilson. Ms. Wilson is Ms. Liu's English teaching partner. She is a white monolingual English speaker. She is a credentialed teacher, and prior to teaching at NGES in Fall 2017, she worked as a third-grade classroom teacher for one year and as a SE assistant for three and a half years before that. Based on my interviews with her, she

chose to work as NGES for two important reasons. One was that she did student teaching with Ms. Brown before and believed that Ms. Brown had great leadership and the ability to make things “unique and amazing.” The second reason was that the mission of DLE matches her beliefs as a professional educator as she indicated in the interviews.

I find the experience and sort of the human that is created by being a dual language learner and being exposed to two cultures at such a young age so vital to a healthier society. I think that the more kids that see unique ways of teaching and not only unique ways of teaching, but also unique ways of learning and people who are different than they are as their educators. The better they are able to interact with the global world; they have a more well-rounded perspective... I think it is really important for kids, especially now to see all the types of people that are educators, and all the different ways that education happens, so that was a huge piece of what I was interested in the school.

Ms. Wilson is a very energetic teacher and constantly communicates with her friends who teach in the Spanish-English two-way immersion school in the same school district to learn about bilingual teaching practices, although she does not have the official responsibility to teach bilingually at her school.

Ms. Jones. Ms. Jones is a white monolingual English speaker, and she is the only SE teacher at NGES, who is assisted by a Chinese-English bilingual SE assistant. She has rich experiences in multiple professions. She got interested in SE about thirteen years ago after getting to know some struggling kids. After she got certified, she worked in a high school for about ten years and then has been working at NGES for three years. Her major responsibility is to help students of different special needs to get accustomed to the school environment and progress with their academic work. She pulls out students of special needs for a certain period of time each day, but she collaborates intensively with all the classroom teachers so that she can provide services that are aligned with the curricula designed by the teachers.

Ms. Jones does not have a good knowledge of the immersion educational model but is very interested in learning more about it. She thinks that the school and the school district should provide professional development opportunities for teachers to get to know what Chinese immersion is, what the models are and how other Chinese-English DLE programs function.

Ms. Davis. Ms. Davis is the only ELL teacher at NGES, so like Ms. Jones with SE students, she works with ELL students across all grades. She speaks four languages: English, Russian, Spanish, and Turkman. Ms. Davis is the most experienced teacher among the four focal teachers in terms of working in bilingual education contexts. She had the experiences of teaching at Spanish-English bilingual schools for 14 years. About three years ago, Ms. Davis came to work as an ELL teacher at NGES. Despite the rich teaching experiences, Ms. Davis continues to expand her knowledge by taking the professional development opportunities offered by the school district to learn more strategies that help students of lower language proficiencies with their linguistic and academic development, for example, the Sheltered Instruction Observation Protocol (SIOP) and the Guided Language Acquisition Design (GLAD). Ms. Davis seldom pulls students out unless necessary; instead, she goes to their classrooms to help ELL students, guiding their language learning without disrupting their regular classroom activities.

Ms. Brown. Ms. Brown is the principal at NGES. She had about 21 years of teaching experience as an elementary classroom teacher, as she pursued her administrative certificate. The position of principal for NGES opened up a year before the start of the study. Because NGES is in the same school district that she loves and has been working for her entire career, she applied for the position. Ms. Brown did not have

the experience of working at bilingual or immersion schools before she came to NGES. In order to better support the school focus on bilingualism, Ms. Brown took various professional development opportunities to learn more about immersion education and get to know more professionals in the field. After she became the principal, she initiated several changes to the school, including adopting a new Chinese reading curriculum, standardizing the school report card across all grades, and suggesting teachers employ the ACTFL Proficiency Guidelines (ACTFL, 2012) to make their teaching more accountable. She is also very supportive to the curriculum bridging process initiated and implemented by the four focal teachers. She mentioned to me and in the staff meetings several times that she hoped that teachers in other grades would engage in this process so that students' day could be in a "seamless flow" rather than segmented by the two languages.

4.2.2 Students

By February 2019 I have been in Ms. Liu's and Ms. Wilson's classrooms and in contact with a same group of students for about five quarters. These students were in the second grade from September 2017 to June 2018 and in the third grade since September 2018. I officially started to recruit student participants in September 2018 by sending consent forms to their parents or guardians. Among the 15 students, I got 11 consent forms back from parents who gave consent for their child being observed and audio recorded in class. After that I had a one-on-one meeting with each of these 11 students and explained the research aims and process to them, and nine of them agreed to participate and signed the consent forms. Therefore, there are nine student participants in this study, and I did not select focal students. The background information of these nine students is listed in the following table.

Table 4.2
Information about Student Participants

Student (pseudonym)	Available ethnoracial information and home language	Background information
Bella	White, English	Bella is one of the high achieving students in terms of both language and academic development. She likes studying Chinese and practices at home. Her family speak English at home but would watch Chinese cartoons with her and listen to her reading Chinese books. She is an active participant in classroom activities.
Cathy	White, English	Cathy is another high achieving students in all subjects. She has her own way of studying Chinese, for example, she likes challenging herself by reading stories that are a little beyond her current level and would copy all the new characters she encounters while reading and keep practicing until she reads the stories fluently without any bumpy moments. Cathy is also an active participant in classroom activities.
Dina	White, English	Dina is a high achieving student in all subjects except math, which she is fairly good at, too. Dina and Cathy are very close friends and likes working together. Influenced by Cathy, Dina is using Cathy's way to practice reading. Dina likes participating in classroom activities both in English and Chinese.
Frank	White, English	Frank is not in the high achieving group, but he is doing each subject fairly well. Frank struggled with learning Chinese when he was enrolled in NGES, but quickly followed up with more practice in vocabulary and reading. Frank is an active participant in English classes and speaks when being called upon in Chinese classes.
Lucas	White, English	Lucas is in the same differentiation group with Frank in most subjects. Lucas is very energetic and an active participant in all subjects.

Molly	White, English	Molly does not like reading and is struggling with reading in both English and Chinese. While reading in Chinese, she usually needs extra support. She is not quite focused in Chinese classes.
Owen	White, English	Owen is in the same differentiation group with Frank and Lucas. According to Ms. Liu, Owen's pronunciation of Chinese is one of the best in class, but he is easily distracted by other classmates.
Peter	Latino, Spanish (ELL)	Peter is learning three languages simultaneously, Spanish, English and Chinese. Peter is good at math but is a little struggling with both English and Chinese language arts. He seldom speaks in Chinese classes unless being called upon by Ms. Liu.
Tamie	Chinese, English	Tamie's progress in Chinese is slow compared with other students. She is a little sensitive and does not like challenges. In class even when she wants to express opinions, she sometimes chooses to whisper to Ms. Liu rather than speaks to everybody.

According to Ms. Liu, by the end of second grade most of these students are at the levels of novice mid or novice high in listening and speaking, and novice mid in reading, which means that the text levels that students can understand or produce are phrases and discrete sentences on practiced or familiar topics (ACTFL, 2012). This is also the reason why Ms. Liu struggles with teaching subject matters such as science and social studies with the required academic rigor in a language that students are not quite proficient in.

4.2.3 The Role of the Researcher

My original plan was to remain a passive observer and not to make any changes to the research context (Spradley, 1980). However, Ms. Brown's concept of mutual

learning and mutual cooperation between teachers and researchers did make sense to me, so I did contribute my part when Ms. Brown or the teachers needed, but I tried to minimize my influence on the context. When I contacted Ms. Brown, she was in the process of revising the report card to 1) make the format consistent across all grades, and 2) make it aligned with the ACTFL standards. She asked if I could give some suggestions to the report card she was working on, and I agreed. I did not change the original format designed by her but made the continuum of the ACTFL proficiency levels more visible in the report card, as well as revised some inaccurate or vague expressions that did not reflect the characteristics of the Chinese language, for example, deleting the use of cognates and making distinctions between words and characters. Later, I also participated in their meetings focusing on the explication of report cards according to the ACTFL standards. Since none of the teachers were familiar with the ACTFL standards, upon request by Ms. Brown, I explained the structure of ACTFL proficiency levels, the differences between proficiency and performance and how different linguistic features, text types, and contexts are aligned with varying levels of proficiency. Since it was only a brief informational session, I did not think teachers had a solid understanding of the ACTFL standards and how to use it in their curriculum planning and assessment. In recognition of the need of systemic training, all the Chinese teachers are going to attend the summer institute organized by ACTFL in Summer 2019. From Fall 2017 to Spring 2019, whenever the teachers had questions about the terms in the report cards or had disagreements on what levels they should place specific students according to their assessment scores, they would contact me, and I would participate in their discussion.

Another influence I brought into the context came from the questions I asked the teachers during the interviews, after class or after their meetings to clarify my understanding of their curriculum planning and instructional practices. For example, after a period of time of observing Ms. Liu's class, I found that there was no explicit teaching on the features of phonetic-semantic compounds, which take up about 80% to 90% of all Chinese characters (Li, 2014), so I asked her why. She said that she did not know that phonetic-semantic compounds accounted for such a big proportion of the Chinese characters. Also, because of the unreliability of the phonetic radical to predict the correct pronunciation, she chose not to discuss the features in class. However, because of this conversation, Ms. Liu realized that she might have missed important teaching points, so she came to where I lived and asked me if I could systematically explain the linguistic knowledge about the phonetic-semantic compounds to her, and I did. After that, she sometimes made use of the linguistic feature in class and also allocated 40 minutes a week for a Chinese teacher sent from the Confucius Institute Headquarters (Hanban), China, to do metalinguistic teaching on radicals.

In class, my interactions with students were limited, although they were all accustomed to my presence in class and addressed me as 王老师 (Ms. Wang). When they needed my help with their shoelaces, pronouncing or writing Chinese characters, they would come to me, and I would help. Sometimes I also read with Molly who needed support with reading when Ms. Liu was busy with other students. On special occasions, for example, during the Spring Festival, upon Ms. Liu's request, I demonstrated how to do calligraphy in class. Otherwise, I just sat at my designated spot and limited my movement in order to minimize the distractions.

In summary, I would describe my role in this research as a participant-as-observer (Gold, 1958). Although I tried to limit my influence on the research context, I became involved in their revision of students' report cards, attended their staff meetings, had lunch together with the teachers in the teachers' lounge, and developed friendship with the teachers and most of them regarded me as one of the NGES members. Therefore, I have to acknowledge my "active participation" in the research process (Spradley, 1980). This role as a participant-as-observer allowed me to get into the participants' lived worlds and acquire an emic perspective; however, I have to admit that it also engendered challenges for me to be detached from participants and view the data objectively (Gold, 1958). In order to counter this challenge, I tried to write my field notes as detailed as possible (Anderson-Levitt, 2006) and used audio-recordings as an anchor to do the analysis.

4.3 Initiation of Curriculum Bridging

Curriculum bridging is a bottom-up approach taken by the teachers without any prompting by the school administrators as they recognized the need to build connections in topics that students were learning in both classrooms regardless of their instructional language boundaries. It was initiated first by Ms. Wilson after she heard from her friends who worked at a Spanish-English two-way immersion school that they were using a Biliteracy Unit Framework (Beeman & Urow, 2013) that integrates the "Bridge" in biliteracy instruction, which refers to the instructional moment when Spanish and English are put side by side to allow students to compare and contrast the two languages to raise students' metalinguistic awareness. At the same time, since the language points being compared are derived from content areas, this process allows students to transfer the

academic content from one language to the other and thus reinforce the academic learning in both languages (Beeman & Urow, 2013). Although Ms. Wilson did not read the original book by Beeman and Urow (2013), she immediately got interested in this approach and “bridging” became the central idea for her to collaborate with other teachers. She shared the information with Ms. Davis who went to introduce herself to Ms. Wilson when the latter was hired in the summer of 2017. Ms. Davis suggested thematic teaching to Ms. Wilson, which could offer a conceptual hub for the bridging of curricula between the Chinese and English instructions. To achieve this process, the Chinese teacher Ms. Liu would be a key player, without whom no connections could be made across the two sides of the classroom. Ms. Liu took it as a great learning opportunity and decided to join. Ms. Jones who had always believed in the importance of connections in students’ learning was also drawn to the idea. In September 2017, the four teachers started to meet and collaboratively discuss Ms. Liu’s and Ms. Wilson’s lesson plans. The co-planning meeting happened every Monday. Sometimes Ms. Jones and Ms. Davis were absent due to schedule conflicts.

A few weeks after the focal teachers started their collaborative lesson planning, Ms. Brown invited two Spanish immersion teachers who had the experiences of using the Biliteracy Unit Framework to introduce how to implement it in their Spanish-English two-way immersion program. During the session, the teachers realized that the Biliteracy Unit Framework focused more on the metalinguistic transfer between Spanish and English, which does not work the same way between Chinese and English that are not cognate with each other. Therefore, they decided to experiment with new ways of curriculum bridging that could work for their Chinese-English DLE program.

In their collaboration, Ms. Wilson invested most in the enterprise, as she initiated ideas, took notes for the whole group, and organized the meetings and all the materials used for co-planning, which played a significant role in keeping the group cohesive and driving it forward. Both Ms. Jones and Ms. Davis were experienced teachers and were enthusiastic about the collaborative opportunities. According to Ms. Davis, they liked sharing ideas and teaching experiences with Ms. Wilson and Ms. Liu. With regard to Ms. Liu, a novice teacher in the group, she was more like a learner, who gradually grew in the process.

I did not realize that these teachers were trying to implement curriculum bridging until my first interview with Ms. Wilson in late October 2017. It took me some time to get to know the school culture and what was happening in my research site, so not until April 2018 did I start to officially audio record the curriculum bridging meetings after I received an active consent from Ms. Brown and all the four participant teachers, although I had attended a few meetings before that. My research focus also became fixed on the current topic and I started to revise my research protocol, get consent from the school district, teachers, parents and students and then added the procedure of audio recording teacher-student interactions in the data collection starting from Fall 2018 to further explore how curriculum bridging influences students' learning in class.

4.4 A Typical Day

Ms. Wilson's half day consisted of two major parts, about 90 minutes of mathematics and 60 minutes of English literacy. According to Ms. Wilson, math remained an isolated and intact subject, and thus no curriculum bridging happened in math. Ms. Wilson found more flexibility in her English literacy time, and she could

integrate readings on topics of science or social studies into her read-aloud time, which made bridging between the two instructional spaces possible. Ms. Wilson adopted literacy blocks of “read to self,” “listen to reading,” “instruct reading strategies in small groups,” and “work on writing.” She used the Common Core State Standards (CCSS) to guide her curriculum planning and implementation. In between the ELA and math time, Ms. Wilson usually allocated about 10 minutes for students to play games to allow students to take a brain break, engage in teamwork, and practice how to follow rules.

Ms. Liu used a similar approach of literacy blocks but modified it to fit the characteristics of learning Chinese. Taking Grade 3 as an example, the Chinese literacy time was divided into “read to self,” “listen to reading,” “shared writing,” “Chinese character writing or typing.” Each week students had one science or social studies lesson, which lasted for 30 to 45 minutes, but vocabulary and sentence structures that were derived from the science or social studies topics were integrated into the Chinese literacy blocks, such as “listen to reading” and “shared writing.” On those days when there were no science or social studies classes, students did stations such as “word work,” and “write the classroom” (copy any characters they see in the classroom).

In terms of CLA, although Ms. Liu was aware of the importance of the ACTFL standards, without formal training she did not know how to use the standards systematically. With regard to science and social studies, she used the state standards in these two subjects to guide her teaching. According to Ms. Liu, there were very good science curricula available at her school, but they were in English, so she could

not use them directly in class. As for social studies, there was no set curriculum. Therefore, for both science and social studies classes, she had to translate or design her own teaching materials.

4.5 Data Collection

The data collection process lasted for about 5 quarters from October 2017 to February 2019. By the fifth quarter, data saturation had become evident (Baker, 2006). After following the teachers for about 16 months, data on ways of their collaboration, benefits and challenges involved in the collaborative process and how curriculum bridging was or was not achieved had been collected, meaning that the key research questions can be answered. During the five quarters, I collected different types of data in different periods of time (see Table 4.3) because of the evolving and recursive design of the research plan (Green, Dixon, & Zaharlick, 2005), which will be explicated in the following sections.

Table 4.3
Summary of Data Collection

Major data sets	Time	Data collected
Interviews	Fall 2017 to Winter 2019	Interviews with the 4 focal teachers and the Principal
Teacher-student interactions	Fall 2018 to Winter 2019	Audio-recordings (about 100 hours) and field notes of teacher-student interactions
Curriculum bridging meetings	Spring 2018 to Winter 2019	Audio-recordings (about 16 hours covering 6 units) and field notes of curriculum bridging meetings

4.5.1 Interviews

From October 2017 to February 2019, I conducted three semi-structured interviews with Ms. Liu and Ms. Wilson and one with Ms. Davis and Ms. Jones (divided

over three times because of her schedule) on their background, their understanding of and beliefs in DLE and their motivation of initiating or joining the endeavor of curriculum bridging. The interviews with Ms. Liu were conducted in Chinese, while interviews with other teachers were in English. Each interview lasted for one to one and a half hours. Another data source was the recordings of Ms. Liu and Ms. Wilson's reflections on implementing their planned curricula after certain units, which often occurred spontaneously after class.

Before interviewing each teacher, I prepared an interview guide that included basic questions about their professional experiences and their opinions on DLE (Patton, 2002; Werner & Schoepfle, 1987). The interview guide enabled me to keep the conversation in focus, but during the interview, I remained flexible by adjusting the phrasing and order of the questions and also allowing the follow-up questions to emerge as the interview unfolded (Brenner, 2006). Following ethnographic interview principles, I also paid special attention to the teachers' own angle and vocabulary that were employed to describe their experiences, beliefs and practices to catch what mattered to them from an emic perspective and make further inquiries (Murphy, 1980; Spradley, 1979). The concept of curriculum bridging was one of these instances that became visible to me as a researcher during the interview.

4.5.2 Teacher-Student Interactions

There are two stages of classroom observation in Ms. Liu's and Ms. Wilson's classrooms. From Fall 2017 to Spring 2018, I observed Ms. Liu's and Ms. Wilson's classes once a week, and audio recorded the teacher discourse. During that period of time, I immersed myself in the research context and spent time with Ms. Liu and Ms. Wilson to

explore what is happening in their classrooms (Merriam, 2009), which recursively informed my research design (Green, Dixon, & Zaharlick, 2005). Starting from Fall 2018, after the recruitment of student participants, teacher-student interactions were audio-recorded, adding another data source for micro-ethnographic analysis that focuses on interactions (Bloome, Carter, Christian, Otto, & Shuart-Faris, 2005). Each time the observation and audio recording lasted for the whole day, half of the day in Ms. Liu's classroom covering the subjects of CLA, science or social studies and the other half of the day in Ms. Wilson's classroom covering ELA and mathematics, resulting in about 100 hours of recordings. I picked one school day per week to observe because Ms. Liu formally taught science or social studies once a week, and these two subjects provide themes and foci for their curriculum bridging.

Each time I did the classroom observation, I sat at a corner of Ms. Liu's or Ms. Wilson's classrooms. Unless being requested by the teachers or the students, I would sit at my spot and write fieldnotes. The fieldnotes mainly recorded the classroom activities in a temporal order and described contextualization cues in teacher-student interactions such as gestures and facial expressions (Bloome et al., 2005; Gumperz, 1992), but more importantly the fieldnotes were used to capture the indigenous meanings and concerns of the participants (Emmerson, Fretz, & Shaw, 1995), which later further guided the analysis. While I was in the classrooms, the teachers wore a fanny pack with an audio recorder in it to capture the teacher-student interactions. The fanny pack was small and usually covered by clothes, so it did not attract much attention from the students. Yet, two students did asked me what that fanny pack was for, and I explained that it was to capture the voices of some of them and the teachers, so that more people could know how their

teachers teach and how they learn Chinese and learn through Chinese. The audio recordings provide a richer representation of the verbal interactions between the teachers and students (Hammersley, 2010).

4.5.3 Curriculum Bridging Meetings

I also attended and audio recorded the four teachers' curriculum bridging meetings from Spring 2018 to Winter 2019. The meeting was held once a week and lasted for about one hour each time, totaling in about 16 hours of recordings that covered 6 units. There were three science units that focused on "Work of Water," "Animal Heredity and Adaptation," and "Force and Motion." The data also included three social studies units that covers the topics of "Citizenship," "Continents and Maps," and "Culture Diversity."

While attending the meetings, I mainly assumed a passive role as an observer (Spradley, 1980), and I did not initiate any intervention or join the discussion in their meetings unless they asked me questions, such as how to pronounce a Chinese character. However, as mentioned above, teachers may have sensed my positioning towards their curriculum design from the questions asked. For example, after I asked them about the balance between the cognitive load of learning in each classroom, they became more aware of this issue and constantly talked about if there was enough cognitive challenge in the Chinese instruction after the English teacher provided support for the content learning.

4.6 Data Analysis

In this study, data collection and data analysis are "interactive-reactive," in the sense that they are not in a linear process (Zaharlick & Green, 1991). Analysis of the

collected data informed the next step of data collection, while choosing what to collect was also a process of analysis itself. To address different research questions, I employed different data analysis methods, specifically transcription, coding and discourse analysis, which will be discussed in this section.

4.6.1 Transcription

Transcription is a process of turning audio or video records into written text, and that transcribers decide what to present and not to present as well as how to present, which is a theory, context and value laden process (Hammersley, 2010). Although there is not a single correct way to do transcription, as researchers we have to make transparent how the transcribing decisions are made (Skukauskaite, 2012). There are three sets of audio-recording in this study, which record the curriculum bridging meetings, teacher-student interactions in class and interviews with the participant teachers. All the transcription was done by me so that I could further familiarize myself with the situated interactions and participants' insights in these three contexts and take control of the transcription process (Tilley, 2003). The 16 hours' audio recordings of teachers' curriculum bridging meetings and the interviews were transcribed using Nvivo 12. The transcriptions of the meetings were construed in sentence format, in which tones, hesitation, repetition, run-on sentences and grammatical mistakes were transcribed in a way that was faithful to the original speech in the audio recordings. Although it cannot be assumed that this written format could represent the oral interactions, the adoption of this way of transcription was guided by the research questions that focus on the process of curriculum bridging and the reasons why teachers engaged in the collaborative process (Evers, 2011). In terms of the teacher-student interactions, telling cases (Green et al.,

2012) were also transcribed using Nvivo 12. Not only teachers' and students' utterances, but also the contextualization cues that were captured in the fieldnotes were included in the transcripts to capture the meaning-negotiation process (Bloome et al., 2005).

Although only selected episodes were presented in this dissertation, the detailed account of the situation allowed the researcher to use cases to shed light on broader issues in the DLE contexts (Heath, 1982).

4.6.2 Coding

The method of coding was employed mainly to analyze the transcripts of the curriculum bridging meetings. Both deductive and inductive codes were used in the coding process (Saldaña, 2013). Deductive codes were derived from the literature on teacher collaboration (Fullan & Hargreaves, 1996; Goddard, Goddard, & Tschannen-Moran, 2007; Vangrieken et al., 2015) and curriculum bridging in DLE (Beeman & Urown, 2013; Lyster et al., 2009; Lyster et al., 2013; Sánchez et al., 2018). The codes include such as "sharing materials," "sharing teaching strategies," "stating instructional plans," and the codebook is attached in the Appendix. The inductive codes were those emerged from the coding process, and in vivo expressions that reflected the emic perspective were used as codes (Saldaña, 2013), for example, "identifying the *bridge*." Figure 4.1 is one sample of the coding.

Ms. Davis: So you do have access.
 Ms. Wilson: So I was like I can
 Ms. Davis: I wasn't sure if everyone has access.
 Ms. Wilson: Yeah, I think everyone has access to that one. I think it's so free. I don't know. [Digression] So I just thought what I'll do is do an anticipation guide with them on the first day with some visual pictures. I found a Bill Nye video about erosion that's really good that I've used in the past. The kids love it, so I'm sure I'll show that like every single day and I found a flovocab video about it that talks about how land forms are created by natural processes and links into erosion. [Stating Instructional plan] And I'm going to just focus on building some vocab so maybe we can go over what vocab we want to make sure we've built working on a moving anchor chart between the two classrooms maybe trying to build and some TPR with that. [Identifying the bridge]

Ms. Davis: It's easy to use TPR because things like mountains and rivers. This is an easy one

Ms. Wilson: And then my other thought was just to expose them to slow erosion and fast erosion. So like a mudslide book. And just how like erosion can be really slow over time like the wind can be a cause of erosion and maybe touching on cause and effect relationship. So there's actually even though that's all going to be within one week we're going to do a lot. We're going to get some layers. [Stating Content goals]

Ms. Davis: And I was noticing in mystery science which was not using, but the vocabulary flow for water flowing and you just mentioned mudslide. So I'm used to doing that on and above a kindergarten, first grade level where we're talking about valleys and rivers and oceans and lakes. [Sharing teaching strategies-Ms. Davis to Ms. Wilson]

TE: Right. But

Figure 4.1. Sample coding

Considering the mutual-learning relationship in CoP (Wenger, 1998), I also labeled the subject and object when a specific instructional material or strategy was suggested to someone, for example, the last code in Figure 4.1 indicates that the teaching strategy was shared by Ms. Davis to help Ms. Wilson, which reflects the unique roles of each teacher in the curriculum-bridging community.

