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Student Language Use in a One-way Mandarin Immersion Classroom: A Sociolinguistic Perspective

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by

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Abstract

The trend of expanding language immersion access to all students calls for further research in multiple contexts, especially those with a sociolinguistic lens. Potowski (2004), among a few systematic language use researchers, conducted an investigation in an upper-grade two-way Spanish immersion classroom and utilized the identity investment concept in interpreting language use data for the first time. Her study inspired me to conduct the present research that describes language use by four first-grade students during mathematics and Language Arts instruction in a one-way fifty-fifty Mandarin immersion classroom in an urban public school in the heart of an African-American community in the Northwest. As a seasoned immersion educator, I explored interactions among linguistic input (Krashen, 1982), output (Swain, 2000), transfer (Cummins, 1979), and sociocultural identity (Norton, 2006; Potowski, 2004). This qualitative research involved observations using video- and audio- recordings with four focal students wearing lapel microphones over five weeks, followed by a semi-structured focus group interview. A total of 3,090 speech turns were coded and analyzed under five categories: the number of speech turns, vocabulary, grammar, linguistic functions, and other themes that emerged from the interview. Overall, students used Mandarin 61% of the time, a higher percentage than in Potowski's (56%) study. Findings support the use of diglossia though not all students exhibited this behavior. Data indicated that the time factor alone cannot

account for target language outcomes. The African-American girl, Abelina (a pseudonym), with the least exposure to Mandarin prior to enrollment at the researched school outperformed her native English-speaking peers. Her motivation, learning strategies, social identity, and Creole background may have contributed to her success. Implications for changes in immersion curriculum and instruction as well as calls for future research on trilingual education are shared.

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Chapter One: Introduction

In order to prepare young Americans for the international work force and global citizenship in the twenty-first century, schools in the United States began reforming language programs to meet their needs (Stewart, 2012). Shortly after the implementation of the first Canadian immersion program in Montreal in the mid-1960s, American educators and practitioners began to analyze the possibility of its implementation in the United States (Broner, 2000). Research shows that immersion is an especially effective method for second language acquisition (Collier & Thomas, 2004; Genesee & Lindholm-Leary, 2013). These programs emerged in the United States primarily for the following reasons: (a) As linguistic, cultural and general educational enrichment; (b) As magnet schools to bring about a balanced ratio of ethnolinguistic groups; and (c) As a means of achieving some degree of two-way bilingualism in communities with large populations of non-English-speaking residents (Genesee, 1987). While recognizing the effectiveness of immersion programs, there also exists a need to pay attention to problems that potentially impede their progress. Research has shown that students do not use the "target language" exclusively in immersion classrooms (Broner, 2000; Potowski, 2004). Target language refers to an instructional language other than English. In the language research literature, this term is sometimes used interchangeably with partner language, second language, or foreign language. In this paper, I used the term target language when I emphasize the language of instruction in immersion programs; and use first language (L1) versus second language (L2) when I focus on second language acquisition.

Among immersion programs in the United States, Spanish is the most common non-English language (Genesee & Lindholm-Leary, 2013). However, since the September 11, 2001 terrorist attacks, many languages that are critical to our economic growth and national security are categorized as "Critical Need Languages." They include Arabic, Chinese, Japanese, Korean, Russian, and the families of Indic, Persian, and Turkic languages (U.S. Department of Education, 2008). Chinese immersion programs are among some of the fastest-growing areas of second language education in American schools (Met, 2012). Prior to 2000, there were fewer than ten public or private elementary school immersion programs in either Cantonese or Mandarin (Met, 2012). About 90 Mandarin immersion schools registered in the Directory of Foreign Language Immersion Programs in U.S. Schools in 2011 (Center for Applied Linguistics, 2011). By 2015, 207 immersion schools existed, offering at least fifty percent of instructional time in Mandarin (Weise, 2015).

The increase of Mandarin immersion schools relates to the research findings that support the efficacy of immersion education. An immersion program has beneficial social psychological, psycholinguistic, and educational effects for students. Students in immersion programs gain proficiency in a new language without any detriment to progress in their first language or to subject matter achievement (Collier & Thomas, 2004; Steele et al., 2015). The success of such a program is contingent on valuing diversity, language development, integration of content and language, and the goals of the local community. One of the major factors characterizing the immersion program model is instructional time allocated to the target language. The breadth of

exposure to the target language input affects language learning outcomes, including second language oral output (Genesee & Lindholm-Leary, 2013).