4.6.3 Discourse Analysis

Fieldnotes that were taken while I was observing the curriculum bridging meetings and classes served as a guide to locate the rich points in this study (Green et al., 2012), and these episodes were selected for transcription and analysis. Supplemented by the interview data and teachers' reflections, a discourse analysis (Gee & Green, 1998) was conducted to focus on the meaning-making processes and how teachers' and students'

use of language shaped the planning and implementation of their curricula. Each episode will be analyzed within the context of the ethnographic culture.

4.7 Summary

In this chapter, I discussed the ethnographic research design and introduced the research setting, including the process of gaining access and the background of the dual language school. Then the background information of teacher participants, student participants and the role of the researcher were described. Major data sources of this study included audio-recordings of teachers' curriculum bridging meetings for six units lasting for about two quarters, audio-recordings of teacher-student interactions in both the English and Chinese classrooms and multiple interviews with the four participant teachers. To analyze these sets of data, qualitative data analysis methods of coding and discourse analysis were used to address the research questions.

Chapter 5 Definition and Process of Curriculum Bridging

Guided by the theoretical framework of CoP (Wenger, 1998) discussed in Chapter 3 and the ethnographic research methods in Chapter 4, this chapter is dedicated to addressing the first research question, which is to provide a detailed account of what curriculum bridging means to the participant teachers and how the teachers plan and implement curriculum bridging. In other words, what is teachers' shared repertoire for curriculum bridging?

5.1 Curriculum Bridging: A Localized Response to the Chinese-English DLE

Context

As introduced in Chapter 4, my research site is a one-way Chinese-English DLE program serving mainly English-speaking children. It adopts the two-teacher 50/50 model, and each teacher takes charge of different subjects. Ms. Liu teaches CLA, science and social studies, and Ms. Wilson teaches ELA and math, while Ms. Jones and Ms. Davis serve special needs and ELL students. At NGES, teachers' responsibilities lie within their own classrooms and their own linguistic realms, and there is no requirement for collaboration between the teachers (Cammarata & Tedick, 2012; Fortune, 2012; Sánchez et al., 2018). The lack of professional development opportunities, insufficient materials, and the difficulty in enabling students to learn Chinese and learn through Chinese are prominent challenges at NGES, which are also common to other DLE programs in the U.S. (Palmer et al., 2016).

Engagement in the curriculum bridging CoP was the teachers' localized responses to this social, cultural and historic reality of their institution (Wenger, 1998). By localized

I mean that teachers responded to the local factors in a way that reflected their own ways of sensemaking (Palmer et al., 2016; Wenger, 1998). Based on my interviews and observation of the co-planning meetings, one prominent theme of the joint enterprise of curriculum bridging was “making connections” between the teachers, between languages and between subject matters, although different teachers emphasized diverse aspects of the connections.

5.1.1. A Localized Response to the Isolated Teaching Culture

According to Wenger (1998), in CoP, members share information, support each other and participate in joint activities and discussions, and the mutual engagement enables them to learn and grow. However, in many dual language schools, isolated teaching is the dominant culture as at NGES. As introduced by Ms. Jones and Ms. Davis who both have been working at NGES for three years, no collaboration had ever happened between the partner teachers at their school before the formation of the curriculum bridging community.

I think classroom teachers just by definition of being a classroom teacher, they are in THEIR classroom, with THEIR students, doing THEIR stuff working on THEIR goals and THEIR curriculum, so you know they are much more like this, just by definition of what they have to do. But I’m, you know... (Ms. Jones).

Although there has been increasing pressure pushing teachers towards collaboration in the educational field (Vangrieken et al., 2015), how the culture of each school is influenced is individualized and shaped by various factors (Grossman et al., 2001). Ms. Jones acknowledged in the interview that by definition there was nothing wrong about working alone, but coming from a SE background, she worked with students of special needs in each classroom and viewed collaboration with the classroom teachers as a significant component of her work. Therefore, she said, “But I’m, you know...” and

stopped there, implying her disagreement with the culture of isolated teaching. With an “outside overall view” of the contexts of all classrooms, she was even more surprised by the compartmentalized teaching in the two languages to the same group of students.

Well my very first year here so three years ago, so I hear Chinese immersion and I, you know, I read the information on the website ... OK, so 50 percent of their day is in English; 50 percent of their day is in Chinese, and I had assumed that there was something between the English and the Chinese part of the day. I had just assumed that there was some sort of overlap, you know, interlinking, shared, you know, collaborative SOMETHING, and I was really surprised and continued to be surprised... You know it's compartmentalized. It's not... there's... you know, there're not any tentacles that kind of go like this. And as a special education person that makes no sense to me because in special education, we are constantly looking for ways to help kids make connections. And so, I still don't quite get it (Ms. Jones).

Not coming from the bilingual education background, Ms. Jones did not have a solid knowledge of immersion education due to her lack of training on the immersion education models, and thus Ms. Jones was unfamiliar with the language separation approach. At first, she assumed that the two language partner teachers would collaborate in some way and bridge students’ learning. However, the reality was that there was no collaboration between the Chinese and English teachers who taught the same group of students, and no connections were made in terms of academic instruction on the two sides of the classroom. As Ms. Jones learnt about the immersion model little by little, she had more questions than answers, which added to her confusion, and she continued to question the effectiveness of siloed teaching in general. These were the reasons why when Ms. Wilson and Ms. Davis talked to her about the collaborative curriculum bridging endeavor, she immediately decided to join, which was her response to the isolated teacher culture in general (Fullan & Hargreaves, 1996; Little, 1990) and the siloed teaching of the two “partner” teachers in each grade.

Similar to Ms. Jones, Ms. Davis has been calling for collaboration for years, however, she found that there were so many obstacles and she did not see any systemic collaboration really happening. For example, she mentioned that for a long time, teachers were working in two separate buildings, and there was frequent teacher turnover, which were not conducive for teacher collaboration. Moreover, based on her observation, not all the partner teachers had the connections between them or the willingness to make efforts to collaborate while they had already set a stable teaching structure and a busy schedule. Despite all the challenges, Ms. Davis strongly believed in the benefits of collaboration and continued to seek opportunities to build connections among teachers. She said to me, “[y]ou put two good brains together and you come up with magic.” When Ms. Wilson proposed the idea of curriculum bridging, she found the common interest between them, and they immediately started to work together.

Ms. Davis suggested to Ms. Liu and Ms. Wilson the idea of thematic teaching, which offered the possibility for curriculum integration. This was Ms. Davis’ response to the aim of promoting students’ bilingual learning in general, as well as to the adoption of the CCSS that emphasizes greatly on literacy development of each discipline and academic discussions across disciplines (Zwiers, O’Hara & Pritchard, 2014).

This is what the Common Core Standards are. This is the Next Generation Science Standards. This is how you take those and build the lesson. And here's how you incorporate literacy into that unit (Ms. Davis).

Here Ms. Davis suggested that the collaborative thematic unit teaching could be one way that literacy got incorporated into science and social studies units, and at the same time there could be content-based literacy development in the instructional time of language arts (Drake & Burns, 2004). However, as different subjects were assigned to be taught in different languages and by different teachers, Ms. Davis emphasized to me that the key

question was, “[h]ow do we break that down into something that can be bridged across the rooms so that the kids have those skills in both languages.” Ms. Davis did not have a definite answer to that question but strongly believed in teamwork that would yield “magic.”

Having been working at NGES for three years, Ms. Jones and Ms. Davis were more familiar with the institutional environment and culture at their school and had always wanted to make changes. With the formation of their CoP through mutual engagement, they finally found a platform to engage in joint discussions, learn from each other’s expertise and collaboratively make contributions to their enterprise for curriculum bridging, which was not only aligned with their professional backgrounds and teacher beliefs but also connected what they did and what they knew with what they did not do before (Wenger, 1998).

5.1.2 A Localized Response to Monolingual Instruction

In the curriculum bridging process, teachers’ own beliefs were played out in their curriculum planning as their unique responses to the Chinese-English DLE program. Aside from teachers’ views on collaboration, another prominent aspect was how the teachers understood bilingual development, which shaped what bridging meant to the teachers.

According to Ms. Wilson, one of her responsibilities in the curriculum bridging process was to “create background knowledge that supports the content that they will be doing in Chinese,” which refers to the process of linguistically and conceptually preparing students to learn the content areas in Chinese via the ways of familiarizing

students with the key terms in each unit in English and then sending students to learn in Chinese.

[I]nstead of having to hear the word for the first time in a language that they are already working so hard on processing, they have this English base so that they can use their dual dictionaries in their head. They will be like OK, I have my English thing going on here, and now I can picture it, now I can use it on the Chinese side and make a merge so that it becomes more meaningful (Ms. Wilson).

This approach of Ms. Wilson's to bridging was to *create* prior knowledge for students to draw on while they were learning in Chinese, including introducing important terms and encoding the concepts in English (most students' L1), which was to release students' cognitive load of processing a second or a third language and the concepts at the same time. Here the assumption was that when students switched to their Chinese classroom, some of the conceptual knowledge had become known, or prior knowledge, and students could allocate more attention or cognitive resources to process the new language.

According to Bunch, Kibler, Pimentel, and Walqui (2013), when second language students have familiarity with the topics being discussed, it is more likely for them to understand and engage in the language they are learning. However, considering that learning content areas in a target language is one of the theoretical premises of DLE that the subject matters expose student to the disciplinary language and provide students with a meaningful, purposeful and academic context for students' bilingual development (Fortune, Tedick, & Walker, 2007), what Ms. Wilson struggled with was that in this process how to "make sure that content learning can happen in Chinese more" if important concepts had already been discussed in English. This question has been constantly reflected on throughout the process of my data collection.

In addition, we can see from Ms. Wilson's quote that she seemed to view bilingualism as two languages in one instead of one integrated repertoire. She assumed

that there were “dual dictionaries” that could be learnt and activated in different spaces and then be merged. This belief led to Ms. Wilson’s support of the policy that both the Chinese teacher and the students should use the partner language and avoid using English as much as possible in order to maximize students’ exposure to Chinese. Ms. Davis also held the same opinion, which came from her training in Spanish-English bilingual programs. She maintained that in the designated time of each language, “that is THE language you teach unless you're bridging and...you're having a discussion about how the languages work.” In this sense, they upheld the language separation approach. However, they did understand the difficulty in learning Chinese and learning through Chinese and the need of using English (most students’ L1) as mediation.

Part of what pulled me to that was this whole idea of bridging curriculum and making sure that the language experiences are being mirrored into two places, so that the language really takes holds, and it is rooted and can be useful (Ms. Wilson).

In this quote, again we can see that according to Ms. Wilson, bilingual learning happens in two places, but she is against the approach that the knowledge encoded in L1 is not taken advantage of while students are taught monolingually in both languages (Cummins, 2017). Yet, the teachers understood that the basis for the *Bridge* in Spanish-English DLE programs was that the two languages shared cognates (Beeman & Urow, 2013), a feature that they did not have in their Chinese immersion program. Therefore, Ms. Wilson and the team decided to come up with their own ways of bridging.

One example was the employment of the Total Physical Response approach (TPR) (Asher, 1964) that was suggested by Ms. Jones and Ms. Davis as a mediator between the two languages. That is, students created actions to match a specific English expression so that they could make a physical response to the corresponding Chinese expression instead of translating it to English, as how Ms. Wilson instructed her students about TRP in class.

We talked about how when you go to Chinese, you might forget the words, and we encourage you to only use Chinese. So, in a moment when you can't use your words, you can use your actions, because you are not using English to talk about this, so you have to have these actions to go in your brain (Ms. Wilson to her class).

In this excerpt the information that Ms. Wilson conveyed was that students had to refrain from using English even when they forgot how to express a word in Chinese, and instead, the actions created to represent the English expressions could be used. This approach to connecting both classrooms was to achieve the aims of both keeping Ms. Liu's classroom as a Chinese monolingual environment and enabling most of the students to take advantage of the knowledge encoded in their L1.

5.1.3 A Localized Response to the Lack of Training

Overall, except Ms. Davis who had teaching experiences in Spanish-English bilingual schools, the other three teachers did not have a systematic knowledge of what the theoretical basis of DLE was, what models there were and how it worked in programs of different language combinations. Professional development opportunities on immersion education were sporadic in this Chinese-English DLE program. This lack of training prominently affected Ms. Liu who was not only unfamiliar with the immersion model, but also still in the process of getting teacher training. Both Ms. Davis and Ms. Jones had worked with several Chinese teachers in their programs and acknowledged that it was not just Ms. Liu who struggled with this challenge.

Most of the time when we have Chinese teachers come in, they're not trained teachers. So, it makes it more difficult for them. And maybe they, you know, they obviously want to, cause this is something they're feeling strongly about. And they're young. You know if they haven't been in it, in a program, you have to figure out what you're doing (Ms. Davis).

When the collaborative effort began, it was Ms. Liu's second year of teaching at NGES. At that time, she already had some professional growth through learning from peers and

her instructional practices. However, as a novice teacher, she was still struggling with all the challenges stated in previous sections. Unlike the other three teachers who had a clear belief in the benefits of some aspects of curriculum bridging, Ms. Liu's motivation to join was a response to the challenges she faced in teaching due to her lack of teaching experiences and unfamiliarity with the teaching approaches in elementary schools in the U.S. as well as a response to the situation of struggling alone (Cammarata & Tedick, 2012; Zhou & Li, 2015b). Yet, when she joined, she might not have had a clear idea of what curriculum bridging was and how to do it. Both Ms. Jones and Ms. Davis pointed out that at first Ms. Liu was a little bit lost and it took her a while to find her own "comfort zone" to participate in the discussion. At the early stage, Ms. Liu just took a peripheral role in the CoP (Lave & Wenger, 1991), observing what was happening, figuring out the routines of communication and looking for her ways to contribute. According to Lave and Wenger (1991) and Wenger (1998), this kind of participation is a way of learning that is ongoing in the process of defining their joint enterprise.

Mutual engagement in CoP provides opportunities for every member to learn from each other's diverse backgrounds and expertise and grow together but may create constraints as well. Based on the interviews, the teachers all had positive opinions about their collaborative process, although Ms. Liu sometimes felt uncertain about whether they had done everything right.

I think the planning that's happened this year and the growth with all of us, it's good for me, too. I learn. There's a lot of things Ms. Wilson has a different way of looking at it than I do sometimes. So she might take you know, the...this is how I'm going to bring texts into it. And this is the way I want to bring the literature into something and I might bring in the... "well have you thought about trying this you know making a video or having the kids do another type of activities so that they can do something more creative and show with it?" So there's that the magic I was talking about that's what happens with the co-planning. I love those moments (Ms. Davis).

Based on my observation, Ms. Davis' account accurately reflected the atmosphere of their co-planning meetings. They shared information, posed questions, provided clarifications, accepted and rebutted suggestions, in which process they were inspired, saw different ways of teaching and got support from each other. Ms. Wilson told Ms. Liu, "[through collaborative planning] I have such a better understanding of the obstacles you face and things you need to accomplish, so I can be a better teammate that way...I got your back, girl," for which Ms. Liu often expressed to me that she was really grateful.

In summary, all the teachers came from different educational backgrounds and with different expertise, which made their interpretations of and responses to the sociocultural realities of the Chinese-English DLE program unique, but these different perspectives converged for a common goal that was to explore the best practices in their own ways by building bridges between the people and between the learning on both sides of the classrooms, as how they renegotiated the concept of curriculum bridging as "moving towards a more continuous bridging model where the two hands of the classroom are talking to each other more, and there is continuous learning behind both." The initiation of the curriculum bridging process was a localized response to the two-teacher language-separation approach in their immersion program, and the process of mutual engagement enabled the teachers to explore how to engage with each other and establish roles in their community of curriculum bridging (Wenger, 1998). It opened up opportunities for them to explore new ways of teaching, but as Wenger's (1998) cautionary note to any community of practice, it was not without problems, which will be further discussed in Chapter 6.

5.2 Curriculum Bridging Process: A Shared Repertoire

CoP develop their own repertoire which include such processes as “renegotiating the meaning of various elements...inventing new terms and redefining or abandoning old ones; telling and retelling stories; creating and breaking routines” (Wenger, 1998, p. 106). This curriculum bridging community also engaged in the process of defining the meaning of bridging and what the routines are like. The term *bridging* was adopted by Ms. Wilson from the Bilingual Unit Framework (Beeman & Urow, 2013) used in Spanish-English immersion programs, but the teachers renegotiated its meaning based on the characteristics of their Chinese-English DLE program. According to the teachers and the analysis above, curriculum bridging is a collaborative endeavor to make the content and language instruction in their two linguistic spaces mirror each other in some way instead of being two unrelated or separate processes so that connections could be made both between the teachers and between the instruction in Chinese and English. In the following I will provide a descriptive account of the curriculum bridging process.

The whole curriculum bridging process that the teachers came up with on their own includes: 1) co-planning (teachers’ original expression), 2) implementing planned curricula, 3) following up and revising, and 4) assessing and reflecting. The teaching team invested most of their collaboration time on co-planning, in which the *bridge*⁴ or the bridging point was decided. In order to explore teachers’ process of building the *bridge*, I employed the method of process coding to code the co-planning meetings, which focuses on ongoing interactions and actions that aim for reaching a goal or handling problems (Saldaña, 2013). Since the teacher had constructed their own routines, the process of

⁴ In order to differentiate the participant teachers’ construction of the concept of *bridge* and the *Bridge* introduced in the Bilingual Unit Framework by Beeman and Urow (2013), the latter is written with a capitalized B.

planning for each unit was relevantly consistent in terms of the components that were covered, but the orders of discussion could be different. The components of co-planning includes: 1) Identifying the theme of the science or social studies unit, 2) Identifying the English literacy topic, 3) Specifying the content goals of the unit, 4) Identifying the language goals of the unit, 5) Identifying the bridging points, 6) Stating the instructional plan, 7) Sharing teaching strategies, 8) Sharing instructional resources, 9) Discussing assessment ideas, occasionally, 10) Clarifying instructional practices, and 11) Coordinating the curricula across the two instructional times, occasionally. In order to triangulate the coding, I presented my summary of the curriculum bridging process as well as my examination of the sample unit “Work of Water” (see Table 5.1) to Ms. Wilson, and she verified that my analysis reflected their working process.

Table 5.1
Curriculum Bridging Process for the Unit “Work of Water”

Process and key components	Chinese instructional time	English instructional time
1. Identify the theme of unit	Identify the theme of the science unit: “work of water”	Identify the topic of the concurrent ELA unit: “tales”
2. Identify the bridging point	<p>Ms. Wilson’s proposal Normal bridging point: introducing key vocabulary and concepts in English during ELA time before the unit starts in the Chinese instructional time</p> <p>Unique bridging point for the unit -English side: to incorporate the phenomenon of erosion into the ELA folk tale unit by using tall tales to explain how people understood natural phenomena before they could explain them with science. -Chinese side: to employ several experiments to help students understand the work of water including erosion in a scientific approach.</p>	

Co-planning	3. Identify the learning objectives	Identify the content objectives based on state standards of the unit, e.g. students will learn about erosion and the impact it has on landforms	Identify the content and literacy learning objectives based on them and the literacy standards, e.g. -students will understand that folktales were often created to “make sense” of the world -Students will understand the plot and story structure of a folktale
	4. Identify language points	Identify content-required language e.g. 侵蚀 (erosion), 流 (flow), 沙子 (sand)	Identify corresponding English expressions, e.g. erosion, flow, sand
	Use a same set of Total Physical Response movements when introduce the vocabulary		
	5. Share Materials	Collect books and materials for the unit	Introduce books that may be used for read-aloud and suggest books that can be translated and used on the Chinese side
	Translated English books used on the Chinese side borrowed from Ms. Wilson: - <u>Follow the water from brook to ocean</u> - <u>Water dance</u> . Folk tales used on the English side: <u>Ming Lo Moves the Mountain</u> ; <u>Paul Bunyan</u> , etc.		
	6. Share instructional strategies	e.g. Ms. Davis to Ms. Liu Sentence pattern: “is”, “has” and “can” sentences in Chinese	e.g. Ms. Jones to Ms. Wilson Provide a big picture for each page of students’ stories to scaffold their story telling.
	7. Design summative assessment for the unit	Shared writing to explain the work of water	Creating “fractured” folktale that explains a natural process related to erosion through a story telling lens.
	8. Coordinate curriculum across instructional times	Ms. Wilson told Ms. Liu that during English literacy time, students would learn structures of fairytales and how to create a problem-solution moment and read stories like Red Riding Hood. She suggested if Ms. Liu needed a read-aloud or a writing component, she could read the Chinese version of the story or do a simple-sentence version of problem-solution moments.	

Curriculum Implementation	Do four experiments on erosion and other phenomena Week 2 to 4 of the unit.	Week 1: Bridging to Chinese: introducing erosion-watching science videos and creating TPR for key vocabulary
	Key activities: Week 1: Read aloud: translated books - <u>Follow the water from brook to ocean</u> - <u>Water dance</u>	Week 2: Folktale: essential concept-folktales are made-up stories that people used to explain something real, e.g. Paul Bunyan. Key activities: read-aloud; using video and graphic organizer to introduce the concept of “plot”; reviewing TPR vocabulary
	Science Experiments: Week 2: Paper Mountain Week 3: Corn flour experiment: How was the Grand Canyon created? Week 4: What strong enough to make a canyon? Week 4: How to stop a landslide?	Week 3: Fairytales and folktales from around the world, focusing on character traits
	Shared writing: Week 3 Why there is sand on the beach?	Week 4: Students write their own fractured tale.
Occasionally Following up and revising	The teaching team checks in with each other how their classes went and make adjustments	
Assessing and reflecting	Shared writing	“Fractured” folktale writing
	The teaching team discusses if the intended curriculum bridging goals have been achieved and how to make improvements	

As stated earlier, the order of the components covered in co-planning meetings was not definite. Usually it was a recursive process in the sense that the discussion of the content goals might inspire the teachers to build the bridging point, or because of the bridging point, they might add more learning objectives to the unit. The co-planning meeting for each unit usually started with identifying the theme of the unit taught in Chinese and the discussion of the content standards. Then Ms. Wilson thought about how the topic could be integrated into her concurrent ELA class and hit the grade-level CCSS. For example, in the unit of “Work of Water,” Ms. Wilson proposed to incorporate the phenomenon of erosion into her ELA unit of folk tales, by using different types of tales to explain how people understood natural phenomena before they knew science, while Ms.

Liu planned to employ several experiments to help students understand the work of water via scientific inquiry. Along the interdisciplinary continuum, the participant teachers focused more on the correlated knowledge in the subjects of ELA and science in a way that the teachers still kept the subject matters separate and distinct but did make attempt to allow correlated topics to coincide with each other and plan their lessons in a complementary way (Adler & Flihan, 1997; Fogarty, 2009). Thus, in addition to introducing key vocabulary and concepts in English, a multiple-perspective understanding of erosion became the “bridge-building” point of the unit (Klein, 2006). Another important step was that the teachers collaboratively specified and reviewed the content and language standards to make sure that their bridging process adhered to the teaching objectives of each subject. Linguistically they identified key vocabulary in the content areas and employed scaffolding strategies such as TPR to assist students to make connections between L1, L2 and the concepts. Before implementing the planned curricula, the teaching team selected learning materials collaboratively. Because of the lack of teaching materials in Chinese, Ms. Wilson, Ms. Davis, and Ms. Jones often suggested English books or videos that were appropriate to students’ age and cognitive levels to Ms. Liu; Ms. Liu then translated and used these materials, for example, *Follow the Water from Brook to Ocean* in the unit of the “Work of Water.” The other three teachers, especially Ms. Davis also shared with Ms. Liu ideas of classroom activities and instructional strategies that they saw fit with the current unit. During each co-planning meeting, both Ms. Wilson and Ms. Liu shared their instructional plan with the whole group, and occasionally Ms. Wilson would try to coordinate what could be done in both classrooms. However, since Ms. Wilson acknowledged that in Ms. Liu’s class, “it is her

world,” this kind of coordination exemplified in Table 5.1 did not happen very often. This lack of coordination also reflected teachers’ vision of knowledge as correlated rather than shared or restructured and the synthesis of knowledge was not the priority on the planning agenda (Adler & Flihan, 1997). With regard to teachers’ instructional plans, sometimes the teachers discussed and clarified the rules and ways of implementing the classroom activities, especially for Ms. Liu. Then the teachers usually ended their co-planning meetings for each unit with the discussion of summative assessment ideas for the unit.

After the co-planning meeting, Ms. Liu and Ms. Wilson implemented their lesson plans separately in their own designated instructional time. The teachers would do occasional follow-ups with each other as to how the instructional practices went after class. In the next co-planning meeting, they would briefly discuss and make revisions if there was a need to adjust the schedule or the cognitive level of the instructional activities. Towards the end of each unit, Ms. Liu and Ms. Wilson either did a collaborative summative assessment, for example, a bilingual project, or assessed students separately. The bilingual project usually was a joint effort of all the teachers, especially between Ms. Liu and Ms. Wilson. For example, in the “Continents and Maps” unit, Ms. Liu and Ms. Wilson jointly organized a bilingual project called “Country Museum,” in which students made a poster to introduce a country they visited, including its continent, language, flag, food, and aspects of its culture. This project was used as a summative assessment for Ms. Wilson to train and check students’ ability to read for information, to make summaries and cite evidence; while for Ms. Liu, it was to check if students learnt how to read and

write continent and country names in Chinese and if they knew the flags and languages of the selected countries.

The bridging process requires creativity and flexibility in the individual instructional design in each class (Fogarty, 2009). In this case, it was Ms. Wilson who sequenced her ELA standards and integrated relevant reading materials according to topics that were to be covered in Ms. Liu's science or social studies classes. Unlike the shared-knowledge interdisciplinary approach in which each discipline is mutually supportive (Adler & Flihan, 1997), the bridging in this teaching team was unidirectional. In the process of implementing the lesson plans, both teachers kept their autonomy most of the time to decide how to carry out their instructional practices, but at the same time, both teachers were roughly aware of each other's curriculum, and in some units the teachers could assess students' learning progress together. When that happened, it was a way to acknowledge and value students' learning in both languages instead of underestimating what students knew due to their limited proficiency in one specific language.

Although the sequenced and webbed model at the beginning end of the interdisciplinary continuum usually requires no or less team planning and is relatively easier to implement (Fogarty, 2009; Klein, 2006), in the case of these participant teachers, they had to make extra efforts to co-plan and share instructional materials and strategies in response to the bilingual context. The insufficiency of teaching materials, the lack of teacher training and the involvement of two instructional languages all contributed to their unique way of constructing their shared repertoire, a model of curriculum bridging that they experimented with in their own DLE program.

5.3 The Bridge

This section will focus on teachers' ways of bridging. In Table 5.2 and Table 5.3, I summarized how Ms. Liu and Ms. Wilson designed their classroom activities to bridge across their instructional time. I presented the curriculum design in the form of English side and Chinese side to represent the reality that these two teachers taught on two sides of the classroom separately, although they were roughly aware of each other's lesson plans and the topics being discussed were related.

Table 5.2
Ways of Bridging in Science Units

Science Unit	Work of Water	Animal Heredity & Adaptation	Force & Motion
ELA Unit	Folktales	Character Traits	Biography
Ms. Wilson and Ms. Liu's unit plan	<p>English side:</p> <ul style="list-style-type: none"> -introducing key vocabulary and concepts e.g. erosion -incorporating the phenomenon of erosion into read aloud in the ELA folk tale unit, e.g. using tall tales to explain how people understood natural phenomena before they could explain them with science. -moving on to ELA focus: types and structures of folktales <p>Chinese side:</p> <ul style="list-style-type: none"> -introducing key vocabulary and concepts in Chinese, e.g. via read-aloud. -using several experiments to help students understand the work of water including erosion in a scientific approach. 	<p>English side:</p> <ul style="list-style-type: none"> -introducing concepts of heredity and adaptation -read aloud and discussion in English on animal traits and adaptation -activity: hereditary traits: traits of Papa monster, mama monster and baby monster -narrative writing on the best part of me to connect physical traits. -moving on to ELA focus: physical traits and personality traits <p>Chinese side:</p> <ul style="list-style-type: none"> -read aloud on animal traits -read to self for information on animal traits -activity: make your own animal-relationship between animal traits and adaptation -activity: hereditary traits: 	<p>English side:</p> <ul style="list-style-type: none"> -introducing key vocabulary and concepts, e.g. push and pull -read aloud on force, push and pull -moving on to ELA focus: biography and autobiography, focusing on biographies of scientists <p>Chinese side:</p> <ul style="list-style-type: none"> -introducing push and pull via video -sorting activity: Push or pull -read aloud on the relationship between force and motion -a bridge experiment <p>Joint Activity: Physics Museum Visit</p>

		traits of Papa dog, Mama dog and baby dog	
Bridged by	-frontloading key words and concepts in English -different perspectives and ways to explain natural phenomena	-frontloading key words and concepts in English -the common focus on traits	-frontloading key words and concepts in English -connections between force and motion, science, scientists and underrepresented scientists

Ms. Liu’s curriculum design for science units usually started with introducing the topic and key vocabulary via read-aloud, videos or a big book and then focused on experiments that were adopted from the science curriculum, *Mystery Science*. Ms. Wilson designed her ELA curriculum separately, but she shared it with the other three teacher, and she usually allocated one week (sometimes two weeks) to build the conceptual foundation for students to get familiar with the science topics by introducing basic concepts and key vocabulary using read-aloud or science videos in English.

Table 5.3
Ways of bridging in Social Studies Units

Social Studies Unit	Citizenship	Continents & Maps	Culture diversity
ELA unit	Mysteries	Procedural writing	Culture diversity
Ms. Wilson and Ms. Liu’s unit plan	<p>English side</p> <p>-brainstorming on characteristics of a good citizen</p> <p>-working on a transferable anchor charts for characteristics of a good citizen</p> <p>-read-aloud on citizenship</p> <p>-read to self for information on citizenship</p>	<p>English side</p> <p>-introducing continent names and key components of maps in English, e.g. campus rose, map key, directions etc.</p> <p>-read-aloud on continents and maps</p> <p>-travel log writing: travel across continents</p> <p>-activity: walking field trip; students drawing a map of their school building and doing</p>	<p>English side:</p> <p>-discussing what is culture and identity; what is family culture. local culture and global culture.</p> <p>-interviewing students’ parents about their childhood, including their family life and school life.</p> <p>-read-aloud on culture diversity</p> <p>-working on comparison and contrast of different</p>

	-moving on to analyzing structures and characteristics of the mystery genre	procedural writing on giving directions	cultures
	Chinese side -read aloud on how to be a good citizen -discussion on characteristics of a good citizen	Chinese side: -introducing maps and globe -introducing continent names -introducing the equator and the prime meridian -introducing directions -activity: drawing the classroom and describing it	Chinese side: -discussing personal culture -discussion and read aloud on the value of diversity -working on comparing and contrasting different cultures
Bridged by	-frontloading key words and concepts in English -characteristics of a good citizen and characteristics of detectives	-frontloading key words and concepts in English -continents and travel log -integration of procedural writing and giving directions	-parallel teaching on the topic of culture -common focus on comparing and contrasting

Comparatively, Ms. Liu struggled with teaching social studies more than science partly due to her lack of living experiences in the U.S., and also due to the linguistic complexity required to discuss a social studies topic at the desired level of depth in Chinese (Met, 2000). Therefore, Ms. Liu was in need of more help from Ms. Wilson with social studies lessons. In terms of the way of bridging, it was relatively similar between science and social studies units. Similar to the unit of “Work of Water” explicated in the previous section, teachers’ design of the *bridge* was featured as the parallel or sequenced model of interdisciplinary teaching (Adler & Flihan, 1997; Fogarty, 2009); similar topics that coincided in the Chinese and English instructional time were discussed in different disciplinary conventions. For example, in ELA, students listened to a read-aloud on cardinal directions and did a procedural writing on giving directions while they learned how to tell directions and the four hemispheres in the social studies class. Another feature of the teachers’ bridging process was that in addition to parallel teaching within their own

subject areas, Ms. Wilson and Ms. Liu also covered the same content, first in English, and then in Chinese in every unit in order to “frontload.”

These two featured ways led to two major kinds of *bridge*. First, connecting: the *bridge* that is based on the correlated knowledge, which connects the content covered across the two classrooms. In the unit of “Work of Water,” the multi-perspective explanation of the natural phenomena, and in the unit of “Animal Heredity and Adaptation,” Ms. Wilson’s focus on personality traits and Ms. Liu’s focus on physical traits were such examples of bridging by connecting. Second, frontloading: a more common and explicit way adopted by Ms. Wilson. Frontloading was a term the teachers used to refer to the process of allowing students to first learn the content knowledge and key vocabulary in English, most students’ L1, before Ms. Liu officially started the unit. As discussed earlier, this was to allow more cognitive space for students to process Chinese and to use their L1 to mediate the learning process. In each unit, the duration of instruction varied from four to eight weeks. Ms. Wilson spent one to two weeks to do the frontloading with such activities as doing discussions, read-aloud and playing videos, and then she moved to her ELA focus, which may or may not directly connect to the science or social studies topics. These two approaches had different effects on students’ learning, which will be further discussed in Chapter 7.

5.4 Summary

This chapter addresses the first set of research questions that focus on what curriculum bridging and *bridge* meant to the teachers, and what the process was. Forming the CoP of curriculum bridging was teachers’ localized response to the teaching context they were in, that is, there was no systematic communication and collaboration between

teachers who taught a same group of students. “Compartmentalized” or “siloeed” teaching in their own linguistic realm was a norm at NGES. At the same time, teachers faced similar challenges as in other DLE programs, such as insufficient teaching materials, Chinese teachers’ lack of training and the difficulty in teaching Chinese and teaching content through Chinese. Due to different educational and professional backgrounds, teachers’ foci on these challenges were different. However, these different foci converged as a joint but localized response to the sociocultural realities of their DLE program, and the teachers made a collaborative effort of “moving towards a more continuous bridging model where the two hands of the classroom are talking to each other more, and there is continuous learning behind both,” which the teachers referred to as the model of curriculum bridging.

In order to achieve this aim, the four teachers constructed a routine for curriculum bridging, which included 1) co-planning, 2) implementing planned curricula, 3) following up and revising, and 4) assessing and reflecting. Intensive collaboration happened during the co-planning process and the teachers came together to plan for the instruction in both classrooms. The teachers discussed the learning objectives collaboratively, shared ideas, became roughly aware of the instructional plan of Ms. Liu’s and Ms. Wilson’s, and revised the teaching practices these two teachers proposed when necessary. One important product of the co-planning meetings was a *bridge* that connected the instruction across the two linguistic spaces. Based on the observation and analysis of teachers’ co-planning meetings and instructional practices, I summarized two types of *bridge*: connecting and frontloading. First, in some units, teachers focused on a correlated topic to connect students’ learning in subjects that were taught in Chinese and English

respectively. The second one was termed “frontloading” by the teachers, which refers to the process when Ms. Wilson introduced key concepts and vocabulary in English before the official content learning started in Ms. Liu’s classroom, aiming to build a linguistic and conceptual basis in students’ L1 to mediate their studies in Chinese.

Chapter 6 Benefits and Challenges in Curriculum Bridging

Last chapter focuses on the description of the curriculum bridging process, based on which this chapter will continue to explore the benefits of engaging in the bridging process, and the issues and challenges involved in the curriculum bridging model constructed by the teachers.

6.1 Benefits of Building Accountability

According to Ms. Wilson, curriculum bridging was not only about building a *bridge* between the content instructed in both classrooms, but also about making connections between people so that the teachers could be aware of each other's curriculum. Some benefits were straightforward, for example, the teachers felt supported and they had access to diverse materials, ideas and pedagogical approaches. This section will focus on one of the benefits, that is, the increase of accountability of Ms. Liu's instructional practices. I focus on Ms. Liu's experiences because she shared some common challenges in teaching as teachers in other Chinese-English DLE programs, for example, the lack of teaching experiences and formal training, and the analysis of Ms. Liu's teaching may provide implications to other Chinese teachers working in similar contexts. However, focusing on Ms. Liu does not mean that other teachers did not learn in the CoP, but it was an angle I took to look into the group interactions and analyze how learning happened for Ms. Liu as a member of the curriculum bridging CoP.

One of the key characteristics of CoP is that their joint effort produces relations of accountability, which are “manifested not as conformity but as the ability to negotiate actions as accountable to an enterprise” (Wenger, 1998, p. 82). In the following I will present a telling case from the co-planning meetings, which is a key component of the

curriculum bridging process, to illustrate the point of accountability. This instance was selected as a telling case because 1) first, it involves all four members of this community of practice, and 2) it makes visible the changes that the formation of their CoP makes to their instructions. By presenting this telling case, I do not intend to provide a comprehensive view of how teachers communicate or collaborate, but to illustrate the possible benefits of their interactions via a micro-analysis of their discourse (Green & Dixon, 2002).

6.1.1 Collective Efforts towards Accountability

The following excerpt happened during the planning meeting for the unit of “Animal Heredity and Adaptation.” Ms. Liu and Ms. Wilson were stating their plans for this unit. Ms. Liu mentioned in the discussion that she was planning to do an activity called “Build My Own Animal,” which was to allow students to compose an imagined animal using the body parts from different animals, and then students would be required to explain “where they live, and how they are gonna survive in the environment.”

Although Ms. Liu seemed to be very excited about it, the other three teachers were more concerned about the detailed design and accountability of this activity.

Excerpt 6.1

Discussion on the Rules of the “Build My Own Animal” Activity

Line	Speaker	Utterance	Available contextualization cues
1	Ms. Liu	For science I will do that, build a animal this week, and they need to tell me why and how they are going to survive in the	
2	Ms. Jones	A real animal, they are building a real animal. ↑	
3	Ms. Liu & Ms. Wilson	Fake.	

4	Ms. Liu	They are taking different parts of different animals and they need to know that the animal has this part of this body part, because they need to survive in the environment.	
5	Ms. Jones	Got it.	
6	Ms. Wilson	So if I had my middle section of my animal as polar bear, and then even I include something else silly for my legs or my head, if I include a giraffe head. In my writing I would say something like I have thick fur, because I live in a cold place. ↑	
7	Ms. Jones	But I have a long neck because I reach the *leaves in the Arctic*.	laughing
8	Ms. Wilson	*The Arctic leave*↑. So I can reach my neck into the ocean for fishes. So do you envision that everyone can do at least like one trait and then so like I have a polar bear body so I can stay warm in cold temperatures. But even if I have other traits, is the goal to explain every single one of the traits they include, or just to focus on clarity with just one trait ↑? Is what I'm saying making sense?	laughing
9	Ms. Liu	I'm thinking about That's also the part I'm still , like * I need some more* 	several pauses, low voice
10	Ms. Wilson	So maybe we can do it together as a group , so maybe we can just make a rough rubric and then we'll bring about that rubric to life of just knowing what we are asking the kids to do, so that we can be really clear in the directions that we give them. So I'll start making something.	Ms. Wilson created a new file and started typing the rubric.
11	Ms. Jones	And this is for your composite animal? ↑	
12	Ms. Liu	Hmm	
13	Ms. Jones	How do you assess it? I'm sorry, like	
14	Ms. Wilson	Assess it, even like what is the goal? What are the learning goals? How to explain that to kids?	
15	Ms. Jones	Oh, why does it have fur? Why it has long neck?	
16	Ms. Wilson	But if each kid is doing something different, so if my animal has the polar bear fur and the giraffe neck. Is it the goal for them to explain everything single trait they include, or just pick one trait and explain how it helps them survive in that environment, because I think what I could see happening is that kids include an array of traits that are conflicting?	
17	Ms. Liu	Some of yeah.	Low voice

In this excerpt, Ms. Liu introduced the rules of making their animals, an activity designed for students to identify the relationship between animals' traits and the environment they live in, which was one of the learning objectives in the unit of "Animal Heredity and Adaptation." According to Ms. Liu's description, students would have a lot of freedom to choose what animal traits to add in their fake animal. Ms. Wilson was concerned that if students selected some "silly" combinations, for example, a polar bear body and a giraffe head, how that would work as shown in Line 6. It seemed that Ms. Jones was imagining what a student would answer about the function of a giraffe neck in the Arctic and joked that it was for reaching "leaves in the Arctic" in Line 7. To make her question clear, Ms. Wilson asked Ms. Liu if she had envisioned the actual implementation of the activity, that is, should students focus on one major trait or any trait included in their fake animal? In Line 9, the pauses and low voice in Ms. Liu's utterance showed that Ms. Liu was unclear about the details yet and it seemed that she did not foresee the potential problems that Ms. Wilson was concerned about. Therefore, Ms. Wilson proposed that all the teachers worked together as a group to make a rubric to clarify all the directions before the activity was implemented with the students. Before the teachers started to work on the rubrics, both Ms. Jones and Ms. Wilson attempted to clarify the learning objectives of the activity, for example, how to elicit students' explanation on why their animals have fur or a long neck as shown from Line 13 to Line 15. In Line 16, Ms. Wilson went back to her original question that if students included "an array of traits that are conflicting," which trait should students focus on? Again, it seemed that Ms. Liu did not think about the details yet as shown in Line 17.

Later on, Ms. Jones suggested that students' creature "has to add up" to "put the

halt on the craziness” of conflicted traits, and Ms. Davis suggested students should choose the habitat first before they start to design their animals so that students would have to make connections between the animal traits they created and the living environment, which was key to understanding the concept of animal adaptation.

Guidelines:

Students will create their own unique animal

Step 1: Must select habitat first:

- Desert
- Ocean
- Polar
- Forest (including rainforest)
- Grassland (think Africa)

Step 2: The unique traits you pick for your animal MUST work in their habitat

- For example: If my animal had gills (a fish head) can it live in a grassland or a place where it can only breathe oxygen?

Step 3 (student goal):

- Students will be able to write what physical trait their animal HAS or CAN
 - “Long brown fur” vs “hair”
 - “Can swim” or “can run”

MAYBE: Step 4: Ms. Liu will make a big chart of various habitat and students can glue their animal creation to these habitats

Figure 6.1. Guidelines for the activity “Build My Own Animal”

The figure above presents the final version of the guidelines for the “Build My Own Animal” activity that includes the elements that the teachers agreed upon in the discussion as shown in Step 1 and Step 2. Although the teachers were concerned about how the activity could serve students’ learning objectives, they largely respected Ms. Liu’s original design that students would be allowed to combine traits of different animals to make their own unique animals, but they added more details to balance the factors of engagement and learning.

This excerpt shows that as a novice teacher, it seemed to be difficult for Ms. Liu to foresee how activities and events were likely to play out (Doyle, 2006), and when Ms. Jones and Ms. Wilson pointed out the potential problems, Ms. Liu was not able to adjust

her activity design. In the later conversation, Ms. Liu acknowledged that “when I think about this project, it is very engaging, but it’s also very hard to like really let them know that it is not... [free for all].” Ms. Liu’s primary focus was on if the activity was engaging, which was very important, but she did not consider thoroughly how to make the learning objectives clear or how to make the activity manageable in class. Another important point demonstrated in this excerpt is that none of the other teachers viewed Chinese teaching as solely the responsibilities of Ms. Liu’s and thus irrelevant to them. Rather, they decided to make a collaborative effort to help Ms. Liu to make the activity feasible and educational and make sure that Ms. Liu’s instructional design was accountable to students’ learning.

6.1.2 Building Accountability through Learning

Language and content integration is one of the key features that have been advocated in immersion programs based on the research results that have shown that enough language input or exposure solely (Krashen, 1985) does not guarantee accurate use of the target language (Snow et al., 1989). Rather, intentional plan for language objectives and explicit teaching of linguistic features are necessary to promote students’ bilingual development to a high level of proficiency (Colye, 2007; Lyster, 2007; Swain, 1996). However, as a novice teacher, Ms. Liu was still in the process of learning how to incorporate language teaching in her science and social studies class, although she always provided key vocabulary and sentence patterns in the introductory class of each unit to prepare students to engage in later discussion.

Step 3 in the guidelines for the “Build My Own Animal” activity (see Figure 6.1) was a writing component that was integrated into the rubric, which was the result of a

long discussion in the co-planning meeting. It was an interactive process that enabled Ms. Liu to take a broader view on students' language learning.

Excerpt 6.2

Discussion on the Writing Component in the Activity "Build My Own Animal"

Line	Speaker	Utterance	Available contextualization cues
1	Ms. Wilson	Is it a goal for students to be able to write about this?	
2	Ms. Liu	No.	
3	Ms. Davis	No? ↑	
4	Ms. Liu	XXXX This is so hard for them.	
5	Ms. Davis	Even if they did that sheet? ↑ Blank, you know? A whatever they are calling it.	Referring to the worksheet she mentioned earlier that includes An animal is __, has __, can __, fears __, and likes __.
6	Ms. Liu	Those like, I know the one you show me, if we think about that a fish can breathe in the water and those, those vocabulary. That's just too , not ready XXX for like	
7	Ms. Wilson	It doesn't mean where they are.	
8	Ms. Davis	So what are they doing? Is there some way they can, cause this one is just I mean for this "A blank" has. Do they know the words for, they know the numbers? ↑	referring to the worksheet.
9	Ms. Liu	They can do has, eat, and maybe fears.	
10	Ms. Davis	OK	
11	Ms. Liu	But to fill in this part is gonna be very hard for them.	
12	Ms. Davis	But do they know arms, legs, tail?	
13	Ms. Liu	Yeah	
<i>Lines 14-22 were omitted. Ms. Liu and Ms. Davis talked about what fruits students know. Ms. Davis told Ms. Liu that she could change the worksheet for her purpose.</i>			
23	Ms. Liu	Then we can write, the students would be able to write what their animal has.	

24	Ms. Davis	Some of them might write long brown furs, and some might just write hair, cause they know that word or something. And fears too, you may or may not do it. What are other things? "Has", "can" is another one you could do, can swim, can climb, you know, you could do "can" instead of one of these or "likes".	Referring to the worksheet.
25	Ms. Liu	For writing, they may probably not be able to write all of like swim,	
26	Ms. Davis	But they know SOME .	
27	Ms. Liu	They know run, they know walk.	
28	Ms. Davis	They could do those, cause they only need a few. Then don't have to write a ton.	
29	Ms. Wilson	And you can decide based on how they feel that they may or may not XXXX. We are just trying to give you some ideas so that you can take that learning we are, you know, XXX you to the kids.	
30	Ms. Davis	Cause if they are writing something like this, they have invested in it, it means something to them, because it is their animal, and they might be more motivated. Kids don't seem to be scared by this, because it is just one word, and they don't even have to fill up all of them. So when I've done it with kids in kindergarten, first grade, they usually do OK, mostly kindergarten.	

Excerpt 6.2 shows one part of the discussion on the writing component in the design of the activity “Build My Own Animal.” When Ms. Wilson asked Ms. Liu if there was a writing goal for students to achieve in this activity, Ms. Liu replied very firmly, “No.” Ms. Davis seemed to be surprised by Ms. Liu’s response and tried to ask again with a rising-tone “no.” Ms. Liu’s reason was that writing on the topic of adaptation in Chinese would be too hard for her students, which was emphasized by Ms. Liu for four times in Line 4, 6, 11, and 25 respectively. It seemed that Ms. Davis was even more surprised, shown by the frequent pauses and tones in her utterance and that she was not even able to monitor the phrasing and structure of her utterance in Lines 5 and 8. She asked if Ms. Liu meant that even with enough scaffolding, for example, using a

worksheet and asking students to fill in blanks, it would still be hard for them to write. Ms. Liu insisted that her students were not ready to write vocabulary like “breathe” in the water. Yet, Ms. Davis did not give up, and she started to suggest Ms. Liu thinking about what students could do instead of what they could not do. After a few rounds of negotiation, Ms. Liu decided to include “what an animal has” as a writing component in Line 23. In Line 24 Ms. Davis continued to propose that Ms. Liu could also do “can” to include verbs, or actions of animals and decide what to include and exclude in the worksheet for her purpose. Although Ms. Liu continued to say that some verbs might be hard for students to write, Ms. Davis kept guiding Ms. Liu to try and think about what students could do. Ms. Davis suggested that their conversation could be a learning process for Ms. Liu who could apply the ideas that were derived from the discussion in her classroom, but she also emphasized that it was Ms. Liu who should make the final decisions based on her students’ learning situations, as shown in Line 29.