Under the flagship of multiple pathways to bilingualism, a variety of immersion programs blossomed. One way to categorize American immersion programs is by the time allocation of instruction in the target language. Instruction in the non-English language can range from 50% to 90% of the school day, giving rise to the common program descriptor terms "fifty-fifty" and "ninety-ten" (Potowski, 2004). American immersion programs can also be divided into two categories: one-way (foreign language immersion) and two-way (dual language immersion). A one-way immersion program is designed for a predominantly linguistically homogeneous student population of native English-speakers. A two-way immersion program is designed for a linguistically heterogeneous student population of native English-speakers and native target language speakers (Tedick & Wesely, 2015). Fortune and Tedick (2008) defined a true immersion program as having the following features: (a) instructional use of the target language to teach subject matter for at least fifty percent of the preschool or elementary day typically up to grade five or six; if continued at the middle/secondary level a minimum of two year-long content courses is customary, and during that time all instruction occurs in the target language; (b) promotion of bilingualism and bi-literacy with sustained and enriched instruction through at least two languages; (c) employment of teachers who are fully proficient in the language(s) they use for instruction; (d) reliance on support for the majority language in the community at large for majority language speakers and home language support for the

minority language for minority language speakers (in two-way programs); and (e) clear separation of teacher use of one language versus another for sustained periods of time.

Regardless of the format of the immersion program, the American Council on the Teaching of Foreign Languages (ACTFL) published a position statement that recommends that language educators and their students use the target language as exclusively as possible, 90% plus, at all levels of instruction during instructional time and, when feasible, beyond the classroom (The ACTFL Board of Directors, 2010). This expectation highlights the need to make sure both teachers and students intentionally or unintentionally use the target language in the foreign language classroom as much as possible. In second language acquisition, a consensus has been reached that second language input (listening) and output (speaking) is essential to acquisition, as well as the development of communicative competence which includes five components: linguistic competence, strategic competence, sociocultural competence, actional competence, and discourse competence (Celce-Murcia, Dornyei, & Thurrell, 1995). In language departments in the real world, there are a mix of teachers who use the target language extensively and those who use the target language less than 90% of the time for a variety of reasons (LeLoup, Ponterio, & Warford, 2013). Research data evidenced that language use varied from classroom to classroom and was dependent on a plethora of factors (Broner, 2000; Potowski, 2004). This directly affects student language use in the classroom, because students are aware whether their teachers require them to speak in the target language. Students speak

more of the target language when their teacher has clear language use expectations (Ballinger & Lyster, 2011).

The problem relating to language use in immersion classrooms are three-fold. First, some immersion teachers do not emphasize oral language development, so students do not develop oral language skills (LeLoup, Ponterio, & Warford, 2013). Second, immersion teachers who emphasize oral language development face challenges to keep their students using the target language (Fortune, 2012). Third, student language use is complex. Multiple factors influence its process and product, particularly, attitudes, motivation, social identity and teachers' pedagogical approaches (Llinares & Lyster, 2014; Potowski, 2004). Further research in various immersion contexts is needed for us to better understand student language use and ways to improve second language education.

Thus, the over-arching question of the present research was: How do four first-grade students in a one-way fifty-fifty Mandarin immersion classroom in an urban public school in the Pacific Northwest United States orally use Mandarin when learning mathematics and Language Arts?

Sub-questions were as follows: 1) How many turns did each student produce in the L1 and L2 during each observation? 2) What type of vocabulary did each student use in the L1 and L2? 3) How accurate was the grammar of their Mandarin? 4) What are the linguistic functions of each focal student's oral language output?

Through the last four decades, a number of immersion researchers focused their studies on classroom language use (Ballinger & Lyster, 2011; Broner, 2000;

Potowski, 2004). Among them, the earliest documentation of classroom language use in a one-way immersion classroom in the United States was done by Cohen and Lebach in 1974. Following it, language use research went through a methodological revolution from casual observations to systematic recordings and complex designs (Broner, 2000). Rich data collected in these studies triggered valuable discussions in the second language acquisition field. They range from a first language (L1) and second language (L2) debate, to the role of corrective feedback (Llinares & Lyster, 2014), instructional approaches, language use expectations (Ballinger & Lyster, 2011), social identity, and effects of gender, interlocutor, subject area, developmental stages (Broner, 2000), linguistic functions (Garcia, 2007), and language proficiency (Steele et al., 2015).

Findings from these language use studies are phenomenal and valuable to the field of immersion research. Delgado-Larocco (1998) found that some immersion teachers' constant use of target language enables students' development of oral language skills, which suggested that pedagogical approaches are directly linked to students' language learning and language use. Potowski (2004) found that the teacher and the school can encourage or discourage students' investment in the identity of being a target language speaker. The choice of language is determined by social conditions, not by a preconceived notion that the mother tongue should per se be used. A learner-centered pedagogy has to take a learner's motivation and identity into consideration. A language learner's motivation to speak is mediated by investments that may conflict with the desire to speak (Norton, 2006). While students' identities

are directly associated to their language use, teachers' identities are equally critical in affecting student language use. Cammarata and Tedick (2012) researched the experience of immersion teachers to investigate how they integrate language and content such as mathematics, science, and other subject matter. They found that the immersion teachers who considered themselves as content teachers often emphasize the content more than language, which results in a lack of grammatical accuracy in their students' oral language production. This implied that teachers' awareness of the roles of their language use and their perception of being a content-language balanced educator can indirectly affect their students' target language output. Roles of a teacher's language use go beyond speech modeling. In a form of feedback, teacher's language influences students' social construction of knowledge and self-identity as well.