From this excerpt, we can see different beliefs on teaching and learning. For Ms. Liu, the activity of “Build My Own Animal” was to engage students in understanding the concept of animal adaptation, and the language component was to ask students to present their animals and explain how the animal traits helped them survive in their environment. At the same time, based on her judgment on students’ writing proficiency, she maintained that writing on the subject of adaptation in any form would be difficult for her students; therefore, she decided not to include the writing component in it. As for Ms. Davis, the unit of animal adaptation provided a meaningful context for students to practice writing about what traits animal had and what they could do in their environment, and if they were not ready for it, Ms. Liu could use a worksheet or adjust the writing format to

scaffold the process. Further, asking students to describe the animals they created on their own was an acknowledgement of students' agency and they might be motivated rather than intimidated to write, as Ms. Davis explained in Line 30.

In fact, Ms. Liu was the one who knew her students best. She was able to identify students' current level as determined by what they could speak and write independently, but the problem was that she fixed her attention on what students could not do and did not have a clear aim for students' potential development with the help of her guidance (Vygotsky, 1978). Ms. Davis was guiding Ms. Liu to focus on what students could do and what they could do more with the help of the teacher and the right material. In Ms. Davis' opinion, if Ms. Liu did not expect students to achieve more and create the scaffolding to push them to the next level, they never would.

[I]f you don't expect them to write, they are not going to. If you authorize it, you provide it, you expect them, you figure it writing is a normal part of what we do here, they'll know we all write, and they'll do it (Ms. Davis).

What Ms. Davis was trying to convey to Ms. Liu was that writing was a difficult part of learning no matter it was in students' first language or second language, but teachers still needed to set high expectations for students. What teachers needed to do was not to avoid it, but to expose students to it, scaffold it and make it a normal part of their learning.

From the sociocultural perspective, the interaction between Ms. Liu and Ms. Davis was not only a discussion on scaffolding students' learning, but also a learning opportunity for Ms. Liu. She and Ms. Davis were in a novice-experienced relationship. Her collaboration with Ms. Davis, a more capable peer, could potentially deepen her current understanding of teaching and learning to a level that she was not able to reach if she worked alone (Vygotsky, 1978). However, the key question was, did learning happen? According to Wenger (1998), in CoP, change in participation indicates learning. In that

co-planning meeting, Ms. Liu did not explicitly express if she would accept Ms. Davis’ suggestions or not, but in the next meeting, we can see the change of her attitude towards writing.

Excerpt 6.3

Follow-up Discussion on the “Build My Own Animal” Activity

Line	Speaker	Utterance	Available contextualization cues
1	Ms. Wilson	Did they like it? ↑	
2	Ms. Liu	They were like, can we do it during our free time?	Laughed
3	Ms. Wilson	They were telling me all about this. Like, *Miss Liu found a website where we can make our own animals*. I was like, that was because she is amazing. Don't ever forget that.	Imitating the students
4	Ms. Liu	So, I think they Yeah	
5	Ms. Wilson	Do you think that the rubric we made [last week kind of guide their learning from your perspective too? ↑	
6	Ms. Liu	That's really helpful]. Yeah	
7	Ms. Wilson	OK good.	
8	Ms. Liu	And I think this week I will do more like just reinforce based on the animal they build, and do something more through their language.	
9	Ms. Wilson	[Yeah, I think that's great.	
10	Ms. Liu	So they can write something about it].	

Excerpt 6.3 happened in the co-planning meeting one week after the discussion shown in Excerpt 6.2. In this co-planning meeting, Ms. Jones and Ms. Davis were absent. Ms. Wilson started the meeting by following up with Ms. Liu how the “Build My Own Animal” activity went. Ms. Liu answered that students asked her if they could continue to do it during their free time, implying that students liked it. In Line 3, Ms. Wilson echoed with what students told her, which also indicated how excited student felt about the activity. Having complimented Ms. Liu’s design of the activity, Ms. Wilson asked if the

guidelines they constructed collaboratively helped students' learning. Ms. Liu said that the rubrics were "really helpful" and told Ms. Wilson that she planned to "do something more through their language" based on the animal they built and ask students to "write something about it" in Lines 8 and 10. This time, instead of saying that it would be too hard for students to write, Ms. Liu voluntarily mentioned that she was going to incorporate more language practice and a writing component into later activities in this unit, which in a way demonstrated the effects of the discussion between her and Ms. Davis and her increased awareness of explicitly integrating language components into her teaching of science.

Further, in actual practice Ms. Liu did adopt the worksheet Ms. Davis suggested in her instructional practices. Based on her teaching objectives, Ms. Liu did not use it in the "Build My Own Animal" activity but incorporated it in the "read to self" station. The adapted worksheet is shown in Figure 6.2.

have eat live at

有 吃 住在

动物：_____

Trait 特点

- Appearance trait
- Behavior trait

画这个动物

Researcher translation:

Animal_____.

Draw this animal

吃什么

栖息地

Habitat

What does the animal eat

Figure 6.2. Worksheet for researching on animal traits

Ms. Liu found a series of Chinese videos that introduced animals' traits, food and habitats in simple linguistic expressions and asked students to watch those videos to do research on animals as a way to build up the concepts of traits and adaptation as well as to practice listening and reading in Chinese. Ms. Wilson suggested to Ms. Liu "that would be good for them to take notes on, cause as they are reading." Combining all the ideas, Ms. Liu revised Ms. Davis' worksheet, added the component of taking notes and used it in the "Research on Animal Traits" activity (see Figure 6.2). At the same time, the writing requirement in the rubric for "Build My Own Animal" (see Figure 6.1) was

incorporated by Ms. Liu as a must-have element in students' oral presentation of their own animals.

Ms. Liu's learning happened through the negotiation of her own understanding of teaching and learning with more experienced peers and was demonstrated in her change of awareness and practice in her teaching. According to Wenger (1998), learning is becoming. For Ms. Liu, participating in the CoP for curriculum bridging was a learning process for her to gradually become a classroom teacher and a Chinese immersion teacher. Her collaboration with the teachers became the affordance that enabled her to learn because of the relations of accountability that her CoP produced (Wenger, 1998) rather than a surface friendliness and suppression of conflicts as in pseudo-communities (Grossman et al., 2001). The other three teachers could have withheld their opinions about Ms. Liu's design of her classroom activity, and Ms. Liu could also have kept her orientation towards writing to herself. In that case, none of the discussions and negotiations above would happen in their co-planning meetings. It seemed that the joint enterprise of curriculum bridging to promote real communication among the teachers and sustain students' continuous learning across the two linguistic spaces drove the teachers to make a collective effort towards accountability.

6.2 Challenges of Teachers' Limited Training

Despite teachers' agency to engage in the curriculum bridging process, both Ms. Wilson and Ms. Liu had uncertainty about whether they bridged the languages and content areas in the right way and constantly discussed how to balance the learning in the two linguistic spaces. Without formal training in theories of interdisciplinary teaching

and the linguistic knowledge in both English and Chinese, there were challenges for the teachers to design the actual *bridge* across different subject matters in a systematic way.

6.2.1 Lack of Theoretical Basis

Bridging between teachers, languages, and subject matters was not an easy task. It required a lot of creativity from the teachers, especially Ms. Wilson, who was more confident in her teaching and more enthusiastic about curriculum bridging than Ms. Liu, to integrate the learning objectives of the two languages and the subject matters involved. More importantly, it also required theoretical considerations in the process of collaborative planning for the *bridge*. Since the CoP took a bottom-up approach to curriculum bridging and they did not have systematic professional training on this topic, it was found that most of the time the *bridge* was built based on teachers' personal theories rather than formal theories, for example, the criteria and principles on curriculum integration or the linguistic knowledge of Chinese and English.

Based on the curriculum bridging process and the types of the *bridge*, it was found that teachers relied more on corrected knowledge to design the units of study, that is, similar topics were addressed simultaneously in different subject areas, illustrating different aspects or perspectives of the topics within each disciplinary domain (Adler & Flihan, 1997; Applebee et al., 2000). For example, in the unit of "Continents and Maps," students kept a travel log as they "traveled" to different continents through reading in Ms. Wilson's ELA class, while they were learning the names and locations of the continents in Ms. Liu's social studies class. The learning objectives were different, but both activities were related to the topic of continents. Therefore, relatedness became a central feature of the teachers' bridging, with other characteristics of interdisciplinary teaching

unaddressed (Fogarty, 2009). The challenge for the teachers was that they were immersed in their own approach of bridging and not aware of the criteria for a good interdisciplinary design.

For example, when Ms. Liu taught the science unit “Force and Motion,” the concurrent unit in ELA was “Biography,” which were two seemingly unrelated topics, but during the co-planning meeting, Ms. Wilson and Ms. Liu tried to find the bridging point as shown in the following excerpt.

Excerpt 6.4

Discussion of the Bridge in the Unit of “Force and Motion”

Line	Speaker	Utterance	Available contextualization cues
1	Ms. Wilson	They're learning about force and motion, so it's kind of like parallel learning again. Like they are force and motion, that base getting built in Chinese. And then in English they're learning a little bit about it, like that might be like the frontloading I do with them.	
2	Ms. Liu	What are you going to do?	
3	Ms. Wilson	I think what I will do what I just do, I think what I'm going to do is do some learning about scientists and have it be more of like informational writing, like almost like biography writing, yeah. *So because so many science jobs involve force and motion?* ↑ So that might be like our small connection is like I don't know ,that might be too hard. The science job connection in force and motion? Like that might be too deep, but I think we can talk about just like you guys are learning about force and motion in Chinese and engineers used force and motion all the time. Engineers is a type of scientists, let's learn about a couple other types of scientists then.	laughing while saying "that might be too hard"
4	Ms. Liu	The way that engineers	
5	Ms. Wilson	Yeah	

6	Ms. Liu	Build or design things or observe things, do the research.	
7	Ms. Wilson	<p>Okay so that was a great sentence. What did I just say? ↑ You guys are learning about scientists in Chinese. Engineers use force. Oh no, you're learning about force and motion in Chinese. Engineers use force and motion in their job for building, and problem solving. We will be learning about other kinds of, I think we'll do other kinds of scientists that solve problems. Problem solving scientist.</p>	<p>Taking notes while speaking; laughing while saying, “you're learning about force and motion in Chinese”</p>

As usual Ms. Wilson decided to do frontloading to provide students with the background knowledge of force and motion as shown in Line 1. Then Ms. Liu asked Ms. Wilson about her teaching plan, and Ms. Wilson stated that students would be learning about scientists and getting familiar with the genre of biography. It seemed that Ms. Wilson was concerned about how to make connections and identify the bridging points in Line 3. There was a great variety of biographies for her to choose, but she decided to focus on scientists so that the science topic and her ELA topic could somehow be related. However, she also acknowledged that building connections between the topic of force and motion and scientists was hard, so she tried to clarify the logic. Together with Ms. Liu, Ms. Wilson came up with the wording that she was going to use to explain the connections to her students, that is, “you're learning about force and motion in Chinese. Engineers use force and motion in their job for building and problem solving... we'll do other kinds of scientists that solve problems”, as shown in Line 7.

While I was listening to the discussion in the excerpt above, I did not expect that they could connect these two distant topics, and I was amazed by the teachers’ agency and creativity. However, I kept wondering if the relatedness they created was a “genuine” overlap that could strengthen the cohesiveness of the unit (Fogarty, 2009). Moreover, was

this kind of connection significant for students' learning? Going back to Ackerman's (1989) criteria of validity for the disciplines, would students learn the topics of force and motion and scientist biography better after this *bridge* was specified than they just learnt separately? I doubted it. Unlike in the unit of "Work of Water," in which without the bridging point, students might have missed a learning opportunity to construct a well-rounded perspective on how people explained natural phenomena; the significance of the bridge between force and motion and scientist biography seemed to be trivial and artificial. In contrast, if the teachers had considered such principle or criteria as the contribution of the *bridge* to broader outcomes or the validity beyond the disciplines, for example, shaping students' ways of thinking (Ackerman, 1989), there might be another way to build the bridge, which was already implied in Ms. Liu's utterances but did not get elaborated. Ms. Liu mentioned how scientists worked in Lines 4 and 6, such as observing and researching. Based on what I observed in Ms. Liu's classes, in which she taught the process of scientific research (see Figure 6.3), she might be referring to the possible connecting point to the theme of how scientists or engineers "[b]uild or design things or observe things, do the research" (Line 6) that could appear in Ms. Wilson's scientist stories (it did), which could echo her science class when students was going through the process of making scientific inquiry. In this way, a common skill could be threaded into each subject area, and the learning in each discipline could be mutually supportive and reinforce one another (Fogarty, 2009).

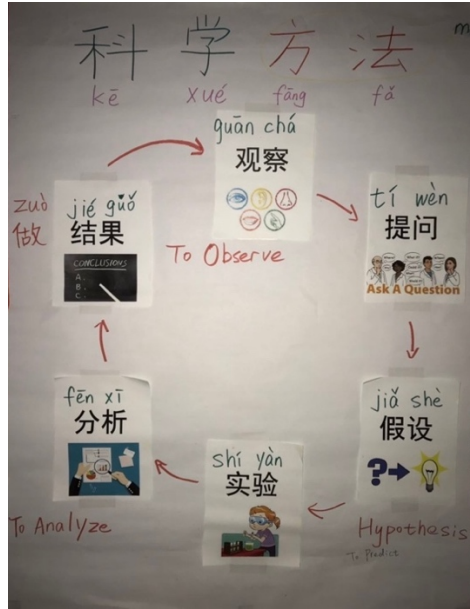


Figure 6.3. Process of doing scientific research (a poster in Ms. Liu’s classroom)

What is to be noted in this example is that a valid *bridge* did not happen just because it was named a “*bridge*,” and also it could not just make sense intuitively to the teachers. Rather, criteria for curriculum bridging needed to be considered in order to guarantee the effectiveness of learning across the English and Chinese instructional time in the real sense.

6.2.2 Limited Linguistic Bridge

Another challenge for teachers to resolve was how to bridge the two languages in their curriculum bridging process. The teachers drew on the Biliteracy Unit Framework (Beeman & Urow, 2013) to set the routine to address the components such as learning objectives, assessment and suggested materials. The Bridge suggested in Biliteracy Unit Framework centers on the comparison and contrast of Spanish and English on the phonological, morphological, syntactic, and pragmatic levels to raise students’ metalinguistic language. However, without reading the original work by Beeman and

Urow (2013) and having only one training session on the Biliteracy Unit Framework by two Spanish immersion teachers, it seemed that the teachers only limited their linguistic bridge at the vocabulary level, which did not address the linguistic features of the languages and only provided equivalent expressions in the partner language to express the concepts. Among the four teachers, only Ms. Liu speaks Chinese, but as Ms. Liu did not have training in linguistics, she did not have a systematic pedagogical knowledge of Chinese, as shown by our conversation on phonetic-semantic characters. Therefore, it could be a real challenge for this curriculum bridging CoP to take advantage of Chinese linguistics to build connections between the two languages. For instance, Chinese also has derivations (Packard, 2000), for example, 科学-科学家 (science-scientist), 艺术-艺术家 (art-artist), 小说-小说家 (novel-novelist), and comparison could be made across these two languages. In the unit of “Community” when teachers were talking about professions, this kind of comparison could build students’ metalinguistic awareness in both languages, although teachers should be aware that students may overgeneralize. Also, at the syntactic level, Chinese and English both have SVO as the basic structure, a feature that can be used for students to practice sentence patterns. Although at the discourse level, Chinese is topic prominent instead of subject prominent (Li & Thompson, 1981). It means that the SVO order in Chinese can be changed in various ways depending on the contexts without generating grammatical mistakes, which is different from the English sentence structures. This kind of differences could also create learning opportunities for students to make contrast and deepen their understanding of the two languages.

Although teachers could cover similar topics in different subject matters based on the correlated knowledge (Adler & Flihan, 1997), what was missing was that they were not able to identify the relatedness of the two instructional languages (Fogarty, 2009) due to the lack of training in both English and Chinese linguistics. In general, the comparison and contrast between Chinese and English may seem less regular and systematic than that between Spanish and English, but building the linguistic *bridge* is still possible between these two languages. Other than the direct translation at the vocabulary level, the connections between the linguistic knowledge in these two languages could be evidenced at other levels. The challenge lies in how teachers perceive and make use of the linguistic knowledge of Chinese and English.

6.3 Issues in Implementation

The term of teacher collaboration has an intuitive appeal, especially in the two-teacher DLE model. However, engagement in CoP can be both generative and constraining and has the potential of pushing the practice forward or drawing it back, inspiring new ideas or settling down (Wenger, 1998). The key lies in how aware the members are of their own practice, where they are now and what the future direction is for their enterprise (Wenger, 2002). Acknowledging the potentials of teachers' self-initiated curriculum bridging process, the following section will focus on a few issues that occurred while teachers implemented their model. At the global level, the curriculum bridging was unidirectional. At the local level, there were concepts that were not transferable across the languages, which carried different cultural nuances. In addition, among the teachers, there were imbalanced powered dynamics.

6.3.1 Unidirectional Bridging

Based on my observation at NGES for about 16 months I found that the curriculum bridging process was unidirectional instead of bi-directional, which means that only Ms. Wilson integrated the science or social studies subjects that were assigned to be taught in Chinese into her ELA instruction, but math that was taught by Ms. Wilson remained siloed without any form of bridging across the Chinese and English instructional time.

In fact, at NGES, originally math was taught in Chinese from kindergarten through second grade, which was purposefully designed by the founders to benefit students from the transparent representation of the base value and face value in the Chinese number system (Miura, Kim, Chang, & Yukari, 1988), and then it was switched to be taught in English from Grade 3 to Grade 5. After the principal Ms. Brown came, math was assigned to be taught in English starting from Grade 2 based on the teachers' and students' experiences in previous years. According to Ms. Brown,

What I recognize with my experience as a second grade teacher is that the vocabulary in math and the large amount of explanation students need to do in math would not really allow them to stay in the target language for very long, because there is a large number of speaking and communicating that is taking place. And they've already spent so much of their time just focusing on vocab that they would not get to the math.

It was suggested that in partial immersion program, math and science could be taught in the non-English language considering that these subjects “require less extensive proficiency in reading and writing” compared to other subjects such as social studies (Met, 2000, p. 142). However, as what Ms. Brown mentioned, there was an increasing emphasis on students' ability to verbalize their math thinking, to understand and solve word problems, and to do accountable math talk, which all requires sufficient language

proficiency. Ms. Wilson also found that when her students moved from first grade to her classroom, “they are mental math thinkers, but they cannot verbalize it” in English. Without empirical research evidence, Ms. Wilson said that she was not sure if it was because students’ math thinking was “housed” in Chinese. Considering the close relationship between extensive exploratory talk and the thinking process (Barnes, 2008) and the great pressure of standardized math assessment, Ms. Brown’s decision to switch math to the English classroom was legitimate. However, the problem was that even among the teachers who actively advocated curriculum bridging also viewed math as a “siloeed” realm.

And I think the design of like what the school was supposed to function is to have these siloeed pieces, like math is supposed to be the most siloeed of all of them, and then like the literacy pieces have a little bit more fluidity and flexibility because there is so much that you could actually find books about the science and social studies topics that connect back to literacy standards. As for math, it may be hard to find those things that are naturally occurring that would flow between the two (Ms. Wilson).

According to Ms. Wilson, math was supposed to be taught in English only based on the design of the program. From the perspective of practicality, math was less fluid and flexible than science and social studies that could connect with ELA relatively easily. As for why there was no bridging of math to Chinese, according to Ms. Wilson, she regarded the responsibility of teaching math as solely her own, considering that Ms. Liu had already been struggling with so many challenges in teaching her own subjects. Ms. Liu told me that she felt very grateful that Ms. Wilson offered support to her teaching, and she was willing to do the same for the math subject. However, since Ms. Liu did not have professional training in math in the U.S., “it would be one more thing for Ms. Liu to have to figure out and know about and deal with in an already really busy day” (Ms. Wilson).

Then what does it mean to students if there is no bridging in math across the two languages? In both Ms. Liu and Ms. Wilson's classrooms, I almost never encountered any instances that students used the Chinese language or any linguistic features of Chinese to learn math except when they counted how many seconds that Ms. Liu had been waiting for students to behave or how many bonus paws they got for good behavior. The only instance of students using Chinese in math that I encountered was when Bella wrote her result of an addition problem in Chinese characters on her white board. The result was 107, and she wrote, “一百七” (170). Although she told Ms. Wilson she got 107 in English, she wrote one hundred and seventy in Chinese characters, which should be “一百零七” (107). The reason why this error occurred was that there was no continuous learning of math in Chinese, even at the basic level of counting over one hundred. My observation was echoed by Ms. Wilson, “they are very much monolingual in math I think once they hit second grade and beyond.”

Then is it the ultimate goal of DLE program? In other words, will students have the opportunities to take advantage of the bilingual resources in learning math? For example, numerically both Chinese and English adopt the base 10 numeration system, which means that the value of a given digit in a multidigit numeral depends on both its face value and its place value, meaning the value of a same digit increases by 10 times by moving its position from right to left. However, the difference lies in the spoken system. In Chinese the numerals are named based on the tens and ones contained in them, and how they are spoken is corresponding to how they are written (Miura et al, 1988); for example, the number 12 is read ten-two (*shí èr*), and 23 is read two-ten(s)-three (*èr shí sān*) in Chinese. While in English, not all the numerals are read based on its elements of

tens and ones, for example, 12 is read twelve, no indication of the face value of the digits. According to Miura et al (1988), benefiting from the transparency of the place- and face-values in the Chinese numerical language, Chinese-speaking students tended to construct numbers by building on base 10 blocks, while English-speaking children tended to rely on a grouping of counted objects. In addition, since Chinese is a monosyllabic language, except rare cases, most of the Chinese words, including all the one-digit numbers from 0 to 9 consist of only one syllable, some Chinese-English bilingual students found it easier to get familiarized with the multiplication table in Chinese by reading, for example, $1 \times 3 = 3$ as 一三得三 (yī sān dé sān). Instead of three times four equals twelve, they read $3 \times 4 = 12$ as 三四一二 (sān sì yī èr), which facilitated them to extract the equations more intuitively when they did calculations (Sun, 2011). Without the continuous learning of math in Chinese, students may not be able to identify or keep the advantages of understanding numbers in Chinese.

Another point is that in the process of teacher collaboration, it seemed that Ms. Liu was positioned as the one who was in need of help and Ms. Wilson offered support to cover some of the science and social studies topics in English. While in the math subject, Ms. Wilson mentioned that if Ms. Liu felt ready and willing to help, she was more than happy to collaborate, but she also did not want to impose on anyone to do things for her, although she also faced her own challenges in teaching. For example, she mentioned the difficulty of teaching phonemics and phonics, which she believed was something she could overcome over time, and she did not want to disrupt others' instructional flow and “make anyone else's day-to-day more complicated” just because they had to integrate the

subjects she taught. Although both Ms. Wilson's good intention and Ms. Liu's day-to-day struggle needed to be acknowledged, what could be improved in their unidirectional bridging was the mutuality in their engagement, that is, to incorporate the competence of all the members in their group so that not only the members but also the teaching of the subject areas can be mutually supportive (Adler & Flihan, 1997; Wenger, 2002).

The unidirectional bridging across the two classrooms was a decision that was made based on multiple factors, including the consideration of a better approach for students to learn math, the pressure of state-level standardized tests, teachers' expertise and the dynamics between the collaborative teachers. However, placing math in a siloed monolingual space may deprive students of the opportunities to use their bilingual resources or the linguistic features of the partner language to facilitate their math learning (W. Lee & Lee, 2017). Moreover, the unidirectional bridging is not conducive for the participant teachers to build up a mutual relationship to support each other and draw on their expertise to contribute to the whole CoP.

6.3.2 Untranslatable Concepts

In the curriculum bridging process, the teachers planned their curricula to cover similar topics, however, there were inevitably concepts that did not necessarily translate across languages and cultures in equivalent ways. For example, suburb, the direct translation into Chinese is 郊区(jiāo qū), the outskirts of a city that are economically less developed than the city, which carries different cultural nuances from what suburb means in the U.S. Although the two teachers sometimes addressed the same concepts in their classes, Ms. Liu discovered that the nuances of certain words were different across the two language systems.

At times, Ms. Liu decided not to go into the subtle differences in Chinese based on her understandings of appropriateness or value for students. For example, the concept of community, Ms. Liu used its direct translation 社区 (shè qū) in her instruction, meaning a physical area where people live in Chinese. Ms. Liu explained in her reflection why she chose to use the direct translation, although it did not carry the same conceptual meaning.

我觉得这里面的社区，它不只是一个组织结构...一种意识，有点像我们的集体，对吧，我们不能说集体就是一个组织。但是大家都要说，在中国，大家都喜欢说，你要关心这个集体，其实是这个概念。但是你不能把 community 翻译成集体，因为概念上可能我们这种理解更相似，但是它叫 community，将来看到的所有的翻译可能都是社区，所以就得叫社区。

(In the US, I think community is not only a physical entity... it is an ideology. It is like the collective (集体, jí tǐ) in China, right? We cannot say “collective” is an organization. But in China, everyone likes saying you need to care about the collective (集体); it is like this concept. But you can't translate community into collective (集体), although conceptually they are more similar. It is community in English, and in the future the translation they see of this word may always be 社区 (shè qū), then we have to use 社区 (shè qū).)