One of the most significant findings remains the diglossia in a language immersion community. Tarone and Swain (1995) defined a diglossic situation as "one in which a second language is the superordinate, formal language variety, and the native language is reserved for use in informal social interactions" (p. 166). Research data suggest that while children in the early years of immersion tend to use the target language more, children in the later years tend to fall back into using their L1. A number of possible aspects relate to this phenomenon: opportunities to speak, instructions, code-switching contexts, language policy, language status, and so forth (Broner, 2000). While the use of both the L1 and the L2 in immersion classrooms has been acknowledged in the literature there seems to be insufficient information on the

extent of the L1 use and particularly on the reasons why a shift in preference for one language to the other across grade levels might take place.

In order to further understand second language acquisition, researchers also described students' language use and second language learning. They investigated the process and product of language use, the quantity and quality, and the when and how. Tarone and Swain (1995) called for systematic research in language use and proposed a sociolinguistic perspective to examine the type of language use and for what purposes the L2 was produced.

While acknowledging the major contributions made by past language use research, I was intrigued by the discrepancies found in some studies. Ballinger and Lyster (2011) found in their study that the first-grade Native English-speaking students were never observed speaking spontaneously in Spanish to their teachers in the two-way immersion classroom. On the contrary, Garcia (2007) found that in the context where the L2 exposure was less than an hour a day, five-year-old participants were still able to communicate in the L2 if the teacher motivated them with activities that led them to use the L2 for various linguistic functions such as asking a question, explaining something, and so forth.

Another disparity was the quantity difference of the L2 use in different types of immersion classrooms. Both Broner (2000) and Potowski (2004) investigated student language use in terms of interlocutors to whom the focal students spoke, activities, and subject areas in relation to language use in fifth-grade classrooms, but their findings are very different. Potowski found that the overall students' L2 use (56%) in the

observed two-way Spanish immersion classroom was less than Broner's finding (63%) in a one-way immersion. It is not known whether this disparity was caused by differences in language rule enforcement and expectations for Spanish use by the teachers or something else. Potowski looked at the issue through the sociocultural lens and discussed in depth students' opportunity to speak, investment in identity as a Spanish-speaker, and the cultural context around the learner.

Mandarin immersion programs are still in their infancy. Research in this specific field in the United States is relatively scant and many studies are centered on academic achievement, language proficiency, and cognitive skill development. Lindhom-Leary (2011) recently reported results from a study of two two-way Chinese immersion programs. Students in grades four through eight whose home language was Chinese tested at or above their grade level and the same as or well above peers with similar demographic profiles who participated in non-immersion programs.

Steele et al. (2015) conducted a longitudinal study on the effect of dual language immersion including both one-way and two-way programs on student achievement in Portland Public Schools in Oregon. Findings were consistent with Lindhom-Leary's (2011). As a part of Steele et al.'s (2015) program evaluation, classroom language use was investigated to describe general immersion classroom practice within the whole school district, instead of student language acquisition. About 13 schools across four different languages, Spanish, Mandarin, Japanese, and Russian participated in the observation. I explain this study in detail in Chapter Two. It is important to note that no audio or video equipment was used in Steele et al.'s data

collection. No focal students were identified. Only the percentage of the L1 versus

the L2 use was reported. The disaggregated data by grade or by language were not

reported. The overall findings indicated that more than 82% of the students spoke in

the target language for more than 90% of the time. Furthermore, the demographics of

the participants in Mandarin classrooms in this study centered on middle class Asian

and Caucasian, with very little other ethnic representatives. This indicated that the

historically underserved population, African-American students, in this school district

were absent from this research.

In terms of student language acquisition, there have been studies on African-

American students in language classrooms (Haj-Broussard, 2005; Holobow, Genesee

& Lambert, 1991; Potowski, 2004). Research findings support that African-American

students are as academically successful in language immersion programs as African-

American students in non-immersion programs. However, one third of the African-

American students in French immersion were in a program which the qualitative

research found to be a less than ideal immersion setting (Haj-Broussard, 2005). Haj-

Broussard did not describe "ideal" in detail in her article, but it implied that African-

American students encountered different challenges from students in other ethnic

groups in dual language immersion school settings. Potowski (2004), in a study of

student Spanish use in a two way immersion program in the United States, found that

over half of the students receiving pullout Spanish as a second language were African-

American, many of whom were labeled learning disabled. Considering African-

American students are only 14% of the researched school's population, Potowski

proposed an area for future research focused on whether such students experience greater challenges learning the minority language in dual immersion contexts.