Based on Ms. Liu's understanding, the gist of the concept of community in the U.S. was that it referred to an ideology in addition to a physical entity in the sense that people should care about their community. From this perspective, Ms. Liu registered that the translation of 集体 (collective) reflected the concept of community more precisely compared with the direct translation of 社区, which in Ms. Liu's words, “cannot be bridged to the concept of community.” However, Ms. Liu chose the latter because she was afraid that using the word 集体 (collective) to refer to community would impose Chinese ideology on American students, which she thought was not appropriate, although in her opinion, they carried similar connotations. Also prevalent translation tools that students have access to, for example, Google translate, all use 社区. Thus, in order to

avoid confusion, she chose the direct translation. I asked Ms. Liu since she was aware of the differences, if she would teach what the equivalent terms really meant in Chinese. She was quite firm that the content standards required in the American curriculum was the target to hit, and she was not going to teach the Chinese concepts. Although cultural awareness was a component required by the content standards, Ms. Liu mentioned that that was not the key, and learning about America was her students' priority.

因为你要教的是美国小孩,所有的东西就把它当成英文课,学习它的 standards,然后它要求你教给他什么,你就教给他什么。不能去教他、我不太赞成、我应该不会去教他们中国的概念,对应概念。这不是他们这个 standards 的重点,而是 standards 之后,他们知道 diversity,因为每一个 social studies,每一节课都有你要去 compare,你要知道,因为 standards 也有一条,就是你要知道 differences,就是 international 是怎么样的。但是他们首先肯定是要先学美国的。

(Because you are teaching American kids, so you need to study American content standards like you are teaching in English. You teach what the standards require you to teach. I cannot, I am not for, and I may not teach them the equivalent Chinese concepts. It is not the key of what the standards require. But after meeting the standards, students need to learn about diversity, because in each social studies unit, there need to be a component of comparison. That's because it is required by the standards that students know the differences and what it is like internationally. But they need to learn about America first.)

Ms. Liu encountered similar challenges in the unit of “citizenship” in which characteristics and qualities of a good citizen were the learning objective. It was very hard for Ms. Liu to translate citizenship or good citizenship into equivalent Chinese expressions, so she used 好公民 (good citizen) as the central topic of the unit.

Going back to the curriculum bridging process, in the case of teaching the concept of community, while Ms. Liu and Ms. Wilson were discussing “社区” and “community” respectively in their classrooms, were they talking about the same or different concepts? Should students be bridged to understand the connotations of the terms they learn, no matter it is in English or Chinese? In the whole process of data collection, there was no discussion between the Chinese teacher and the other three English teachers on the issues

of translation and transferability of concepts, thus the English teachers might not be aware of the subtle differences. Whether getting into these finer subtleties of the translation and connotation was at the discretion of the Chinese teacher and what she saw to be appropriate and effective for students' learning. In other words, the transferability of concepts was never introduced into the shared repertoire constructed by the CoP. This lack of awareness in a way prohibited Ms. Liu from reconsidering her own assumptions as well as the CoP from discovering potential possibilities for bridging (Wenger, 2002). In this case, it resulted in missed opportunities for the teachers to do comparison and contrast to raise students' cultural awareness that could be one of the ways of curriculum bridging.

6.3.3 Imbalanced Power Dynamics among Teachers

In the four teachers' CoP, Ms. Liu's learning about lesson planning and instructional practices happened through her communication with the other three teachers. As shown in Section 6.1, all the teachers collaboratively worked towards increasing accountability in their teaching, especially Ms. Liu whose change in her understanding of teaching and learning was reflected in her actual instructional design. In their CoP, compared with Ms. Liu, the other three teachers were her more capable peers (Vygotsky, 1978) who were more senior than her and had both more experiences and training in the teaching profession. Moreover, the co-planning meetings were conducted in English, a language that Ms. Liu was less proficient in than the other three teachers. Therefore, although these teachers worked for a joint enterprise for curriculum bridging and aimed to support each other, it was found that there were power dynamics among the teachers that caused imbalanced collaboration as shown in the following examples.

Excerpt 6.5

Interrupted Utterances

Line	Speaker	Utterance	Available Contextualization cues
1	Ms. Wilson	Is this feeling too complicated on you?	
2	Ms. Liu	No, it helps me to like	
3	Ms. Jones	Hone it in? ↑	Ms. Jones immediately started to talk when Ms. Liu paused.
4	Ms. Liu	Like how to guide them to do that, because when I think about this project, it is very engaging, but it's also very hard to like really	Speaking slowly
5	Ms. Jones	Teach it? ↑	Ms. Jones immediately started to talk when Ms. Liu paused.
6	Ms. Wilson	Like lock it in? ↑	
7	Ms. Liu	Like how to let them know that it is not just they are	
8	Ms. Jones	Free for all.	Ms. Jones immediately started to talk when Ms. Liu paused.

The above conversation happened after the teachers helped Ms. Liu come up with the guidelines for the activity “Build Your Own Animal.” Ms. Wilson checked with Ms. Liu if she would feel “too complicated” about using the guideline. It seemed that Ms. Wilson did not want Ms. Liu to feel that they were imposing their ideas on her and forcing her to use the guideline. Ms. Liu answered, “No, it helps me to like” and she made a short pause as if she was searching for words to finish her sentence. But Ms. Jones immediately cut in by suggesting the expression “Hone it in.” From Line 4 we can see that although Ms. Liu spoke more slowly than the other teachers and needed to pause while speaking, she had

the English proficiency to express her thoughts in this specific conversation, for example, she thought the activity would be engaging but she realized that it might be hard to implement it. However, when she paused again, both Ms. Jones and Ms. Wilson cut in to pick words for her, and this situation continued (see Line 5, 6 and 8). This example showed that linguistically Ms. Liu was positioned as someone who needed help from others to complete her English expressions. The following is another instance showing the power dynamics among the teachers.

Excerpt 6.6

Ms. Davis Suggesting an Instructional Strategy to Ms. Liu

Line	Speaker	Utterance	Available Contextualization cues
1	Ms. Davis	I mean do you know what a CCD ⁵ is? ↑	
2	Ms. Liu	Umm the the	Low voice
3	Ms. Davis	The vocabulary chart.	
4	Ms. Liu	The cognitive	
5	Ms. Davis	Yeah.	
6	Ms. Liu	Yeah, I know that.	
7	Ms. Davis	Are you comfortable doing those? ↑ I forgot about to make sure you know about those.	
8	Ms. Liu	I know that, but I I just don't think Umm, that I will use it this unit.	
9	Ms. Davis	Cuz I've been using it. You only pick one word a day.	
10	Ms. Liu	Mm Hmm. Mm Hmm.	

In this excerpt, Ms. Davis inquired if Ms. Liu knew the vocabulary teaching strategy of CCD, Cognitive Content Dictionary, which they had discussed one week before in the “Animal Heredity and Adaptation” unit. It seemed that Ms. Liu had an

⁵ CCD stands for Cognitive Content Dictionary. It is a vocabulary teaching strategy where students are introduced to a new word; they make predictions about the word meaning and later the teacher clarifies any misconceptions and discusses the final meaning. Then students create sentences with the new word.

impression on that discussion, but she was struggling to search for the right term for the teaching strategy. She paused a lot and used a low voice while she was speaking in Line 2. Ms. Davis reminded her of the element of the vocabulary chart. In Line 4 Ms. Liu remembered what the first C stood for but did not come up with the full term. She stopped there and she told Ms. Davis that she knew what it was. Having heard a confirmative answer, Ms. Davis said in Line 7, “[a]re you comfortable doing those? I forgot about to make sure you know about those.” Ms. Davis was suggesting Ms. Liu use this strategy in her class and positioned herself as someone who had the responsibility to keep Ms. Liu informed of useful teaching strategies. However, although with some hesitation, Ms. Liu told Ms. Davis that she did not plan to use it in the current unit. It seemed that Ms. Davis did not quite understand why Ms. Liu did not want to try and emphasized “[c]uz I’ve been using it. You only pick one word a day”, indicating that based on her experiences, it was not complicated to implement it. Her utterance also implied that you should try it, “[c]uz I have been using it,” although Ms. Liu had shown resistance.

In the CoP of curriculum bridging, different teachers assumed different roles in contributing to their joint enterprise. From these two instances and other excerpts of conversation between the teachers in Section 6.1 that discussed the increased instructional accountability of Ms. Liu, we can see that it was Ms. Liu who was positioned as the person who was in need of help in terms of the language use and instructional design, and there were instances that the other teachers intended to make decisions for her, for example, using the CCD strategy. There were several confounding variables that led to the imbalanced power dynamics, including but not limited to the age

difference, teacher novelty as well as English proficiency. Compared with the other teachers, Ms. Liu was not a certified teacher, and she was younger, less experienced and less confident in teaching. Further, she was using a foreign language to express her thoughts in the co-planning meetings. On the one hand, Ms. Liu was indeed in need of the guidance from other members of the CoP to revise and expand her vision of teaching and learning. Her interactions with the more capable peers created learning opportunities for her to improve her teaching. On the other hand, it seemed that other teachers' interruption of Ms. Liu's utterances and questioning of Ms. Liu's decisions were imposing ideas on Ms. Liu, and that Ms. Liu's agency and decisions were in a way not acknowledged in these communicative practices, which might hinder Ms. Liu from gaining professional growth as shown in Excerpt 6.7.

Excerpt 6.7

Ms. Liu Discussing Instructional Plan with Ms. Wilson

Line	Speaker	Utterance	Available Contextualization cues
1	Ms. Liu	And for this part, it that OK to I'm just trying to think about to let them draw it or write it?	
2	Ms. Wilson	Mm Hmm	
3	Ms. Liu	For the third graders, definitely I would like them to write.	
4	Ms. Wilson	Yeah	
5	Ms. Liu	For the second graders, I	Ms. Liu was cut off by Ms. Wilson
6	Ms. Wilson	I think it is your world, and you say what's right. I'm only here to support you on this journey and my support is you know what's best for your kids. I've no idea.	

One week after the CCD conversation, in another co-planning meeting when only Ms. Liu and Ms. Wilson were present, Ms. Liu was asking advice from Ms. Wilson about whether to include a writing component in her activity in Lines 1, 3 and 5. Before Ms. Liu finished her sentence in Line 5, Ms. Wilson cut her off and emphasized that Ms. Liu should “know what’s best for” the kids and make her own decisions. As the co-planning meetings continued, after being questioned for several times and suggested various instructional strategies, Ms. Liu habitually asked for confirmation from her peers about her instructional plan. Asking another teacher “is that OK to” let students draw or write in her own classroom itself already indicated the imbalanced power dynamics. Therefore, it is worth noting that although as an inexperienced teacher, Ms. Liu needed scaffolding from her peers in the process of lesson planning and instruction, it was necessary that teachers construct a balanced relationship of collaboration so that each member could contribute to the joint enterprise in their own ways and gain growth in the real sense.

6.4 Summary

The first section of this chapter focuses on one aspect of the benefits of curriculum bridging, the increased accountability of Ms. Liu’s instructional practices, a key characteristic of CoP. Immersion teachers’ lack of teaching experiences and professional training is a common problem in DLE programs (Palmer et al., 2016; Zhou & Li, 2015a, 2015b), but the curriculum bridging endeavor seemed to have provided with the teachers an opportunity for on-site training. Through the discourse analysis of a telling case in which teachers revised a classroom activity designed by Ms. Liu, it was found that there was a collaborative effort towards accountability in each member’s teaching. Coming from different backgrounds, the teachers contributed their unique

expertise to their community, which enabled teachers to learn from each other. Ms. Liu's understanding of teaching and learning was broadened through the interactions with more experienced teachers like Ms. Davis, and there was actual change happening in her teaching, which demonstrated that she did take up the learning opportunities afforded by the relations of accountability that were produced by the joint enterprise of curriculum bridging.

Despite teachers' positive attitudes towards the curriculum bridging enterprise, there were also challenges and issues involved in the process. First, while teachers planned for the bridging point, the teachers' focus was more on creating the bridge *per se*, and there was usually a lack of systematic theoretical consideration for its validity in facilitating students' learning for and beyond the discipline. Second, due to the lack of knowledge in Chinese and English linguistics, the teachers focused mainly on the vocabulary level for students to acquire equivalent terms, which was very important for students' bilingual development, but they failed to recognize the relatedness of the two languages and construct possible ways to compare and contrast these two languages at other linguistic levels. Further, unidirectional bridging, untranslatable concepts and imbalanced power dynamics were the major issues found from the data that hindered the teachers from fully exploring the potential benefits of curriculum bridging, such as allowing students to take advantage of all the linguistic resources to learn each subject, enriching the shared repertoire, and allowing each teacher to contribute in a safe and balanced relationship of collaboration.

Chapter 7 Effects and Potentials of Curriculum Bridging

From the last two chapters, we can see that the four teachers made great efforts to construct ways to bridge the lessons across the English and Chinese instructional time so that there was continuity in students' learning and students could access the content knowledge in both languages. This bottom-up initiative of curriculum bridging as a localized response to the teacher/language separation approach sounds very appealing, but one of the key questions is how it was or was not achieved in class. In other words, did students notice and take up the connections that the teachers had embedded in their lesson plans. If yes, how did curriculum bridging influence students' learning?

The routine that the teachers created for curriculum bridging usually started with Ms. Wilson' frontloading, which refers to the process of introducing key vocabulary and concepts in English first to prepare students to learn in Chinese. This means that most of the time students already had some understanding of the concepts through watching videos, participating in discussions or listening to read-aloud in Ms. Wilson's class. When they transferred to Ms. Liu's class, they engaged in activities that specifically focused on the topic of the science or social studies unit. In order to explore whether students recognized the connections between the learning across the Chinese and English instructional time, I observed all the science or social studies class each week and what happened in the English classroom before they switched to work with Ms. Liu. Mixed messages were found to the questions stated above. I will use examples from both the science units and the social studies units to illustrate the point of mixed messages.

7.1 Connections in Content Learning Recognized by Students

As analyzed in previous sections, Ms. Wilson usually integrated Ms. Liu's science or social studies topics into her read-aloud time so that she could frontload students with the key concepts in English and at the same time create a sense of coherence of the content taught across the two linguistic spaces. Based on my analysis of the classroom interactions, it was found that in each of the units I observed, although not in each lesson, there were instances that students made connections between what they learned in Ms. Wilson's class and what was being taught in Ms. Liu's classes, as illustrated by the following examples.

Excerpt 7.1 happened in the first class of the unit "Animal Heredity and Adaptation." Ms. Wilson started her teaching of the new unit with a Big Book⁶ written by herself to introduce the concept of heredity and then she employed a read-aloud *What if You Had Animal Hair* and a follow-up activity to facilitate students' understanding of heredity. The part of her Big Book that was read on that day was,

The important thing about heredity is that every living thing has special traits that have been passed down from great grandparents to parents, then to offspring. These special traits allow the offspring to live in their unique environment. A Bernese Mountain Dog puppy will have similar color fur as their parents, but the important thing about heredity is that every living thing has special traits that have been passed down from great grandparents to parents than to offspring (Ms. Wilson's Big Book on Heredity).

While reading, Ms. Wilson emphasized that "living things have special traits they could pass down even further back than great great grandparents...a species have traits that keep going going and going and going"; in other words, animal traits were passed down

⁶ It is a teacher-made enlarged book that is composed of academic language and pictures. Each page repeats one or two sentence frames. Through reading and discussing, the Big Book strategy is used to facilitate students' especially English Language Learners' learning of concepts, vocabulary and key academic expressions. The Big Book is one of the strategies included in the Orange County Department of Education Project GLAD strategies. GLAD represents Guided Language Acquisition Design that aims to improve English Language Learners' language learning.

from their ancestors that allowed them to survive in their living environment. Since not many students heard about the word “heredity,” Ms. Wilson used the Big Book to explain its meaning. Then she read *What If You Had Animal Hair*, a book that discusses the functions of animal hair, for example, polar bears’ fur and lions’ mane, and why humans do not have animal hair. The discussion question proposed by the teacher before she started to read was “why don't we have animal hair.”

Excerpt 7.1

Discussion on Why Humans Do Not Have Animal Hair

Line	Speaker	Utterance	Available Contextualization cues
1	Ms. Wilson	Why don't we have animal hair? What do you think, Peter?	Looking at Peter
	Peter	Because he does not get what he has; he gets what he needs to survive.	
2	Ms. Wilson	Interesting. So maybe it is because it's not what we need to survive ↑. Bella	Looking at Bella
3	Bella	Umm because our great great great whatever great great grandparents, all back there were not animals. There were humans.	
4	Ms. Wilson	We did not come from the same type of parents as porcupines.	

In the discussion session, Peter interpreted the question from the perspective of adaptation, that is, animal hair was not what humans needed to survive, and Ms. Wilson echoed Peter. Then Bella referred to the information from the Big Book they just read and answered in Line 4 that our ancestors were not animals, so they could not pass animal hair to us. It seemed that students had understood the concept of heredity. The next day, in Ms. Liu’s first class on heredity, she designed a warm-up activity in which she showed students pictures of an orange elephant, a blue horse and some other animals.

Her questions were “你觉得真的有橙色的大象吗？可能还是不可能？为什么？” (Do you think there are orange elephants? Possible or impossible? Why?) Then the questions extended to other animals, for example, horses, crocodiles and donkeys. Part of the discussion was shown in Excerpt 7.2.

Excerpt 7.2

Discussion on Why Donkeys Cannot Be Colorful

Line	Speaker	Utterance	Available Contextualization cues
1	Ms. Liu	我的问题是为什么有些颜色 never 你觉得不可能。你会觉得彩色的, 看! 你会觉得彩色的驴子是不可能的, 一个彩色的驴子是不可能的。 (My question is why you think some colors are never possible. You'll think colorful Look! you'll think it is impossible for donkeys to be colorful , impossible for a donkey to be colorful.)	Speaking very slowly
2	Lucas	Because it's impossible.	
3	Ms. Liu	因为 (stress) (Because)	Stress “因为” and stop speaking to elicit Lucas' ideas
4	Lucas	因为它不可以 be born like that 。 (Because it can't be born like that.)	
5	Ms. Liu	因为它不可以 born like that. 因为它的谁给它的? (Because it can't be born like that. Because who gave it the color?)	
6	Lucas	它的 ancestors 不是 (Its ancestors aren't)	
7	Cathy	它的家人[不是 (Its ancestors aren't)	
8	Lucas	colorful like that.]	
9	Ms. Liu	一个一个 (One by one)	Looking at Cathy, suggesting Cathy to let Lucas finish first

- 10 Lucas 不是 colorful like that 。
(not colorful like that.)
- 11 Ms. Liu 它的爸爸妈妈，or 它的爷爷奶奶。
(Its parents or its grandparents.)
- 12 Lucas Yeah.
-

In this discussion between Ms. Liu and the students, we can identify the traces of Ms. Wilson’s teaching on heredity. When students answered Ms. Liu’s question why a donkey cannot be colorful, Lucas emphasized, “因为它不可以 be born like that” (because it can’t be born like that), because “它的 ancestors 不是 (its ancestors are not), 不是 colorful like that (are not colorful like that)” in Lines 6, 8, and 10, and Cathy held similar opinions as shown in Line 7. In the whole discussion session that was not included in the excerpt above, Lucas and Cathy were not the only students who made connections with what they learnt in Ms. Wilson’s class. While discussing why elephants could not be orange, Bella and Dina also contributed their ideas, “因为它的 family back were not orange probably, 橙色，所以它也不是橙色” (because its family back were not orange probably, orange, so it can’t be orange), and “[w]hat if 它的家人红色和白色?” (what if its family members were red and white?) respectively, which all implied the idea of traits passing down from ancestors to the offspring.

Although Ms. Liu never mentioned the term “heredity” in either English or Chinese in this class, students voluntarily related Ms. Liu’s questions and examples with Ms. Wilson’s teaching and the information on heredity encoded in English, based on which, they made their own analysis and then tried to formulate their answer in Chinese. Since students like Lucas did not know how to say “born,” “colorful,” or “ancestors” in Chinese, they used translanguaging as a mediator to express their ideas. This example

shows that students could recognize the relatedness between the classroom activities across the two linguistic spaces and they were able to maneuver two languages to synthesize the information they acquired.

From the perspective of interdisciplinary teaching, Ms. Wilson and Ms. Liu took the approach of juxtaposing information side by side in a parallel fashion, which lies at one end of the interdisciplinary continuum that focuses on the correlated knowledge (Adler & Flihan, 1997). At this level of the interdisciplinary continuum, since teachers' focus is not on the pre-planned common goal but their respective instructional plan, it largely depends on students to recognize the connections between what has been taught in different classes (Adler & Flihan, 1997; Applebee et al., 2000). With regard to the curriculum bridging approach, these instances showed that students were able to recognize the relatedness of the instruction across the two linguistic spaces. The instances of students transferring knowledge they learnt in English to the Chinese classroom happened in each unit of study. Similar examples are listed in the Appendix (see Appendix 3) as well as in the following sections. However, what is worth noting is that mixed messages were found from the analysis in the sense that although students recognized the relatedness of teaching, the continuity of learning could be disrupted by teachers' actual instructional practices.

7.2 Continuity in Content Learning Disrupted by Teachers

In this section, I will continue to examine whether curriculum bridging was or was not achieved in class. Ms. Wilson's coverage of the science and social studies units enabled students to have access to more diverse materials that were available in English and to engage in more in-depth discussion on the topic in their stronger language. The

problem was that because of the lack of coordination and teachers' assumptions on bilingual learning, the continuity in content learning sometimes was disrupted in terms of retaining relatedness and maintaining the academic rigor of the curricular design.

7.2.1 Relatedness Disrupted

According to Fogarty (2009), relatedness in an interdisciplinary unit refers to “natural hookups and connections across the various disciplines” (p. 119). It is an important characteristic of an interdisciplinary design, which may range from without connections to natural and genuine connections across disciplines (Fogarty, 2009). However, no matter how well a lesson is planned, the ultimate quality of which depends on teachers' enactment and students' take-away. The connections that are intended by teachers may go unnoticed by students, while students may make connections that are not expected by teachers in their lesson planning (Applebee et al., 2000). Tying it to the current study, when the latter happens, part of the mission of curriculum bridging is achieved, that is, “there is continuous learning behind both” classrooms (Ms. Wilson). However, in actual implementation this continuity was disrupted by the teachers due to the lack of coordination and Ms. Liu's unfamiliarity with the materials and language used in the English classroom.

7.2.1.1 Lack of Coordination. The following two excerpts happened on the same day when Ms. Wilson and Ms. Liu were teaching the unit of “Culture Diversity.” Different from other units, these two teachers started this unit at the same time instead of adopting the normal procedure that Ms. Wilson did frontloading first. Ms. Wilson began the unit with the discussion of identity and stereotype to convey the idea that everybody was unique, and “how stereotypes might hurt someone's identity”, if people were judged

by what appeared to be true. The following is part of the first-time discussion on identity between Ms. Wilson and the students.

Excerpt 7.3

Teacher-Student Interaction on Identity

Line	Speaker	Utterance	Available contextualization cues
1	Dina	Like it tells you who you are, so that people know that you are safe, and like if you work somewhere, you get some kind of tag like Ms. Wilson has. Put your identity on there so like people know you are safe, and if you work somewhere.	Ss were sitting on the carpet facing Ms. Wilson and Ms. Jones
2	Ms. Wilson	So you guys are thinking about identification as a connection to this. Identity is same or different? ↑ OK, Cathy.	
3	Cathy	Sometimes people are louder XXXX or something, you want to hide your identity, so that they don't know who you are. So it kind of	
4	Ms. Wilson	It tells [who you are.	
5	Cathy	It tells who you are.]	
6	Bella	Like basically yourself, like who you are.	
7	Ms. Wilson	Awesome, Bella!	
<i>In between Line 7 and 8 voices of non-participant students were deleted from the audio.</i>			
8	Ms. Wilson	We have some really COOL ideas actually here about identity. Here are how our brains are going to think about identity. Identity is know who I am, what I like, what I don't like.	
10	Dina	[What you look like.	

11	Ms. Wilson	What is important to me.] What I look like. All of those things are kind of like a puzzle piece that fits together, and the puzzle pieces make all of this, me as a human. Here is my little puzzle piece about what I like. Here is my little puzzle piece about what I don't like; maybe here a piece about what I look like. All of this works together to make me who I am. Now I know who I am, and when other people see me, they might THINK they know some things about me. Maybe from how I look, but do they know all of me?↑	Pointing to herself while saying "all of this". Pointing to shoulder while saying "puzzle piece about what I like"; pointing to other body parts while saying "a piece about what I look like."
12	Ss	No.	loud voice

At the beginning of this excerpt, students were brainstorming what identity means. Students mentioned their understanding along the lines of “identification,” “secret identity,” and “who you are.” It seemed that students only had a vague idea of its meaning, which became a teachable moment for Ms. Wilson. Ms. Wilson made an analogy between puzzle pieces and what made who you are. She used the examples such as “what I like,” “what I don’t like,” and “what I look like” to illustrate the meaning of identity. Then Ms. Wilson guided students to think if people made judgement based on what they thought was true about her, did they know the true identity of her? Students were very firm and answered loudly, “no.” Then Ms. Wilson transitioned to the topic of stereotype, and they had some thought-provoking discussion on the connections between identity and stereotype.

The same day in the afternoon, these students transitioned to Ms. Liu’s Chinese classroom and took the social studies class. As planned, Ms. Liu began the unit of “Culture diversity” with the discussion of personal culture by using herself, “Ms. Liu’s culture” as an example. Before they started the discussion, they reviewed a book *We are*

the same; We are different that they read the day before to illustrate the point that everybody was unique. Then Ms. Liu introduced what languages she spoke, what she liked eating, wearing and doing.

Excerpt 7.4

Teacher-Student Interaction on Personal Culture

Line	Speaker	Utterance	Available contextualization cues
1	Ms. Liu	好 all of this 是刘老师的不一样的地方，and it is my 是刘老师的文化。[不是 (OK, all of this is something unique about Ms. Liu, and it is Ms. Liu’s culture . Not)	Ss were on the carpet facing Ms. Liu. Tamie was standing at the edge of the carpet
2	Ss	Identity]	Loud voice
3	Ms. Liu	不是 identity，我知道你们和 Wilson 老师学了 identity 。但是刘老师想说的不是 identity 。是我的文化。你想想，刘老师吃的，刘老师说的语言， my language ，刘老师喜欢玩儿的，刘老师庆祝的，刘老师的家人，刘老师住的，刘老师穿的，刘老师喜欢的音乐和艺术，画画和音乐。Bella 你觉得什么是文化？↑ (Not identity. I know you learnt identity with Ms. Wilson. But what I want to talk about is not identity. It is my culture. You think about it, what Ms. Liu eats, what languages Ms. Liu speaks, my language, what Ms. Liu likes playing, what Ms. Liu celebrates, Ms. Liu’s family, where Ms. Liu lives, what Ms. Liu wears, and what art and music Ms. Liu likes, painting and music. Bella, what do you think is culture?)	
4	Bella	是你的 personal like yourself basically...What you like, basically (It is your personal like yourself basically...What you like, basically)	
5	Lucas	What your life is.	
6	Tamie	Identity. Ms. Wilson said earlier, right? ↑	Tamie started to walk around the carpet.

7	Dina	It's not that.	Dina were looking at Tamie.
8	Molly	All the stuff about you.	
9	Ms. Liu	It's all about me. Cathy 你觉得?小朋友你看一看这些. (It's all about me. Cathy, what do you think? Class, look at these.)	Pointing to the slides that include her "personal culture" on the screen
10	Cathy	Is it personal preference? ↑	
11	Ms. Liu	对, why do you think I have these different preferences or 不一样? 为什么有这些不一样? (Right. Why do you think I have these different preferences or differences? Why are there these differences?)	
12	Frank	因为我们 unique. (Because we are unique.)	
13	Ms. Liu	因为我们不一样, 是为什么我们不一样, 为什么我吃的不一样? 我是一个中国人, 你是一个美国人, 我从 (Because we are different. Why are we different? Why do we eat different food? I'm Chinese, and you are American. I'm from)	
14	Peter	这是你的 opinion。 (This is your opinion.)	
15	Ms. Liu	这不是我的 opinion。 (This is not my opinion.)	
16	Tamie	Identity ↑	Tamie stopped walking and looked at Ms. Liu.

Based on all the examples, Ms. Liu wanted to convey the idea that the combination of all the things about her was called Ms. Liu's culture. After processing what Ms. Liu explicated, for example, her likes and dislikes and all the puzzle pieces about her, students shouted out immediately, "identity." However, Ms. Liu emphasized that what she was talking about was not identity, although she knew Ms. Wilson had taught identity in her class. Then she repeated all the examples she mentioned earlier and

asked students “什么是文化” (what is culture)? Bella answered, it was “yourself basically”, which was exactly how she defined identity in Ms. Wilson’s class. Other students started to guess whether 文化 (culture) was “what your life is,” “all the stuff about you” or “personal preference” in Lines 5 and 8 and 10 respectively. Then Ms. Liu started to guide students to think why people had personal preferences and uniqueness by specifically mentioning that she and her students were from different countries. It seemed that she wanted to lead students to answer that different people from different places had different cultures. Yet, the questions framed by Ms. Liu could not lead students to think that far. Students, especially Tamie, seemed to be confused and kept asking and wondering if Ms. Liu was talking about “identity” and why it was not identity.

The reason why I stated earlier that mixed messages were found in the implementation of curriculum bridging was that if we ask whether students recognized the connections in learning across the two linguistic spaces, the answer was yes based on the classroom interactions, but at the same time, students’ understanding of the concepts seemed not to be enhanced, but hindered in this case. Ms. Wilson’s goal of bridging, which was to encode the conceptual knowledge in students’ stronger language and enable students to take the knowledge base with them to process their learning in Chinese, was realized. For example, while Ms. Liu introduced her personal information, likes and dislikes, students were attending to the messages, processing the information encoded in Chinese, and then making connections with what they learnt in Ms. Wilson’s class, which seemed to be the reason why they immediately answered that all the pieces about Ms. Liu was her identity. Even having been negated twice by Ms. Liu and Dina in Lines 3 and 7 respectively, Tamie still insisted that it was identity that Ms. Liu was talking about. As

Molly said, it is “all the stuff about you,” then why was it not identity according to the prior knowledge they got from the English classroom? Although students were using English to engage in the discussion, they were drawing on information from both languages and answering Ms. Liu’s questions based on their own analysis (Swain & Lapkin, 2013). From this perspective, students were accessing knowledge in both English and Chinese.

However, the relatedness recognized by students was disrupted due to Ms. Liu’s instructional practices and the lack of coordination between the curricula of the partner teachers. When students mentioned the concept of identity, it was a teachable moment for Ms. Liu to build on what students had already known to reinforce students’ understanding of this concept and provide a different perspective (Bransford et al., 2000). However, Ms. Liu herself cut the connection by saying, “不是 identity, 我知道你们和 Wilson 老师学了 identity。但是刘老师想说的不是 identity” (Not identity. I know you’ve learnt identity with Ms. Wilson. But what I want to talk about is not identity). Further, although both teachers were roughly aware of each other’s curriculum, they seldom knew the details of the instructional design of each classroom activity. As in this case, Ms. Liu knew that Ms. Wilson had discussed identity with students, however, she did not know what examples or what analogy Ms. Wilson used or the depth of the discussion. In fact, they employed similar examples and perspectives to talk about two different terms, which were interrelated, but the interrelation was disrupted by Ms. Liu’s insistence on solely talking about “personal culture”. This lack of flexibility in teaching and coordination across curricula caused a first level of confusion for students. In students’ mind, “all the stuff” about Ms. Liu was her identity, but Ms. Liu emphasized that it was not identity but 刘老

师的文化 (Ms. Liu's culture). At the same time, Ms. Liu was talking about personal culture and culture interchangeably, which caused the second level of confusion. She used examples to illustrate personal culture, but asked students 什么是文化 (what is culture). It was the first time that the students formally came across with the word 文化 (culture) and they did not know it meant culture. Bella defined it as "yourself basically," same with her definition of identity. Molly and Tamie seemed also understood 文化 as identity. Yet, in fact, 文化 (culture) itself (not personal culture) and identify are two concepts of great difference. Thus, in students' mind there was misalignment between the English concept of identity and the Chinese expression of 文化 (culture).

Later Ms. Liu's questions that led students to think about where they were from and why they had different personal preferences still could not reverse the misalignment. Overall, the whole discussion did not become an affordance for students to learn the concept of 文化 (culture) but hindered their learning.

Excerpt 7.5

Ms. Liu Telling Students What 文化 (culture) Means

Line	Speaker	Utterance	Available contextualization cues
1	Ms. Liu	我告诉你们这是什么。文化 means culture 。这是刘老师的文化。 (Let me tell you what it is. 文化 means culture. This is Ms. Liu's culture.)	
2	Dina	*Oh*	It not said in a unique tone.
3	Ss	这个不 make sense 。 (This does not make sense.)	

Since students did not think about 文化 in the direction as what Ms. Liu anticipated, she decided to end the discussion and directly tell students what it meant. When Dina heard that Ms. Liu had been talking about culture, she said “Oh” with a unique tone. I could not tell if it was a feeling-frustrated “Oh” or “Oh, I did not realize that.” Either way, Dina did not expect that 文化 meant culture. Some of other students also disagreed with the answer that Ms. Liu revealed and said, “This does not make sense.” Until the end of the class, it seemed that none of the students really understood what 文化 meant.

In her reflection, Ms. Liu explained to me that her plan was to start with personal culture and then build upon that to further explain what culture was. She did realize that in the class she was talking about personal culture and culture indistinguishably, which caused students’ confusion, so she decided to rephrase it the next day. Yet, she did not mention anything about the potential connections between identity and personal culture.

7.2.1.2 Unfamiliarity with Materials and Language in English. It was found that Ms. Liu at times missed the bridging point due to her unfamiliarity with the materials and terms employed by Ms. Wilson, and thus the relatedness recognized by students could not be retained in the Chinese instructional time. For example, Ms. Wilson used the tall tale, Paul Bunyan, to show how people made sense of the world before they knew science, which was intended to work as a bridging point with Ms. Liu’s science experiments. When students observed the experiment on how Grand Canyon was created, students kept saying that Paul Bunyan set his foot on that land. However, because Ms. Liu did not know who Paul Bunyan was, she thought students were not focusing and said, “说中文” (speak Chinese).

就是即使你给了再多的图片，有几个孩子就是不知道你在做什么...就是这些东西就是这些东西不对他们的生活 make sense。和他们的 background knowledge 永远都联

系不起来，然后他们不主动去做。但如果我那是知道 Paul Bunyan 是什么，就是他们知道...就说“哦，原来我们在做跟峡谷有关的东西”。...但即便是那样的孩子，即便他们反应很快，但是这种的强化肯定更好。

(Even though I provide a lot of pictures, there are a few students who still do not know what you are doing. If it does not make sense to their life or relate to their background knowledge, then they do not engage. If I know what Paul Bunyan is, then the students will realize “Oh, we are talking about canyons.” ... Even for those students who react fast, this is kind of reinforcement will also benefit them.)

Ms. Liu thought it was a shame that she missed the bridging point/teachable moment, because she felt that she was not able to take the opportunity to build on their prior knowledge that had been created in Ms. Wilson’s class. According to Ms. Liu, if she knew who Paul Bunyan was and made connections between this giant figure in American tall tales and the topic of her class, students, especially those who were struggling with the Chinese language, would know immediately that they were going to talk about canyons and get engaged in the experiment. For those high-achieving students, the connections could become reinforcement for them. After each co-planning meeting, Ms. Wilson would write down all the books to be used in their shared document, but Ms. Liu unfortunately did not have the time or opportunity to become familiar with them all. Upon reflection, Ms. Liu realized the need of continuous collaboration after the co-planning stage.

Another instance was from the unit of “Continents and Maps,” in which both teachers taught cardinal directions. In Ms. Wilson’s class, students shared the mnemonic of “Never Eat Soggy Waffles” with each other in order to memorize the four directions of North, East, South and West. After the students transitioned to the Chinese class, they learned the similar topic in Chinese as shown in Excerpt 7.6.

Excerpt 7.6

Discussion on Strategies to Memorize Cardinal Directions

Line	Speaker	Utterance	Available Contextualization cues
1	Ms. Liu	那我们怎么记? (Then how do we memorize them?)	
2	Ss	Never Eat Soggy Waffles.	Chanting
3	Ms. Liu	嘘，那我么怎么记: 北，东，南，西? (Silence, then how do we memorize North, East, South and West?) Anyone has a good strategy?	Pointing to the compass rose clockwise on the white board.
4	Frank	Never Eat Soggy Waffles.	
5	Ms. Liu	嘘，嘘，小朋友，你有没有好的办法 memorize it ? [北，东，南，西。 (Silence, silence, class, do you have any good strategies to memorize it? [North, East, South and West.)	
6	Lucas	I know you just keep it there].	Pointing to the compass rose on the white board.
7	Peter	Never Eat Soggy Waffles.	Saying the sentence very slowly. Other students were also murmuring.
8	Ms. Liu	你有没有好的 strategy ? 好的办法? (Do you have good strategy? Good strategy?)	

Students learnt the four cardinal directions in the read-aloud session in Ms. Wilson's class. On the same day, Ms. Liu was teaching the four hemispheres in Chinese, in the expressions of which each cardinal direction was a key component, for example 东半球 (Eastern Hemisphere). Therefore, students needed to learn how to say the four directions in Chinese. For students, 北, 南, 东 and 西 (North, South, East, and West) were four random characters, which might be challenging for them to associate each with its corresponding direction, so Ms. Liu encouraged students to come up with their own strategies to facilitate the memorization. She asked in Line 1, “那我们怎么记”(Then how

do we memorize them)? Students repeatedly suggested the mnemonic of “Never Eat Soggy Waffles” they discussed during the English instructional time in Lines 2, 4, and 7. Yet, it seemed that Ms. Liu did not understand what students were talking about. She might have thought that students did not understand her question and were engaging in side talk, so she asked students to be quiet and repeated her question again and again as shown in Lines 3, 5, and 8. In fact, although the mnemonic of “Never Eat Soggy Waffles” could help students to remember the English expressions of North, East, South, and West, it was not related to the Chinese characters in any way, neither to the meaning nor to the pronunciation. But Ms. Liu missed the teachable moment to first acknowledge students’ transfer of knowledge that they acquired in English, and then clarify that they had to make their strategy work for the Chinese expressions, which could draw students’ attention to the characteristics of the Chinese characters.

Despite the fact that Ms. Liu and Ms. Wilson had been working closely with each other, there were inevitably missed opportunities to bridging. As Ms. Liu sighed, “你永远不能面面俱到，即使她给我铺垫了那么多” (You just cannot cover everything, even though she [Ms. Wilson] has set such good foundations for me). Further, based on my observation, teachers seldom actively referred to the other teacher’s instruction to create learning opportunities for students to reinforce their understanding of the knowledge constructed in both classrooms. Therefore, rather than solely depend on students themselves to recognize the relatedness or disrupt students’ continuous learning, more detailed coordination is needed so that teachers can take advantage of those teachable moments to build upon students’ prior knowledge and scaffold students to the next level of learning.

7.2.2 Academic Rigor Downgraded

Another influence of curriculum bridging on students' learning came from teachers' assumption that challenging content should be taught in students' stronger language, so the academic rigor was downgraded in the Chinese instructional time. According to Fogarty (2009), academic rigor does not mean that the classroom activities are hard to accomplish, but that they involve high quality and intricacies of higher-order thinking. In the case of the curriculum bridging approach, the academic rigor was gauged according to the grade-level standards.

The following excerpts are from the unit of "Animal Heredity and Adaptation." The *Next Generation Science Standards* (NGSS Lead States, 2013) that teachers adopted suggest that by the end of this unit, students who demonstrate understanding can:

- 1) Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.
- 2) Use evidence to support the explanation that traits can be influenced by the environment.

Based on these standards, the teachers identified the overall learning objective, that is, "students will identify that animals have unique traits that are different than our traits; these traits are passed down (heredity) from 'parents' and are not random. The extended goal was that "these unique traits are designed to help them survive (adapt) in unique environments." These learning objectives were agreed upon by all the members of the CoP and documented in their collaborative lesson plan.

When Excerpt 7.7 in the following happened, Ms. Wilson and Ms. Liu already discussed with students the definition of heredity, adaptation and traits in their respective classes. Excerpt 7.7 was from a read-aloud session in Ms. Wilson's ELA class. Before Ms. Wilson started to read, she reviewed the definition of adaptation with students and

asked students to think about how animals' unique traits enabled them to survive in the winter climate, illustrating the interactions between animals and the environment as indicated in the standards.

Excerpt 7.7

Discussion on Animal Traits and Adaptation during Read-Aloud

Line	Speaker	Utterance	Available contextualization cues
Intro	Ms. Wilson	So adaptations, unique traits that an animal has, or plants or humans that helps them survive and stay alive for generation after generation after generation. Today we are gonna read a story called over and under the snow. I want you to be thinking as we are reading. How are these animals that you see on each different page stay alive in the winter climate in this forest? So, they all have some things, some unique traits that are making sure, yep, we are staying alive. <i>(Ms. Wilson started to read the book.)</i>	Ss were sitting on the carpet facing Ms. Wilson. Ms. Wilson was holding the book <i>Over and Under the Snow</i>
1	Ms. Wilson	So what unique traits do owls have?	
2	Bella	They are nocturnal .	
3	Ms. Wilson	They are nocturnal. What is another unique trait? Cathy.	
4	Cathy	They can stay over the snow.	
5	Ms. Wilson	T: They can see over the snow?	
6	Cathy	No, like stay.	
7	Ms. Wilson	Oh, stay. What else did owls do? Frank	
8	Frank	They can turn their head mostly around.	
9	Ms. Wilson	They can turn their head mostly around. So, any idea on this? ↑	
10	Peter	They have very cozy feathers.	
11	Ms. Wilson	Like keep them cozy and warm? ↑	
12	Peter	Yes, and it is the reason why they are not out in the sun. It is because it's hot.	
13	Ms. Wilson	So what traits does the fox have that made him be able to know where on earth this little mouse was?	

Non-participant students' voices were deleted. Foxes' ears were mentioned.

- | | | |
|----|------------|--|
| 14 | Ms. Wilson | What about his ears? Who can add on to that? What about his ears? Were they just like cuter or like really helpful or just cuter? ↑ Lucas |
| 15 | Lucas | They like , he was able to listen to things that are super quiet. |
| 16 | Ms. Wilson | So does he have really good hearing senses? ↑ |
| 17 | Ss | Yes. |
-

While Ms. Wilson reviewed the definition of adaptation with students, which was presented at the beginning of the excerpt, she reminded students to pay attention to not only what traits animals had, but also how those traits helped them survive, the relationship of which constituted animal adaptation. In the discussion, there was a progression in Ms. Wilson's questions in Lines 1, 7, and 13, which asked about "animal traits," "how animals act," and "the relationship between animals' traits and survival" respectively, with each latter question more intricate about the concept of adaptation. From Line 2 to Line 8, students' answers to Ms. Wilson's questions focused more on describing animals' physical traits and behavior traits. Although the answer to how these traits could help them survive was implied, there was no student who explicitly specified the functions of animals' physical traits. In Line 9, Ms. Wilson asked if there were more thoughts on Frank's idea that owls "can turn their head mostly around" to elicit more specific answers. Peter took the turn but diverged the topic to talk about owls' feather. Therefore, Ms. Wilson tried again in Lines 13 and 14, which directed students' attention to the function of foxes' ears, "were they just like cuter or like really helpful or just cuter?" Lucas answered what the fox could do with the ears, that is, "he was able to listen to things that are super quiet."

This excerpt showed that most students had already understood the relationship between animal traits and their survival in the living environment, which was implied in their answers. It seemed that at this stage students still needed explicit instruction on how to verbally express the logic between the key elements in animal adaptation, which required more complex thinking beyond describing animal traits. Ms. Wilson seemed to be aware of this, and she assigned an in-class task where students were asked to pick two animals from the story and write about how each animal's unique adaptation helped them stay alive in winter. At the same time, students could practice the literacy skill of drawing on details from the reading to support their ideas. In the direction, she specifically mentioned that "You guys might see more physical traits, how they look, instead of how they act, and that's OK, too."

One week after Ms. Wilson's read-aloud of *Over and Under the Snow*, it was the time for students to present the animals they built in Ms. Liu's classroom. While students were composing their animals, Ms. Liu used the guidelines created collaboratively with the other teachers to guide students to pay attention to the relationship between the animal traits they picked and the environment they survived in. In Ms. Liu's directions to the presentation, students were required to describe both their animals' traits, such as, 很尖的牙齿 (pointy teeth), 很长的尾巴 (long tail) and 很多的毛 (furry) and the habitats. However, there was no requirement for students to verbally present how the environment affected animal traits or how these traits enabled them to survive in their habitats. Here I will present two students' presentations, a typical one from Peter to demonstrate how most of the students did the presentation, and a unique one from Bella who extended her answer beyond Ms. Liu's requirement.

Excerpt 7.8

Peter's Presentation of the Animal He Built

Line	Speaker	Utterance	Available contextualization cues
1	Peter	这就是一个 ，它有长长的尾巴。 (This is a , it has a long tail.)	Slow pace
2	Ms. Liu	尾巴，好棒，它有 嘴巴，它有很尖的嘴巴。 (Tail, excellent. It has , a mouth. It has a pointy mouth.)	
3	Peter	很尖的嘴巴 (pointy mouth)	
4	Ms. Liu	它有漂亮的头还是不漂亮的头？↑ (Does it have a pretty head or not?)	
5	Peter	它可以飞。 (It can fly.)	
6	Ms. Liu	它可以飞，它有翅膀。好了吗？↑ (It can fly. It has wings. Is that all?)	Slow pace
7	Peter	好。 (Yes)	
8	Frank	它住在哪里？ (Where does it live?)	
9	Ms. Liu	对，它住在哪里呀？↑ (Right, where does it live?)	
10	Peter	森林和海洋。 (Forest and ocean)	Slow pace
11	Ms. Liu	哦，它住在森林和海洋，很棒。 (Oh, it lives in the forest and ocean. Excellent.)	

Peter presented his animal according to Ms. Liu's directions. With a little help from Ms. Liu, he introduced that his animal had a long tail, a pointy mouth and it could fly. What drew my attention was Ms. Liu's question in Line 4, “它有漂亮的头还是不漂亮的头？” (Does it have a cute head or not?), which Ms. Wilson directed students' attention away from so that they thought further about the function of specific animal traits for their

survival. Also, when Peter answered Frank's question by saying that his animal lived in the forest and ocean, Ms. Liu did not ask further questions as to why this animal could live in both habitats to elicit Peter's understanding of animal adaptation.

Excerpt 7.9

Bella's Presentation of Her Animal

Line	Speaker	Utterance	Available contextualization cues
1	Ms. Liu	来小朋友一起问：它住在哪里？ (Class, let not ask together, where does it live?)	
2	Ss	它住在哪里？ (Where does it live?)	Ss asked together
3	Bella	在森林。 (In the forest.)	
4	Ms. Liu	它住在森林。好，它有什么特点？123 (It lives in the forest. Good, what are its traits? One two three)	123 was used to elicit students to ask together.
5	Ss	它有什么特点？ What are its traits?	Ss asked together
6	Bella	它很大的 ，它有 like red brown fur。 (It is very big. It has like read brown fur.)	
7	Ms. Liu	它有红色和咖啡色的 (It has red and brown)	Long pause to elicit Bella's reply in Chinese.
8	Bella	fur, to blend in with trees	
9	Ms. Liu	毛，它有红色和咖啡色的毛, say it. (Fur, it has red and brown fur; say it.)	
10	Bella	它有红色和咖啡色的毛，因为它喜欢 blend in with the 树 。 (It has red and brown fur, because it likes blending in with the tree.)	
11	Ms. Liu	因为它可以住在树上。 (Because it can live in the tree.)	
12	Bella	Without being seen.	
13	Ms. Liu	对，因为它可以住在树上，我喜欢你给一个因为、所以，还有吗？↑	

		(Right, because it can live in the tree. I like you give a cause-and-effect. Anything more? ↑	
14	Bella	它有很大的脚，所以它可以 run 很 quickly 。	
		(It has very big legs, so it can run very quickly.)	
15	Ms. Liu	它可以跑很 (It can run very)	Long pause to elicit Bella's reply in Chinese.
16	Bella	快。 (quickly)	
17	Ms. Liu	很棒，还有吗？ ↑ (Excellent, anything more? ↑)	
18	Bella	它有很大的眼睛，可以做 nocturnal 。	
		(It has very big eyes, and can be nocturnal.)	