Despite the existence of several studies on African-American learners in language immersion programs, there are a paucity of qualitative studies on this ethnic group in Mandarin immersion classrooms. In the states of Oregon and Utah, the enrollment of African-American students is significantly lower in dual language programs in comparison to other states such as Georgia and New York, especially in early language learning programs. Consequently, language use is rarely studied in a Mandarin immersion program that has predominantly African-American learners in the early grades. Steele et al. (2015) investigated language use in Mandarin immersion classrooms, but they have not explored African-American learners' Mandarin use. By 2013, in their research site Portland Public Schools, African-American students made up 10.7% of the total 47,127 students enrolled. Out of 3,860 dual language immersion students, only 2% were African-American students and in Mandarin immersion classrooms the representation of this ethnic group was near zero (Portland Public Schools, 2015). This study was designed to narrow the research gap and investigate student language use in a Mandarin immersion program in the heart of an African-American community.

The present study benefits audiences from the linguistic, educational, and sociology fields. The immediate beneficiaries are the teachers and students. Moreover, the stakeholders in the immersion programs could also benefit from this research. One of the greatest challenges for immersion teachers is to keep their

students using the target language, especially when working and talking amongst themselves (Fortune, 2012). Findings from this study inform teachers on how to adjust instruction to increase student language output and overall language learning outcomes. The results may impact school district decision making in curriculum development. They can also influence immersion teacher's professional development and the teacher preparation programs at the university level. The description of language use sheds light on second language acquisition, the relations between linguistic theories and practice, and the relations between linguistics and society.

Methodologically, I combine interaction analysis features and constitutive ethnography features in the present study, which is qualitative in nature. I, as a native Mandarin-speaker and an experienced Mandarin immersion teacher, acquired advanced research skills to conduct this investigation. As the data collection instrument, I brought a unique emic perspective into the research process. For data collection, I employed systematic observations, videotaping, and lapel-recordings of actual language use, and triangulated findings of interview on student language use attitudes, which is different from many language use studies conducted in the past where some inquiries only employed a single source of data collection, such as a note-taking only approach (Blanco-Iglesias et al., 1995). It is well-accepted that language acquisition research that collects naturalistic data within genuine classrooms is crucial for understanding classroom language acquisition (Nunan, 1992). I follow this tenet and examine student language use through multiple lenses with a sociolinguistic lens as the primary perspective.

Both Potowski (2004) and Broner (2000) utilized systematic observations and modern technology in recording Spanish language use in their research. However, Spanish is the most taught language in immersion schools in the United States. Further, studies in different immersion contexts, especially in programs where students learn less commonly taught languages, are still needed. A Mandarin immersion classroom is an excellent investigation site for us to examine young learners' language acquisition of this increasingly taught language (Stewart, 2012).

The purpose of this study is to explore students' target language learning experiences and oral output in a one-way Mandarin immersion classroom during the teaching of the subject areas of mathematics and Language Arts in a first-grade classroom. The philosophical assumption is that this study provides rich descriptions of learners' language use and language learning experiences. Students in the participating classroom were ethnically diverse learners with a majority of African-American students. I use speech turns to quantify language use. A turn is defined as a completion of one interlocutor's speech with no interruption from another interlocutor, following Broner (2000). Besides the quantification of turns, this study also concurrently focuses on three linguistic features of Mandarin language use including vocabulary, grammatical accuracy, and linguistic functions such as asking a question, explaining something, and so forth. Data are triangulated with observation field notes and the interview feedback.

This study chiefly serves four goals. First, it investigated student oral language use in a one-way immersion classroom, because it directly links to student second

language acquisition and learning outcomes. Second, it contributes to the body of knowledge on Mandarin immersion education in the United States. The increase of Mandarin immersion programs demands guidance from research that provides rich descriptions of students' use of the target language. Third, it provides more information on the relationship between learner diversity and learning experiences. For example, it helps clarify the experiences of African-American students in learning a second language in an immersion setting. Fourth, it explored students' language use and the linguistic features they employed when different subjects were taught. This information is valuable to classroom teachers as they plan daily lessons and instructional activities.

Chapter Two: Literature Review

Student language use in immersion classrooms has been systematically studied by several scholars (Ballinger & Lyster, 2011; Broner, 2000; Potowski, 2004). Past language use investigations often describe the quantity and quality, linguistic features such as functions and forms, as well as extra-linguistic factors including interlocutors, tasks, and the purpose of interactions. Interpretative analyses in these studies discuss elements that influence student language use including pedagogical differences, language expectations, and social identity. However, due to the lack of an immersion educator's perspective in the data analysis process, the explanations tend to be more theoretical and technical, rather than practical.

Theoretical Framework

In the present study, I adopted a sociolinguistic perspective in looking at student language use. It allowed me to examine what type of language and for what purposes students were using the language (Tarone & Swain, 1995). Sociolinguistics refers to the use of linguistic data and analyses in other disciplines concerned with social life, and conversely, the use of social data and analyses in linguistics (Hymes, 1977). In Hymes' perspective, the purpose of language is to communicate. Humans are born as social beings (Vygotsky, 1987). Through interaction, language becomes a sign or tool for communication. This interaction is social. Shared meaning is developed through such social interaction. The language user lives in a constant state of negotiation of meaning and tolerance of ambiguity (Long, 1996). Thinking, as a function of language, occurs when the language user views ideas through others'

perspectives. When a person knows when to say, what to say, and how to say

something, this person acts as the agent of being. Language can be used to direct at

others or at self. When language is directed at self, it functions as thinking (Vygotsky,

1987). The acquisition of language depends on experience. The complexity of

language use context and how the learner's brain processes information are both

crucial to language acquisition. Sociolinguistics presupposes that knowledge is

socially constructed and the science of society and language can be accurately and

completely analyzed (Hymes, 1977).

Different from most linguistics studies that focus on language structure,

acquisition, use, and change, sociolinguistics highlights language use (Mesthrie, 2008).

It explores the role of language in human life and views language as a social

phenomenon that is socially construed. It studies how language is socially embedded,

the social background and intentions of speakers, issues pertaining to their social

characteristics and identities, as well as to the social context of speaking. The social

context includes who is authorized to speak, what counts as appropriate language in

different circumstances, and how speakers from different backgrounds may have

different cultural assumptions and norms which bias the semantics of the same

language forms. Thus, sociolinguistics does not focus on grammar for its structural

aspects, acquisition mechanisms, or the abstract mental capacity underlying all

languages. Rather, it focuses on language use within a speech community (Mesthrie,

2008).

Mesthrie (2008) summed up the sociolinguistic approach, in that it is generally: (a) non-prescriptive and non-purist, (b) appreciative of variation, (c) considerate of speech and conversational norm, (d) sympathetic towards multiculturalism and multilingualism, (e) mindful of the interactive nature of speech, (f) attentive to attitudes and norms of different subgroups within a society, (g) receptive to change in language, and (h) responsive to broader contextual issues relating to power, culture, and identity.

I believe it is vital that language immersion educators use a sociolinguistic lens in understanding language use in their classrooms. It allows the teacher to see the whole child instead of solely focusing on how much a student remembers the surface structure of language such as grammar, pronunciation and vocabulary. Teachers need to move away from emphasizing the language use product such as syntax. The language learning process is more complex than the product. Language use data are a window to view the language learning process and a learner's learning experience. Through the sociolinguistic lens, the teacher can notice that any corrective feedback or general feedback carries implied messages and impacts a student's perception of self and identity in the speech community. In addition, the cultural differences between the teacher and students affect how feedback is perceived. While recasts, an implicit reformulations of learners' non-target utterances, are preferred by teachers in immersion classrooms, students may be less likely to notice them as corrective feedback (Llinares & Lyster, 2014). Language immersion educators need to take

culture and social context into consideration as they design lessons and interact with their students.

A sociolinguistic perspective can be accompanied with other theories in practice, for example, Krashen's input hypothesis (1989), Swain's output hypothesis (2000), Cummins's (1979) linguistic interdependence hypothesis and threshold hypothesis, as well as Norton's (2006) sociocultural theory of identity.

Krashen (1989) is renowned for his contributions to the field of second language acquisition, positing five hypotheses that have implications for teaching languages in a classroom context. Krashen explained that the input hypothesis assumes that we acquire language by understanding messages. Comprehensible input is the essential environmental ingredient, the optimal input. It is interesting, relevant, but not grammatically sequenced. Optimal input must be in sufficient quantity. There are multiple ways for teachers to facilitate comprehensible input. Common strategies include using visuals and body language, making speech comprehensible, providing immediate feedback, teaching students to ask for help or access resources, and assisting learners to make connections. Krashen stressed that the Affective Filter hypothesis works hand in hand with the Comprehensible Input Hypothesis. Three attitudinal affective variables encompass motivation, self-confidence, and anxiety. When a second learner is anxious, the brain will not seek for comprehensible input. This theory captures the relationship between affective variables and the process of second language acquisition by positing that acquirers vary with respect to the strength or level of their Affective Filters. Strategies to monitor students' affective filters can

be to provide feedback that help students build pride in work or create a positive and safe environment towards the L2 language and culture.

Furthermore, Krashen (1989) contended that a richly specified internal language acquisition device, the part of the brain responsible for language acquisition, also makes a significant contribution to language acquisition. When the language acquisition device is involved, language is subconsciously acquired. While you are acquiring, you do not know you are acquiring; your conscious focus is on the message, not form. This acquisition process is identical to what has been termed "incidental learning." Incidentally acquired knowledge is represented subconsciously in the brain.