Bella was the only student in class who did not create an imagined creature by combining different animals' traits, because she did not think the made-up animals really made sense and the animal she loved the most was the spider. Therefore, in this activity, she chose to present a spider. According to Bella, the spider lived in the forest, and it was big and had red and brown fur. Bella's presentation was a unique case because she was also the only one among the participant students who mentioned spiders' adaptation as shown in Line 10, “它有红色和咖啡色的毛，因为它喜欢 blend in with the 树” (It has red and brown fur, because it likes blending in with the tree). In Line 13, Ms. Liu praised her presentation of this point not because of her relatively higher-order thinking, but because she used the expression of “因为” (because) in Chinese. Then Bella continued to introduce that the spiders had big legs which enabled them to run quickly and they “can be nocturnal” in Line 14 and 18. Nocturnal is a word that was mentioned in Ms. Wilson's class, and Bella tried to use it in both the discussion of the read-aloud *Over and Under the Snow* and this presentation to specify the trait of spiders.

Again, there was a trace of Ms. Wilson's teaching in Bella's presentation in terms of her treatment of trait as not only a physical feature but also something that was related to the environment that animals lived in and was key to animal adaptation. Also, the use of the word "nocturnal" showed that Bella was able to use the knowledge she acquired in both classrooms. Therefore, in Bella's case, she did make connections between what had been taught across the two linguistic spaces and she seemed to use her entire repertoire to organize and express her ideas, which was reflected by her translanguaging in the presentation (Garcia, 2009), for example, "因为它喜欢 blend in with the 树" (because it likes blending in with the tree) and... "所以它可 run 很 quickly" (so it can run very quickly). In these expressions, the English words were inserted into the right places where the Chinese equivalents were supposed to be. It demonstrated Bella's great grasp of Chinese sentence structures and metalinguistic awareness. At the same time, the concepts that Bella learned in English became the basis for her learning in the Chinese class.

The problem was that Bella's presentation was a unique case among all the students. Although Bella is one of the high achieving students in all subjects, it does not necessarily mean that other students cannot engage in the grade-level cognitive demands in Chinese, especially with the help of Ms. Liu, their peers and the mediation of their first language. However, in the actual classroom practice, the academic rigor was downgraded from building the interrelationship between animal traits and their survival in the living environment to describing the physical features. In the process of curriculum bridging, usually Ms. Wilson and Ms. Liu covered similar topics, and the instruction in one classroom became students' prior knowledge to be built upon in the other classroom.

Although there were language constraints in the Chinese classroom, Ms. Liu still needed to know where students' current level was in terms of the content learning, and vice versa for Ms. Wilson. Otherwise, the complexity of learning could not spiral up but may suffer as in this case of the animal feature presentation.

To guarantee the academic rigor in both classrooms was an issue that the teachers, especially Ms. Wilson constantly reflected on. How to “make sure that content learning can happen in Chinese more” was a question that Ms. Wilson brought up several times in their co-planning meetings, but they did not figure out the way to resolve it. Despite Ms. Wilson’s concern, teachers constantly allocated imbalanced cognitive load across the two linguistic spaces, especially in social studies units. For example, in the unit of “Culture Diversity,” Ms. Wilson took the responsibility of discussing what culture, identity, family culture, local culture and global culture mean, while Ms. Liu focused on personal culture and the value of diversity via a read-aloud *The Day the Crayons Quit* that was translated from English into Chinese. We can see an imbalance here between the cognitive load allocated to the English and Chinese instructional time. Instances like Excerpt 7.10 also occurred in other units such as “Continent and Maps” and “Citizenship.” In fact, Ms. Liu might have realized that sometimes more science or social studies content was taught in English as shown in the following conversation in their co-planning meeting.

Excerpt 7.10

Discussion on the Bridging Point for the Unit of “Culture Diversity”

Line	Speaker	Utterance	Available Contextualization cues
1	Ms. Wilson	OK, so we know what we are doing. We are living in a dream. The bridge for what we are doing, umm, that is a little less clear. Shall we try and	Laughing while saying "less clear"

		clarify what our bridge is? ↑	
2	Ms. Liu	But you are already talking a lot about the culture.	Low voice
3	Ms. Wilson	Is that a bridge ↑, like, I feel funny because normally we would have like something that we've done that's been really formal. Almost wonder and I don't know if this is true and real bridge, but it'll be kind of cool, so they are working on their little cultural sheet, this one, like this guy, right? And we are doing a class book. Almost wonder if it would be kind to cool to like get together and share the two pieces of work as sort of like a final , I don't know.	Showing Ms. Liu's "My Culture" worksheet while saying "this guy"
4	Ms. Davis	Could the Chinese be a page in the class book? ↑	
5	Ms. Wilson	Put this in the class book, too.	
6	Ms. Liu	Mm Hmm	
7	Ms. Davis	Unless XXXX it is included.	
8	Ms. Wilson	That will be kind of cool!	

In the co-planning meeting for the unit of “Culture diversity”, Ms. Wilson mentioned that the *bridge* for this unit was a little unclear. Ms. Liu responded, “but you are already talking a lot about culture.” This utterance could be interpreted in two ways. First, Ms. Wilson already had a thorough plan for teaching different aspects of culture. The parallel teaching of culture itself could be a *bridge*. Second, Ms. Wilson already decided to talk about almost every aspect of culture, what should be taught in Chinese then? In either interpretation, we can see that Ms. Liu might have realized that most of the academic demands were assigned to the English instructional time. To clarify my understanding of their conversation, I asked Ms. Liu after the meeting. Ms. Liu did realize the imbalanced allocation of the cognitive demands in the two classrooms, but it seemed that she did not see it as a problem. According to Ms. Liu, guided by the CCSS

that requires more content-based literacy development, there was nothing wrong for Ms. Wilson to integrate content learning into her ELA class or take an approach that would enable students to learn better. Going back to this excerpt, in Line 3 Ms. Wilson mentioned the parallel plan of their culture teaching. That is, on the English side, one product would be a class book on culture, and on the Chinese side, students would be working on a worksheet on personal culture. She suggested students integrate the two products together in order to create a *bridge*, based on which Ms. Davis proposed in Line 4 that students could incorporate the “my personal culture” page in their English class book, and all the teachers agreed.

What should be noted is that in the whole process there was no coordination of the content taught across the two linguistic spaces, although they shared their instructional plans during the co-planning meeting with each other. This lack of coordination made me wonder as a researcher if the teachers were aware that an imbalanced amount of content learning had been transferred to the English instruction, and that the academic rigor in the Chinese instructional time could suffer. In order to make sure that I did not misinterpret teachers’ curriculum design, I did a member-check with the teachers after one co-planning meeting. My question was, “I feel that you (Ms. Wilson) are taking more responsibilities in fulfilling the content objectives. So, I’m wondering if you are doing it on purpose or just without realizing that?” Ms. Wilson answered, “kind of without realizing it,” while Ms. Davis thought “some of it was intentional, though.”

Because we realize that in Chinese you weren't able to cover the content as deeply as the kids need to know and meet the standards. So, the science and social studies standards, they are not able to start to work at that level or that fast to cover all the content in Chinese. Then some of that then was intentional brought into the English side this year so that you have time to focus on the language (Ms. Davis).

Ms. Davis' response reflected her assumption that students could not learn at a desired level of cognitive depth in an emergent language, but at the same time, it also revealed the challenge faced the immersion teachers. The longer time for students to become proficient in Chinese (Burkhauser et al., 2016; Watzinger-Tharp et al., 2018), the greater the discrepancy is between students' cognitive level and their language proficiency (Fortune, 2012; Met, 2000). Further, the pressure coming from the standards-based curriculum also contributed to these teachers' decision of allocating more content to the English side as illustrated in Ms. Liu's and Ms. Wilson's words.

Like if we really want to get all the standards meet in Chinese, then I really need to SLOW down. I am doing that every like, during the language art. I'm building the language, but to get into that deep, it's gonna be a month to teach the globe, the map (Ms. Liu).

I think part of me also wonders like, how do we help them access the idea of heredity and traits and like land changes in Chinese in a way that is developmentally appropriate, content appropriate, and standards based? I don't know. I don't really have the answer. I feel like I'm not able to answer that question at all, because I don't understand the language constraints (Ms. Wilson).

Similarly, both Ms. Liu and Ms. Wilson saw sufficient language development as a prerequisite for content learning. However, in DLE programs, students have access to two languages to build their content knowledge, but the key is how the teachers scaffold students with both languages and other resources to enable them to learn content as they are developing their language proficiency. Without sufficient training and support from people outside the group, Ms. Liu and Ms. Wilson's struggles were legitimate, and they were trying to construct a way to counter the challenges by supporting each other and addressing the school curriculum with its academic rigor in at least one of the instructional languages. From the perspective of curriculum bridging and the original aim of forming this community, Ms. Wilson's opinion was "it would look like similar units in

science and social studies are occurring in both place,” considering that they were trying to achieve a continuous bridging model that “the two hands” of the Chinese and English classrooms are communicating with each other more and there is “continuous learning” across the two linguistic spaces. It has to be acknowledged and emphasized that the mission of curriculum bridging, if achieved, has a great potential to enhance teaching and learning in the context of DLE in which teacher separation and language separation are prevalent. However, it seemed that sometimes the aim of creating a *bridge* per se overruled some basic principles in learning and DLE. Cognitive engagement is one key component in effective learning, which creates a genuine need for students to engage in both the language and content (Coyle, 2007; Howard et al., 2018). Further, appropriate cognitive demands are necessary to motivate students to integrate their prior knowledge, concepts, skills and language to yield better learning results (Met, 1998). Therefore, an appropriate level of cognitive demands is needed in the partner language in DLE programs.

The teachers acknowledged that if I had not asked, they did not realize the potential problem or the “side effect” that sometimes, they forgot the original goals of DLE, and did it “the easy way” (Ms. Davis). Ms. Wilson also realized that students might rely on their preferred easier language to access the content, especially considering that each week there was only one 45-minute science or social studies class in Chinese. In fact, the issue of the differentiated academic rigor across the two learning spaces was multilayered, which involved the factors of the challenges in teaching Chinese and teaching content in Chinese, the lack of professional support, the class schedule and a tendency to go for an easy way.

To present these cases to illustrate whether curriculum bridging was or was not achieved is to explore if teachers' efforts paid off at students' end as anticipated. As illustrated above, mixed messages were found, connections between the learning across the two linguistic spaces were recognized by students, but there were also the problems of disrupting the continuity in students' learning on teachers' end and downgrading the academic rigor from the English to the Chinese classroom due to the lack of coordination and teachers' belief that students could only engage in higher cognitive demands in their stronger language.

7.3 Summary

This chapter focuses on the implementation of curriculum bridging in class to explore whether students recognized the connections across the two classrooms as well as how the implementation of curriculum bridging influenced students' learning to explore the ways to maximize the potential of curriculum bridging.

Based on the classroom observation, it was found that students were able to make connections between the concepts and vocabulary that had been frontloaded in Ms. Wilson's class with the learning in Ms. Liu's class. There was evidence showing that students took what they learned in English as a base, acquired additional information in Chinese, processed both knowledge sources, made their own analysis and expressed their ideas mediated by translanguaging. However, mixed messages were found due to the lack of detailed coordination between the two teachers' curricula, and there were instances where Ms. Liu and Ms. Wilson explained different terms using similar examples and perspectives, which caused confusion for students and hindered their understanding of both terms. In other words, connections across the English and Chinese instructional time

were recognized by students, which happened in each unit of study, however, the contiguity of learning was not achieved or even disrupted when there was no detailed and systematic planning of the *bridge*. Instead of building upon the prior knowledge students had, the teachers taught their lessons without considering the learning stages where students were at in the partner teacher's classroom. Also, the disruption of continuity happened because of Ms. Liu's unfamiliarity with the materials adopted in the English classroom. There were instances that she failed to recognize the points that students transferred from the English instructional time and missed the opportunities to build her instructional practices upon their prior knowledge. Further, there was the tendency that the level of academic rigor was downgraded when students switched from the English to the Chinese instructional time due to the participant teachers' assumption that students were not able to learn more challenging content in their emergent language at a grade-level appropriate pace. To identify the missed bridging points was not to criticize teachers' work, as Ms. Liu said, "you just cannot cover everything" in their busy schedule, but it was to explore the potential of these four teachers' bottom-up approach to curriculum bridging and provide implications to theory, practice and policy on this topic.

Chapter 8 Conclusion

This study focuses on a teacher-initiated approach to curriculum bridging in a one-way Chinese-English DLE program, which adopts a two-teacher 50/50 model. By attending teachers' co-planning meetings, interviewing teachers and observing classes in both the English and Chinese classrooms, this study explores the insider definition and the process of curriculum bridging, benefits and challenges involved in the process and how it influences students' learning. Guided by the frameworks of Sociocultural Theory (Vygotsky, 1978), Communities of Practice (Wenger, 1998), principles and criteria of interdisciplinary curricular integration (Ackerman, 1989; Adler & Flihan, 1997; Fogarty, 2009), the previous three chapters present the analysis of data from different sources that addresses three sets of interrelated questions. In this chapter, I will first summarize the findings for each research question and then discuss the limitations and implications of the research results for theory, policy and practice in DLE.

8.1 Summary of Findings

8.1.1 Research Question 1: How do teachers, as a community of practice, define curriculum bridging, and how do they bridge the content and language learning across the English and Chinese instructional time?

The four participant teachers interacted regularly as a group to achieve their common goal of making connections between the teachers as well as students' learning across the Chinese and English instructional time. This joint effort constituted a CoP according to Wenger (1998). The formation of the CoP was both shaped by and a localized response to the sociocultural realities of their DLE program, including an isolated teaching culture, the adoption of the prevalent language separation approach, the

insufficient availability of the Chinese materials, and the lack of professional training for the Chinese teacher as in many Chinese-English DLE programs in the U.S. These teachers took agency and constructed their own ways to counter these challenges.

Although the four teachers' foci on these challenges were different, they aimed for a joint enterprise to promote communication between the partner teachers and allow students to engage in continuous learning with the content and language instruction across the two linguistic spaces being mirrored in some way instead of being two completely separate processes.

Engaging in the CoP, the participant teachers constructed a process for curriculum bridging that was set up as a shared repertoire. The process included the stages of 1) co-planning, 2) implementing planned lessons, 3) following up and revising, and 4) assessing and reflecting. Most of the teachers' collaborative efforts happened in the co-planning process, where teachers discussed the standards and learning objectives, shared ideas, materials and instructional strategies, which offered an opportunity for mutual engagement and allowed all the teachers to learn from one another. At the same time, through the discussion process, all the teachers became roughly aware of Ms. Liu and Ms. Wilson's lesson plans and identified the *bridge* for the unit collaboratively. Two types of *bridge* were identified based on the analysis of teachers' co-planning meetings. One is frontloading, which refers to the process where teachers instruct the key concepts and vocabulary in English to encode the content knowledge in (most) students' L1 so that students bring prior knowledge of the topic with them when they switch to learn in the Chinese classroom. The other type is connecting, where teachers identify a specific bridging point to connect the instruction in the two linguistic spaces, for example,

different aspects of a topic are covered in ELA and the science or social studies classes. After co-planning, Ms. Wilson and Ms. Liu instructed their classes independently based on their own lesson plans. In Stage 3 and 4, there were occasional follow-up and reflections being done informally and sporadically.

8.1.2 Research Question 2: What are the benefits and challenges in process of curriculum bridging?

In terms of the benefits, the teachers felt being supported by each other, and the curriculum bridging process was a new learning endeavor for everybody. At the same time, students had access to more diverse learning materials on a particular topic in both languages instead of being confined in the limited amount of materials available in Chinese. There were several straightforward benefits brought by the curriculum bridging process, but this study focused on one of the key characteristics of CoP, accountability produced in the joint enterprise, especially the accountability of Ms. Liu's instructional design. It was found that there was a collective effort towards the accountability of Ms. Liu's teaching. None of the teachers deemed Ms. Liu's instructional design as solely her own responsibility and thus irrelevant to them. Neither did they act as in pseudo-communities where all the members withhold their opinions and avoid conflicts (Grossman et al., 2001). Instead, they posed questions and disagreement, shared ideas, engaged in discussions, and offered or rejected suggestions. In this process, Ms. Liu's instructional design got revised in a way that appeared to be more effective for students' learning. Meanwhile, joining the CoP of curriculum bridging enabled Ms. Liu to engage in a process of learning as becoming. With the guidance and help of more experienced teachers, Ms. Liu's original view of teaching and learning was broadened, and there was

evidence showing Ms. Liu's revision of her design of classroom activities, which was a process of accountability building through learning.

A close analysis of the curriculum bridging process also revealed several challenges and issues. First, due to the lack of training, teachers' identification of the *bridge* was often based on their teaching experiences and personal theories, and there was seldom systematic theoretical consideration of how the *bridge* would contribute to students' learning for and beyond the discipline besides that students could get a sense of relatedness. Second, although bridging between the two languages was one of the goals of the teachers' joint enterprise, linguistic *bridge* was addressed only at the vocabulary level, which provided students with the oral resources and basic concepts to discuss the content knowledge of each unit. Yet, possible ways to juxtapose the two languages at other linguistic levels remained unexplored due to the lack of a thorough linguistic knowledge of Chinese and English among the teachers.

Other issues include the unidirectional bridging, teachers' neglect of untranslatable concepts and imbalanced power dynamics. At the global level, teachers' curriculum bridging was unidirectional, that is, Ms. Wilson integrated science and social studies topics that were assigned to be taught in Chinese into her ELA classes, but the math subject that was taught by Ms. Wilson remained in a siloed space, which was a deliberate decision made based on the sociocultural reality of the school. However, bridging opportunities might be missed by students in the sense that they could not take advantage of the bilingual features to learn math, for instance. Another issue came from the concepts that after being translated carried different cultural meaning, for example, community and citizenship. Whether teachers got into the finer subtleties of translation

was at the discretion of teachers and what they saw to be appropriate and effective for students' learning. Since Ms. Liu decided not to, the opportunities to bridge the students' understanding of the cultural nuances of different terms in both languages were missed. Also, because of the factors such as age difference, years of experiences in the teaching profession and language proficiency, Ms. Liu was positioned as someone who was in need of help in the CoP, and other teachers tended to make decisions for her in terms of the instructional design as well as her English expressions. As a novice teacher, Ms. Liu did engage in learning from her more experienced and knowledgeable peers, which increased her instructional accountability. However, there was a need of more balanced collaboration that could differentiate imposing and suggesting. On the one hand, Ms. Liu's agency and expertise needed to be acknowledged by other members of the CoP, and on the other hand, Ms. Liu needed to gradually build both the expertise and confidence in her own teaching through learning from rather than relying on her more experienced peers.

8.1.3 Research Question 3: How does curriculum bridging influence students' learning?

Mixed messages were found in the implementation of curriculum bridging. Based on the classroom observation, it was found that students were able to make connections between what they learned across the two linguistic spaces, but the continuity in content learning sometimes got disrupted by teachers' instructional practices. Students could employ the concepts and vocabulary frontloaded by Ms. Wilson as a base to process the information they got in Chinese. However, when there was no systematic planning and monitoring of the lessons taught across the two classrooms, students' learning was

disrupted because the two teachers were not aware of students' prior knowledge that was created in the other classroom, which caused confusion and sometimes hindered students' learning. Based on the classroom observation, instances were also found that Ms. Liu failed to connect with the information that students acquired from the English classroom due to her unfamiliarity with some English expressions and learning materials, and thus missed the bridging points. Moreover, there was a tendency that the academic rigor was downgraded after students switched from the English to the Chinese instructional time because of teachers' assumption that students' limited Chinese proficiency would not allow them to learn at a desired level of cognitive depth at an appropriate pace. To the teachers, how to balance the cognitive load and guarantee the academic rigor in both classrooms had always been a challenge for them, but as they sighed, they kept wondering but had no answer. Although these teachers constantly mentioned this issue, it seemed that they were sometimes unconsciously doing the opposite, that is, allocating imbalanced cognitive loads to the English instructional time. Here the word "imbalanced" does not suggest that the intricacies and complexity of the curricular design in both classrooms have to be the same (Fogarty, 2009). There could be flexibility as Met (2000) suggested, but the key is that teachers have to avoid going for the easy way and there is a great need of coordination of the two teachers' curricula.

8.2 Limitations and Directions for Future Research

This dissertation documented change in instructional practices brought about by a teacher-initiated CoP for curriculum bridging in a Chinese-English DLE context, which yielded both positive and unintended outcomes. There are also limitations that I was not able to address in this dissertation. Regarding the methodological issue, one limitation is

that students' opinions on curriculum bridging were not collected. The inclusion of students' input would allow for a better understanding of how curriculum bridging influences their learning and provide directions for improving the design. In other words, to explore the full potentials of curriculum bridging in the context of DLE, researchers could focus on CoP that consist of teachers, students and researchers as suggested by Coyle (2007). Another limitation is that the composition of the participant teachers reflects various confounding factors, such as differences in seniority, language proficiency and teaching experiences, which inevitably influences the power dynamics among the teachers and the fidelity of their implementation of the curriculum design. Other CoP composition may generate both different processes and results in the DLE context that involves multiple languages and teachers from diverse backgrounds, which is worth attention in future research.

Further, although this dissertation identified both the challenges and issues in the process of curriculum bridging and made suggestions accordingly, experimenting with an improved model was beyond the scope of the current research, as it was intended to focus on the naturally occurring process of curriculum bridging. However, empirical research on a revised model of curriculum bridging is worth exploring in future studies.

8.2 Implications

8.2.1 Theory

Theoretically, going back to the language separation debate in the field, the curriculum bridging model offers an example of the cross-linguistic pedagogy that connects the two instructional spaces without advocating the mixed usage of L1 and L2, which echoes Ballinger et al. (2017). However, there were instances of students'

voluntary use of translanguaging (García, 2009) to connect the knowledge they acquired in English and the task undertaken in Chinese in order to complete their expressions. In this study, the teachers have moved one step away from the isolated two-teacher, two-language approach by bridging their curricula to sustain continuity and reinforcement of content and language learning across the Chinese and English instructional time.

However, at the current stage, the teachers still appeared to view emergent bilinguals as two monolinguals in one, which was demonstrated by their practice of encoding the information in two languages in respective classrooms and solely depending on the students to merge the concepts and languages. The whole curriculum bridging process demonstrates that there is the possibility to reconcile the cross-linguistic pedagogy and translanguaging strategies that were proposed to counter the language separation principle. For the teachers, there may be a way to integrate both, but theoretical constructs are needed to guide the teachers through the process of curriculum bridging and coordination. Presently there is no guiding framework for curriculum bridging. By broadening the CoP to include perspectives from both the researchers and students, it may be possible to better conceptualize what bridging means in the DLE context.

In addition to language separation, this teacher-initiated curriculum bridging model also presents another way to look at the issues of teacher separation and content separation in today's educational context. In DLE programs like NGES, if the curriculum bridging CoP did not exist, the language partner teachers would be largely unaware of each other's curriculum, and students' school days would be separated by language, by teacher and by subject into discrete spaces, which was not conducive for students to see the connections between different languages and disciplines. Admittedly the model

constructed and implemented by the CoP of curriculum bridging is far from perfect, and there are many facets to be improved. However, it provides the field with an opportunity to consider other layers of separation, such as teacher separation and content separation besides the debate on the language separation approach.

8.2.2 Policy

Teachers' change in their instructional practices needs to be supported by policies. Policies are needed to allocate time, training and resources for teachers to do curriculum bridging. How to collaborate between Chinese and English partner teachers as well as between classroom teachers and teachers of other roles (for example, SE and ELL teachers) needs to be integrated into courses in teacher education programs to ensure that teachers have a knowledge base to achieve balanced and authentic collaboration and curriculum alignment. In the case of curriculum bridging, despite teachers' enthusiasm towards this approach, their strategies to integrate different subject matters were limited mainly to frontloading and connecting the topics. Moreover, their understanding of frontloading seemed to be unsophisticated, and they did not consider when lack of coordination whether this approach was too teacher-centered (Estes, 2004) or whether it deprived students of the opportunities to access new content through the partner language. Therefore, before encouraging teachers to try curriculum bridging, sufficient training on teacher collaboration, interdisciplinary design and the immersion model should be provided.

In the context of DLE education, teachers should also be given access to the latest theoretical discussion on bilingualism. Otherwise, teachers might design their curricula based on their personal theories of how bilingualism develops, as with Ms. Wilson and

Ms. Liu who held the assumption that students were not able to engage in the grade-level cognitive demands in their emergent language at an appropriate pace. However, as the data in this study show, it is possible to build on both L1 and L2 as a unitary linguistic resource for students to learn at a desired level of the academic rigor, and there is no need to wait until students' language proficiency is fully developed to access the content. Again, teachers cannot be expected to keep up with theoretical developments by themselves, rather, ample professional development opportunities should be created so that teachers can implement state-of-the-art strategies to allow students to maximize the use of their entire linguistic repertoire to engage in learning without sacrificing the learning space of the minority language (Cenoz & Gorter, 2017).