Without negating the significance of comprehensible input, Swain (2000) explored the role of output in second language learning. She hypothesized that the importance of output to learning is that output pushes learners to process language more deeply than does input, because it puts the learner in control. Output may promote 'noticing,' a metalinguistic awareness that may be conscious or subconscious. However, more importantly, output serves language learning as hypothesis testing such as in a collaborative dialogue. This dialogue is more than a conventionally defined negotiation of meaning. It is a problem-solving and knowledge-building process. When a collaborative effort is being made by participants in an activity, their speaking mediates this effort. As each participant speaks, their 'saying' becomes 'what they said,' providing an object for reflection. Their 'saying' is cognitive activity, and 'what is said' is an outcome of that activity. Through saying and reflecting on what was said, new knowledge is constructed. This mechanism allows students'

performance to outstrip their competence. It highlights the function of language as a thought process. Swain (2000) stressed that internal mental activity has its origins in external dialogic activity. External speech facilitates the appropriation of both strategic processes and linguistic knowledge. "These are insights that a focus on input or output alone misses" (Swain, 2000, p.113).

I want to highlight Swain's (2000) theory, because the power of collaborative dialogue is often overlooked in language classroom practice. It takes a skillful facilitator to use multiple talk moves to monitor the collaborative dialogue effectively. Too often a teacher quickly ends the dialogue with the learner being submissive to the teacher. For example, the learner said an incorrect sentence. The teacher provided a recast as a corrective feedback. The learner nodded. The dialogue was over. It was ineffective in terms of problem solving.

Swain's (2000) social construction of knowledge through collaborative dialogue is consistent with sociolinguistic theory. So does Krashen's (1989) input hypothesis. Comprehensible input only occurs when the learner receives it as a normalized shared meaning through the social interaction. It is important not to equate comprehensible input with memorizable input. A teacher teaches the word Mississippi in a rhyme M-I-SS-I-SS-I-P-P-I. The rhythm does assist memorization of the spelling of the word. However, this is only a memorizable input, not a truly comprehensible input. If the teacher provides information such as Mississippi is an Indian word meaning "the Father of Waters," the students would remember it with much more appreciation to the culture and the semantics of the word. The teacher

could make the word comprehensible by facilitating students' understanding of the meaning and the usage of the word, instead of simple memorization of the form.

Cummins (1979) emphasizes the interaction between sociocultural, linguistic, and school program factors in explaining the academic and cognitive development of bilingual children. He attempts to map out the mechanisms through which "bilingualism" exerts its effects. Linguistic input factors interact with school program factors and mediate the effects of sociocultural background factors. This process affects students' cognitive and academic outcomes. Hence, Cummins examines two main child input factors, conceptual-linguistic knowledge and motivation to learn the L2 and maintain the L1. He argues that a cognitively and academically beneficial form of bilingualism can be achieved only on the basis of adequately developed L1 skills. The language-thought issue also has important implications for teaching strategies in bilingual classrooms. If a bilingual child attains only a very low level of competence in the second (or first) language, interaction with the environment through that language, both in terms of input and output, is likely to be impoverished.

Furthermore, Cummins' (1979) linguistic transfer theory intersects with sociolinguistic theory and manifests in dual language immersion programs as a change agent to help achieve balance in American educational purposes, social equality, social efficiency, and social mobility (Labaree, 1997). Linguistic transfer refers to speakers or writers applying knowledge from one language to another language. The rise of two-way immersion programs was meant to offer heritage students access to academic content in their first language. Heritage students here refer to learners who have

proficiency in or a cultural connection to the target language. Findings from several

large scale research studies suggested that dual language immersion benefits learners

in multiple aspects, including brain development, cultural awareness, academic

achievement, and so forth.

In the field of English as a Second Language (ESL) education, a very

influential concept that also impacts immersion education is Cummins' (1980) Basic

Interpersonal Communicative Skills (BICS) and Cognitive Academic Language

Proficiency (CALP). He distinguished them to draw attention to the timelines and

challenges that second language learners encounter as they attempt to catch up to their

peers in academic aspects of the school language. The term BICS refers to social

language that students use in the hallways or everyday tasks. It is high contextual and

situational. It takes a student six months to two years to acquire. The term CALP

refers to academic language that students encounter in texts or lectures. The context is

reduced, so it takes about five to seven years for a second language learner to acquire

CALP. On the journey to learn a second language, the observable includes discrete

language skills, grammatical forms, language functions, and explicit instruction.

However, the fundamental features such as academic knowledge, life experience, and

linguistic universals are transferable from one language to another. Cummins

considered these transferable skills and implicit metalinguistic knowledge as a

common underlying proficiency that determines an individual's performance on

cognitive and academic tasks in both native language and target language. The

semantic features of a concept stay the same and languages (L1 or L2) become simply

the labels. This attributes to the academic efficacy in dual language immersion programs where learners acquire content in L2 without duplicating the process in L1. Some researchers contended that this linguistic transfer does not happen naturally. Teachers must use "bridging," explicit instruction where the teacher guides the students to make the transfer from the L2 to the L1 or vice versa (Beeman & Urow, 2012).

Norton (2006) focused on the relationship between identity and language learning. She delineated a broader conception of sociocultural theory through outlining five main characteristics of research that addresses identity as a sociocultural construct. First, a sociocultural conception of identity conceives of identity as dynamic and constantly changing across time and place. Second, much research on identity conceives of identity as complex, contradictory, and multifaceted, and rejects any simplistic notions of identity. Third, most researchers note that identity constructs are constructed by language. Fourth, most researchers note that identity construction must be understood with respect to larger social processes, marked by relations of power that can be either coercive or collaborative. Finally, much research seeks to link identity theory with classroom practice.

Using this framework, Norton (2006) examined the data from her study of a social action literacy project in 2003. In the wake of September 11, terrorist attacks, Norton and Kamal (2003) collaboratively investigated literacy and social change in a private middle school in Karachi, Pakistan. This school implemented the Youth Millennium Project (YMP), a global initiative to provide youth with opportunities to

build self-confidence and community by creating a local plan of action that addresses a larger social issue. Participants' native language is Urdu and the target language is English. English is the language of instruction throughout the day, so students are totally immersed in the target language. Their research was conducted in three phases. Phase one focused on the experiences of 80 students with the YMP. Phase two focused on 26 students who were asked to reflect on their perceptions of literacy and ESL. Phase three focused on 20 students' description of the kind of society they hoped to have in 2020. Some students participated in more than one phase. Data were collected with questionnaires, interviews, and observations. Norton and Kamal found students conversed in both native language and target language during small-group work and on the playground. Students preferred speaking in both languages, switching from one to another to convey opinions, thoughts, and ideas to people. They also found that these students recognized the importance of literacy within their community. Students saw the development of literacy, competence in English, and technological advances in the future as desirable and interdependent. They were eager to use literacy to 'invent' the nation and build relationships across nations. Another theme that emerged from their data was imagining English as a language of possibility that can provide Pakistanis with the opportunity to remain socially, economically, and politically connected, not only to the United States and United Kingdom, but to the wider international community. Furthermore, Norton and Kamal found that students imagined a future society in which Pakistan was peaceful, true to the principles of Islam, and a contributing member of the international community. Norton (2006)

contended that these data were best understood with the sociocultural theory in which the English language coexists with vernacular languages and local needs are balanced against global imperatives. In such a context, imagined communities are multiple and identities hybrid. Moreover, in terms of relation between identity and language learning, she found that students were more invested in their identities as Muslims than in any given linguistic identity.

Along these lines, the sociolinguistic perspective focuses on language use. Through examining what type of language is being used and for what purpose(s) the speaker is using the language, the examiner is able to see the relation between social context and student's language behavior. The underlying assumption is that such relation can be understood and controlled. This sociolinguistic perspective and Norton's (2006) social identity theory, along with Krashen's (1982) input hypothesis, Swain's (2000) collaborative dialogue, and Cummins' (1979) linguistic transfer theories, guided me through the examination of research studies conducted in the field of language immersion, especially language use investigations.

Immersion Research

Foreign language programs for English-speaking students include Foreign Language in the Elementary Schools (FLES), foreign language immersion, and dual language immersion. Foreign language immersion is also known as one-way immersion. Dual language immersion is also referred to as two-way immersion. The first two-way immersion program was launched at the Coral Way Elementary School in Dade County, Florida in 1963 (Christian, 1996). Following the St. Lambert French

immersion program model founded in 1965 in Canada, the first one-way immersion in the United States was founded in Culver City, California, in 1971 (Cohen, 1974). Since then, immersion research conducted in the United States has covered second language acquisition in immersion contexts, academic proficiency, foreign language proficiency, program types, and classroom processes such as actual classroom language use and the sociolinguistic characteristics of immersion classrooms (Potowski, 2004).

Several longitudinal research studies function as program evaluations, among which are well-known projects, including a four-year study of a partial French immersion program in Cincinnati, Ohio (Holobow, Genesee, & Lambert, 1991), a study of student outcomes in immersion programs at Houston Independent School District, Texas (Collier & Thomas, 2004), an investigation of two-way dual language programs in the state of North Carolina (Thomas, Collier, & Collier, 2010) and a study of dual-language immersion programs in the Portland Public Schools, Oregon (Steele et al., 2015). Despite the program nuances, implementation, and evolution, a consistent finding was reported that academically, students in the immersion programs scored as well as or higher than students in English-only classrooms. Students who are from ethnic minority groups or learning English as a second language also benefit from these positive effects in the immersion programs.

Language Use Investigations in the United States

The earliest study on language use in one-way immersion classrooms in the United States was conducted by Cohen and Lebach in 1974. They found second

graders spoke both the L1 and L2 to their peers. In chronological order, Broner (1991),

Heitzman (1993), Parker et al. (1994), Blanco-Iglesias et al. (1995), Carranza (1995),

Tarone and Swain (1995), Christian et al. (1997), Delgado-Larocco (1998), Broner

(2000), Potowski (2004), Ballinger and Lyster (2011) and Steele et al. (2015) have all

studied language use in immersion classrooms. Among them, Potowski (2004)

identified five studies that carried out systematic observations and recordings of

students' language use prior to her study: Heitzman (1993), Parker et al. (1994),

Blanco-Iglesias et al. (1995) and Broner(2000) in one-way immersion settings, and

Delgado-Larocco (1998) in two-way immersion classrooms.