8.2.3 Practice

Challenges faced by immersion teachers have long been discussed, such as teachers' lack of training, insufficient materials, insolated working environment and the balance of students' advanced cognitive development and low language proficiency (Cammarata & Tedick, 2012; Fotune, 2012; Met, 2000; Palmer et al., 2016; Zhou & Li, 2015b). The curriculum bridging CoP enabled the teachers to communicate regularly, build accountable relations, revise and transform their understanding of teaching and learning, and learn from/grow with each other. For the novice teachers like Ms. Liu, with the guidance and help from more capable peers, they were engaging in the process of learning by becoming through the participation in the joint enterprise. The collaboration among teachers was like an in-service training for all the teachers; although not systematic, it spoke directly to the needs of their daily practices that enabled students to have access to more diverse learning materials and more accountable instructional design.

From this perspective, these teachers' curriculum bridging approach has the potential of allowing the teachers to collaboratively cope with the challenges in their working context.

Despite the learning opportunities provided by the process of curriculum bridging itself, in practice all the participant teachers are suggested to take the theoretical underpinnings of DLE into consideration in order to maximize the potential of their bridging model and not to dismantle the overarching goals of DLE for the sake of seeking the *bridge* per se. Also, more training in linguistics in both languages is needed for all the participant teachers, not limited to the Chinese teacher, to identify potential bridging points at various linguistic levels to enable students to have a better metalinguistic awareness in both languages. Further, there is the necessity for teachers to apply basic principles and criteria for curriculum integration, so that students are able to not only recognize the common themes that are being taught across the two linguistic spaces but also transform their understanding of the topics being discussed and form a well-rounded perspective to approach knowledge and problems across disciplines.

Another implication for teachers' practice is the need to pursue balanced ways of collaboration, which include two-way bridging between the subjects that are taught in Chinese and English and more balanced power dynamics among the members of the group. In addition, while engaging in curriculum bridging, teachers should not only be forward-looking, meaning always focusing on the planning of the next unit, but also looking both ways to do more reflections in order to summarize valuable experience from their instructional practices and make improvement.

This study does not aim to negate the curriculum bridging approach that the teachers constructed or to criticize the teachers' practices. I showcase their agency and

applaud their efforts to explore alternative ways of bilingual instruction. Chinese-English DLE as a field is in its developmental stage, and we need more bottom-up approach that directly speaks to immersion teachers' need to enrich their instructional practices. This cannot be done alone. As a larger community of practice, researchers, teachers and students should continuously and collaboratively pursue methods of curriculum bridging that can maximize the potential of dual language immersion education.

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APPENDICES

Appendix 1: Transcription Convention

↑ rising intonation at end of utterance
XXXX = undecipherable
CAP=Stress
|| short pause
||| long pause
[Line 1 = overlap
Line 2]
Vowel + = elongated vowel
* = voice, pitch or style change
Words = boundaries of a voice, pitch or style change
() translations of Chinese
Ss=more than one students speak at the same time

(Adapted from Bloome, D.; Stephanie, C. P.; Christian, B. M.; Otto, S. & Shuart-Faris, N. (2005). *Discourse analysis and the study of classroom language and literacy events: A Microethnographic perspective*. Mahwah, NJ: Lawrence Erlbaum Associates.)

Appendix 2: Codebook

Process coding

- Identify the theme and topic of the unit
- Discussing content goals-CG
- Discussing language goals-LG
- Discussing Ss' cognitive levels-CL
- Discussing Ss' language levels-LL
- Sharing instructional strategies-IS
- Coordinating curriculum and/or instruction across classrooms-CC
- Coordinating or maintaining interpersonal relations-IR
- Developing or sharing instructional materials-IM
- Discussing needs of specific students-SN
- Designing Assessments-Ass
- Reflecting on the co-planning process-RP
- Addressing classroom management/discipline issues-CM
- +other emerging themes

Appendix 3: Example Transcripts

The following are two transcripts from the unit of “Force and Motion” that illustrate the point that students could make connections between what they learnt across the two classrooms. The English class happened one week before the Chinese class. Students were transferring their understanding of friction they learnt in Ms. Wilson’s class to the Chinese instructional time, but again Ms. Liu did not retain the continuity of learning because she wanted to focus on the concept of force and hold the discussion on friction for later. So she did not teach students how to say friction in Chinese and asked them to use 力 (force) to substitute when they intended to mention friction.

Table Appendix 3.1

Discussion on Friction in Ms. Wilson’s Class

Line	Speaker	Utterance	Available Contextualization cues
1	Ms. Wilson	"The ball you kicked rolls across the grass. As the grass rubs against it, the ball slows DOWN and stops. This ruby is called friction. Friction has a force that makes things slow down, or completely stop moving. Anything that rubs can cause friction, even air..." Peter?	Ms. Wilson reading the book.
2	Peter	XXXX	
3	Ms. Wilson	Have you ever noticed have you ever noticed, if you have ever seen professional bike racers? They bow XXXX down instead of sitting all the way up, cause they don't want that wind running into them and causing friction. Yes, (name of a non-participant student).	

Between Line 3 and 4, a non-participant student mentioned the streamline

4	Ms. Wilson	It makes it so so that there is less resistance or less friction. How many of you have been on swim team before? You know when your swim coach says going in streamline?
5	Ss	Yes.
6	Ms. Wilson	That's trying to reduce friction.

Table Appendix 3.2

Discussion on Friction in Ms. Liu's Class

Line	Speaker	Utterance	Available Contextualization cues
<i>Ms. Liu was holding a ball. She and students were discussing that force could make the ball move fast and also slow it down.</i>			
1	Dina	刘老师 (Ms. Liu), when you catch it, it stops, because your hand has friction. It is not flat.	
2	Tamie	刘老师 (Ms. Liu), if there is no friction	Tamie was cut off by Ms. Liu
3	Ms. Liu	如果没有 friction (If there were no friction)	
4	Dina	It'll keep rolling.	
5	Tamie	No, you would just be going	
6	Ms. Liu	还有没有小朋友觉得有什么力可以让球的 和运动的关系。Any others? 我们说力可以让球停，力可以让球运动，飞。力还可以让球 大的力可以让球很快地飞吗？ (Are there other students who know what can make the ball , its relationship with motion? Any others? We say force can make the ball stop, and force can make the ball move, fly. Force can also make the ball is greater force can make the ball fly faster?)	
7	Dina & Lucas	不快 (not fast)	
8	Ms. Liu	球慢了。(The ball slows down.)	
9	Lucas	有一点点 friction 在。(There is a little friction).	

10 Ms. Liu 一点点力，let's call it 力，friction will be talked about later. 所以球变慢了，因为有力。
(A little force. Let's call it FORCE. Friction will be talked about later. So the ball slows down, because there is FORCE.) Stress 力

Appendix 4: Consent Forms

A: Parental Consent Form

Purpose:

Your child is being asked to participate in a research project. The purpose of the research is to explore how NGES selects, interprets and implements English language arts, Chinese language arts and other content area curricula taught in Chinese (e.g. Science and Social Studies) in order to meet the program goals.

Procedures:

If you allow your child to participate, we would like to observe teacher-student interactions in your child's English language arts, Chinese language arts and other content area classes taught in Chinese once a week so that students' responses to teachers' curriculum design and implementation can be seen. With your and your child's active consent, we will put a small portable audio recorder in teachers' pockets or a fanny pack to record naturally-occurring teacher-student interactions. The audio recorder will not be seen by students, and the researcher will sit at the back/corner of the classroom to take field notes in order to minimize distraction. There will not be any manipulation or intervention to influence teachers' instructional practices or students' learning.

Benefits:

There are no direct benefits to participating in this project, and no payment is involved in this project. The researcher will share the findings with you and the school to advance the current understanding of curriculum selection and implementation in dual language immersion schools.

Risks:

The class may feel disrupted at the beginning of the study because of the presence of the researcher in the classroom. In order to minimize the disruption, the researcher will sit at the back/corner of the classroom to observe the class and take field notes.

Confidentiality:

Absolute confidentiality cannot be guaranteed, since research documents are not protected from subpoena. However, the research team will protect participants' identifiable information (personal names, symbols, etc.) with measures. In order to protect your family and your child's privacy, we will keep any identifiable information (e.g. names and student numbers, etc.) confidential, and such information will be removed from our notes and audio recordings. Only pseudonyms will be used in the field notes of classroom observation. Identifiable information that appears in the notes will be deleted before the notes are locked securely in a cabinet. The audio files of teacher-student interactions will be downloaded to an encrypted computer, renamed to code numbers and backed up to an external hard drive, protected with an encrypted password. The original recordings will be erased from the recorder. The audio files will be reviewed prior to analysis to remove identifiable information, and voices of students who decide

not to participate in this research will be deleted. The edited data will be stored in another hard drive separately from the original audio recording and also protected with a password. The hard drives will be stored in separate locked cabinets. Only authorized researchers can have access to the data.

When all the editing of the audios finishes, the original audio recordings will be destroyed. When the audio recordings are transcribed, we will change all the identifiable names to pseudonyms, and all the transcripts will be locked securely separating from the recordings, so that the risk of participants being identified could be minimized. Once all the audio recordings are transcribed, the raw recordings with the exception of some episodes that exemplify the main findings will be permanently deleted from the recording devices, computers, and hard drives. The voices of the participants in these short episodes will not be altered unless requested.

In order to advance people's understanding of dual language education, we may want to present some of the data at conferences and scientific publications, with no school or personal identifiable information included. We may also share the results of this study to a more general audience through newspaper columns, school and district newsletters, and on research and policy related web-sites. For the general audience, no audio recordings will be made publicly available, only our written reports will be shared.

Right to Refuse or Withdraw:

Participation in this research project is purely voluntary. You can refuse to take part in this project on behalf of your child and you and your child can stop participating at any time. Whether your child participates or not will not affect his/her grades or course standing in his/her class. You have the right to receive a copy of this consent form.

Contact Information:

If you have questions about the research, you can contact the researcher at tiangewang@umail.ucsb.edu or (805)-886-4550 or Dr. Jin Sook Lee at jslee@education.ucsb.edu or (805) 893-2872.

If you have any questions regarding your rights as a research subject, please contact the Human Subjects Committee at (805) 893-3807 or hsc@research.ucsb.edu. Or write to the University of California, Human Subjects Committee, Office of Research, Santa Barbara, CA 93106-2050

Please indicate your permission for the forms of data that the researchers can get access to (please initial):

___ I allow the researcher to observe my child's classes once a week and take field notes of teacher-student interactions.

___ I allow the researcher to observe my child's classes once a week and audio record teacher-student interactions.

PARTICIPATION IN RESEARCH IS VOLUNTARY. YOUR SIGNATURE BELOW WILL INDICATE THAT YOU HAVE APPROVED YOUR CHILD'S PARTICIPATION AS A RESEARCH SUBJECT IN THE STUDY DESCRIBED ABOVE. YOU WILL BE GIVEN A SIGNED AND DATED COPY OF THIS FORM TO KEEP.

Name of Child (Print)

Signature of Legal Representative (parents or guardians): _____ Date: _____
Time: _____

B: Child Consent Form

Purpose:

You are being asked to participate in a research project. The purpose of the research is to see how your teachers select materials and design their class activities to help you to learn.

Procedures:

If you would like to participate, the researcher will come to your classes during both the English and Chinese instructional time once a week. The researcher will look at how your teachers use different materials and activities in class and how you respond to their instructional practices. If you agree, the researcher will audio record what you and your teachers say in class, which will help us to analyze how teachers instruct and how students learn in a Chinese immersion school.

Benefits:

There are no direct benefits to participating in this project, and no payment is involved in this project. However, your participation will help people learn how students like you learn Chinese and learn content areas through Chinese.

Risks:

You may feel disrupted at the beginning of the study because of the presence of the researcher in the classroom. In order to minimize the disruption, the researcher will sit at the back/corner of the classroom to observe the class and take notes.

Confidentiality:

Absolute confidentiality cannot be guaranteed, since research documents are not protected from subpoena. However, the research team will protect information about you. We will not use your real name in our notes so that you are protected. The notes will be locked securely in a cabinet. The audio recordings of your classes will be stored securely in computers and hard drives protected with passwords. We will share our findings of this study with others, so we can help them to better teach or learn Chinese, but we will not tell them your name or other personal information.

Right to Refuse or Withdraw:

Participation in this research project is purely voluntary. You can refuse to take part in this project, and you can stop participating at any time. Whether you participate or not will not affect your grades or course standing in class. You will receive a copy of this consent form.

Contact Information:

If you have questions about the research, you can contact the researcher at tiangewang@umail.ucsb.edu or (805)-886-4550 or Dr. Jin Sook Lee at jslee@education.ucsb.edu or (805) 893-2872.

If you have any questions regarding your rights as a research subject, please contact the Human Subjects Committee at (805) 893-3807 or hsc@research.ucsb.edu. Or write to the University of California, Human Subjects Committee, Office of Research, Santa Barbara, CA 93106-2050

Please indicate your permission for the forms of data that the researchers can get access to (please check):

I allow the researcher to observe my classes once a week and take notes of my interactions with my teachers.

I allow the researcher to observe my classes once a week and audio record my interactions with my teachers.

PARTICIPATION IN RESEARCH IS VOLUNTARY. YOUR SIGNATURE BELOW WILL INDICATE THAT YOU HAVE DECIDED TO PARTICIPATE AS A RESEARCH SUBJECT IN THE STUDY DESCRIBED ABOVE. YOU WILL BE GIVEN A SIGNED AND DATED COPY OF THIS FORM TO KEEP.

Signature: _____ Date: _____ Time: _____

C: Teacher Consent Form

Purpose:

You are being asked to participate in a research project. The purpose of the research is to explore how NGES selects, interprets and implements English language arts, Chinese language arts and other content area curricula taught in Chinese (e.g. Science and Social Studies) in order to meet the program goals.

Procedures:

Collection of Curriculum Materials

If you agree to participate, the collection of curriculum materials will include the content standards, scope and sequence documents, textbooks, lesson plans and other instructional materials adopted by you for teaching your classes. The researcher will make copies of the curriculum materials with the names or any identifiable information removed and return the original ones. The copies will be filed with code numbers.

Interview

If you agree to participate, one interview will be conducted with you before the winter break in 2018. The interview is to explore your understanding of the curricula you teach and your reflections on curriculum planning and implementation.

The interview will be conducted at a place and time selected by you for your maximum convenience, and it will last for approximately 60 minutes. The researcher will

keep detailed interview notes. With your active consent, interviews will be audio recorded using a portable digital voice recorder.

Auditing Curriculum-Planning Meetings

If you consent, the researcher will attend the curriculum planning meetings of the school, which include Grade 2 and 3 co-planning meetings every Monday, and the curriculum scope and sequence meeting across grades in the summer 2018. With the active consent of the meeting participants, the meetings will be audio-recorded using a portable digital voice recorder.

Classroom Observation

If you agree to participate, the researcher will go to observe your classes once a week for two quarters in order to summarize the consistent patterns of your approaches to curriculum implementation. The focus of the researcher's observation will be on (1) what steps or strategies you take to implement the curricula and how you integrate curricular planning and improvisation to conduct your pedagogical activities, and (2) teacher-student interactions to see how students respond to your curriculum design and implementation.

The researcher will sit at the back of the classroom and take detailed field notes to record the naturally-occurring instructional practices and teacher-student interactions. The field notes will cover students' and your linguistic or paralinguistic expressions. If you, your students, your school and the school district give consent, a portable voice recorder will be put in your pocket or a fanny pack to capture your voices, but non-consenting students' voices that are accidentally captured in the recordings will be deleted. If any of the stakeholders decide to place limitations on audio recording, then no audio recorders will be used in the classroom and the data source will be the researcher's field notes.

An informal 3-5-minute conversation will be conducted between you and the researcher after class to address any themes or questions that come up in a specific lesson, and the researcher will take detailed notes of the conversation.

Benefits:

There are no direct benefits to participating in this project, and no payment is involved in this project. The researcher will share the findings with you and the school to advance the current understanding of curriculum selection and implementation in dual language immersion schools.

Risks:

The class may feel disrupted at the beginning of the study because of the presence of the researcher in the classroom. In order to minimize the disruption, the researcher will sit at the back of the classroom to observe the class and take field notes.

Confidentiality:

Absolute confidentiality cannot be guaranteed, since research documents are not protected from subpoena. However, the research team will protect participants'

identifiable information (personal names, symbols, etc.) with measures, and such information will be removed from our notes and audio recordings. The collection of curriculum materials will be filed with code numbers, with names and any identifiable information removed. The materials will be stored in a locked cabinet. Only pseudonyms will be used in the interview notes and the field notes of classroom observation. Identifiable information that appears in the notes will be deleted before the notes are locked securely in a cabinet. The audio files will be downloaded to an encrypted computer, renamed to code numbers and backed up to an external hard drive, protected with an encrypted password. The original recordings will be erased from the recorder. Audio recordings of interviews will be reviewed and edited to remove any identifiable information. The audio recordings of your curriculum implementation and teacher-student interactions, which will be recorded only if consent for audio recording in the classroom is got from you, your school and the school district, will be reviewed to remove identifiable information, and non-consenting students' voices that are accidentally captured in the recordings will be deleted. The edited data will be stored in another hard drive separately from the original audio recording and also protected with a password. The hard drives will be stored in separate locked cabinets. Only authorized researchers can have access to the data.

When all the editing of the audios finishes, the original audio recordings will be destroyed. When the audio recordings are transcribed, we will change all the identifiable names to pseudonyms, and all the transcripts will be locked securely separating from the recordings, so that the risk of participants being identified could be minimized. Once all the audio recordings are transcribed, the raw recordings with the exception of some episodes that exemplify the main findings will be permanently deleted from the recording devices, computers, and hard drives. The voices of the participants in these short episodes will not be altered unless requested by the participants

After this research is completed, we may want to present some of the data at conferences and scientific publications, with no school or personal identifiable information included. We may also share the results of this study to a more general audience through newspaper columns, school and district newsletters, and on research and policy related web-sites. For the general audience, no audio recordings will be made publicly available, only our written reports will be shared.

Right to Refuse or Withdraw:

You can refuse to take part in this project and you can stop participating at any time. You can skip questions or refuse to answer any questions in the interview. Whether or not you participate will not affect your standing in any group or organization. You have the right to receive a copy of this consent form.

Contact Information:

If you have questions about the research, you can contact Dr. Jin Sook Lee at jslee@education.ucsb.edu or (805) 893-2872.

If you have any questions regarding your rights as a research subject, please contact the Human Subjects Committee at (805) 893-3807 or hsc@research.ucsb.edu. Or write to the University of California, Human Subjects Committee, Office of Research, Santa Barbara, CA 93106-2050

Please indicate the level of participation in this study (please initial):

I allow the researcher to collect my curriculum materials.

I allow the researcher to audit the curriculum-planning meetings.

I agree to participate in the interview.

I allow the researcher to observe my class once a week and take field notes.

I allow the researcher to observe my class once a week and audio-record my instructional practices.

I allow the researcher to observe my class once a week and audio-record teacher-student interactions.

I allow the researcher to conduct informal conversations with me after class concerning the questions that come up in my lessons.

PARTICIPATION IN RESEARCH IS VOLUNTARY. YOUR SIGNATURE BELOW WILL INDICATE THAT YOU HAVE DECIDED TO PARTICIPATE AS A RESEARCH SUBJECT IN THE STUDY DESCRIBED ABOVE. YOU WILL BE GIVEN A SIGNED AND DATED COPY OF THIS FORM TO KEEP.

Signature of Participant or Legal Representative: _____ Date: _____ Time: _____

Appendix 5: Interview Guide

Informant Number

Interviewer

Time

Place

Interview Guide for Interviewing Teachers (English Version)

Hi, my name is ___ and I'm a researcher of the research project on curriculum adoption and implementation in a Chinese-English dual language immersion school. Thank you for your time and willingness to be interviewed. The purpose of this interview is to explore your beliefs about teaching and learning in dual language programs, your approaches of curriculum implementation and the challenges you face in implementing the curriculum in your daily instruction. Before we proceed with this interview, I would like to let you know that you can skip any questions you do not feel comfortable with or relevant. Also, please feel free to interrupt me at any time if you have other things you would like to add. Please be assured that I will keep confidentiality by using pseudonyms for the note-taking and later analysis. Also do you mind if I audio-record this interview, which will be helpful for me to recall the content of this interview?

Questions:

Part I Background information

1. How long have you been teaching?
2. How long have you been teaching at NGES?
3. Why did you decide to teach at a Chinese immersion school?
4. Could you please share with me your teaching experiences before you teach at this school?
5. Could you please provide some information on your professional development, e.g. any professional development programs, any that is dedicated to immersion teaching?

Part II Teacher beliefs: subject matter, how kids learn

1. What in your opinion is special about the instruction in a Chinese immersion school compared with that in English-only schools? Any challenges? How do you deal with these challenges?
2. What are the advantages and disadvantages you have seen so far as a teacher of enrolling students in dual language immersion schools?
3. Have you noticed any instances that students make use of the bilingual resources to understand the content or solve problems? If yes, could you please give me some examples?
4. Do you incorporate bilingual resources in your lessons? Why and why not?
5. Is there any collaboration between teachers of different subjects to plan the lessons, for example, Chinese and English language arts teachers? If yes, how? If not, why?
6. How do you conceptualize English Language Arts/ Chinese Language

Arts as a subject? (What does the teacher expect students to learn in the subjects of ELA/CLA or math or other subject matters that the teacher teaches?)

Part III Curriculum

1. Could you please introduce or describe the curricula you are using for ELA/CLA or math or other subject areas?
2. Who made decisions on curriculum selection? Your role in the process?
3. Could you please describe the sequence of teaching ELA/CLA? (e.g. order of words, e.g. function, frequency, difficulty?)
4. How do you decide what to teach in a specific class?
5. How do you use the content standards in your instruction?
6. How do you divide your instructional time?
7. Your students are very young and emergent readers, what challenges/struggles have you noticed that students have in your ELA/CLA class? What strategies did you use to help them to develop literacy skills?
8. How would you describe your role in your class?

Interview Guide for Interviewing Teachers (Chinese Version)

你好，我的名字叫___，我正在从事一项关于中英双语浸入式学校如何选取和教授课程的研究。非常感谢您愿意并抽出时间接受访谈。本次访谈的目的是探讨您对双语课程教学与双语学习的看法，您如何设计课程以及在日常教学中所面临的挑战。我们在开始访谈之前，我想让您知道：你可以跳过任何您不愿回答或您认为不相关的问题。在访谈过程中，如果您有需要补充的要点，请随时打断我。请您放心，在我的笔记以及之后的分析中，我会使用假名，以保护您的隐私。另外，录音资料会对我之后回忆此次访谈的内容很有帮助，您是否同意我在访谈过程中进行录音？

问题

第一部分 背景信息

1. 您从事教学工作多长时间了？
2. 您在 NGES 工作多长时间了？
3. 您为什么选择到一所中英双语学校工作？
4. 您可以分享一下您到 NGES 之前的教学经历吗？
5. 您可以分享一下您的教师培训经历吗？有与双语浸入式教学相关的培训经历吗？

第二部分 关于学科和学生如何学习的教学信念

1. 在您看来，中英双语学校中的教学与其他只用英语作为教学语言的学校相比有何特别之处？有什么挑战？您是如何应对这些挑战的？
2. 据您观察，学生选择在双语学校学习享有哪些优势，要面对哪些劣势？
3. 您在教学过程中，有没有发现学生用双语资源来理解内容或解决问题的情形？如果有，您可以举个例子吗？
4. 您在您的课上会使用双语资源吗？若会，为什么？若不会，为什么不使用？

5. 不同学科的老师会合作备课吗，例如中文和英文老师？如果会，合作备课是怎样进行的？如果不会，是什么原因呢？
6. 您是如何理解中文课这门学科的？（您希望学生在您的中文课/其他学科，如科学课学到什么？）

第三部分 课程

1. 您可以介绍或描述一下您现在使用的中文（或其他学科的）课程吗？
2. 是谁决定选择这套课程的？您在选取过程中担任什么角色？
3. 您能否描述一下您教授中文课时的教学顺序？（例如，学习词汇的顺序，是以什么因素决定的：功能，频率还是难易程度？）
4. 您在备课时如何决定某堂课教什么？
5. 您在教学中是如何运用课程标准的？
6. 您如何分配您的教学时间？
7. 您的学生年纪都还比较小，读写能力正在发展阶段，他们在学习中文的过程中有哪些挑战或困难呢？您采取了怎样的策略来帮助他们提高读写能力呢？
8. 您如何描述您在课堂中的角色？