Heitzman (1993) and Parker et al. (1994) used the same procedures and data

corpus, audio files and text transcriptions, obtained from a one-way Spanish

immersion program in St. Paul, Minnesota. They investigated student language use

with peers and teachers during mathematical problem solving. Eight focal students

were selected from grades five and six to represent different levels of language

proficiency and academic achievement. Data collection involved field notes,

interviews, and tape recordings. In analyzing the data, classroom activities were

divided into two categories: teacher-fronted and non-teacher-fronted. Teacher-fronted

language use reflected speech output during whole group lecture style of instruction.

Non-teacher-fronted language use referred to oral output in small groups. Then data

were re-sorted by using another set of categories: task-oriented vs. social and task-

oriented. Instances were used as the unit of language use analysis. Each instance was

at least one adjacency pair, a unit of conversation that contains an exchange of one

turn each by two speakers. Many instances were much longer than one adjacency pair.

Findings were three-fold: (a) Students self-reported using the L2 with teachers, and

very occasionally with friends. Observation results confirmed these reports. (b)

Students showed a preference for speaking the L2 in teacher-fronted, task-oriented

situations. (c) Interview results suggest a link between language use and language

proficiency.

Despite the useful results, this research presents several limitations. First, lack

of speech role models and motivation were speculated, but the concept of motivation

was not investigated in-depth (Potowski, 2004). Second, the researcher elicited

students' language use during observations in English, such as asking students to think

aloud in order to record their thinking process. This approach may have primed the

research subjects into using the L1, which skewed the data (Broner, 2000). Finally,

the percentage of instances did not reflect the actual time or length of the language

output. The numbers of instances were small ranging from one to fourteen, so it

diminishes the validity of findings.

Blanco-Iglesias et al. (1995) explored student language use when conversing

with their teacher, when responding to the teacher in teacher-fronted discussions, and

when conversing with their peers during deskwork. Participants were K-5 students in

a one-way Spanish immersion school. The main data collection method of this

qualitative study was taking copious field notes during non-participant observations.

For six weeks, 14 different classes were observed for 10 to 50 minutes each time, for a

total of 10 hours and 15 minutes. Language samples were divided into three

categories: teacher-student, student-teacher, and student-student. Findings showed

from kindergarten to third grade, students spoke Spanish exclusively to their teacher.

Students also spoke less and less English to their peers as they moved up from

kindergarten to third grade. By third grade, students' Spanish use reached a peak.

Then the pattern changed in the fourth and fifth grade. The decline of Spanish use

formed an upside down "U" shape if data are graphed across the grade levels. Blanco-

Iglesias et al. (1995) attributed it to child developmental stages and pre-adolescent

culture. Students in this age group become more concerned with how others see them,

not with how they see themselves. Peer relations and identity formation impact their

choice of language use.

This study contained a few limitations as well: (a) The field notes only

approach may have missed important details that tape recordings or videotaping can

capture. (b) The note-takers were native Spanish-speakers, so English transcriptions

are not accurate or sufficient for detailed analysis (Potowski, 2004).

Tarone and Swain (1995) explained the language shift across grade levels as a

diglossic situation. This diglossia is reflected in the specialized use of the L1 and the

L2 – the L1 is used in social interactions while the L2 is reserved primarily for on-task

academic interactions with the teacher. They proposed that if one takes a

sociolinguistic perspective on immersion classrooms, viewing them as speech

communities, they can be considered to align with the constraints already established

by sociolinguists for other speech communities outside the classroom. Immersion

programs focus on content-based instruction, which may emphasize academic

language only. As a result, students in this speech community (the classroom) may lack social language skills in the L2. However, the implication of the observational and interview evidence Tarone and Swain cited took the position that it is impossible for classroom teachers to teach social vernaculars in the L2. Therefore, it is important to involve immersion children in activities outside the classroom with peers who are native speakers of the L2. This presents challenges for students in one-way less commonly taught language immersion programs.

Delgado-Larocco (1998) examined how pedagogical approaches affect a students' level of language production and ultimate academic achievement in a 90:10 two-way Spanish immersion kindergarten in California. She focused on classroom interactions, language functions, and instructional and communication strategies. Through rich descriptions of the setting and participants, she provided the historical context of the community. Participants were 30 kindergarteners of which 50% were native English-speakers and 50% native Spanish-speakers. Over a one year period, the researcher conducted 38 hours of field observations and 29 hours of video and audio recordings. Interviews and surveys were conducted with administrators, parents, and students. Findings clustered around two themes: language use and patterns of interaction, as well as instructional and communication strategies. In terms of language use, the teacher's consistent Spanish use enabled students to develop oral language skills regardless of their L1. As the year progressed, patterns of interaction changed from primarily shared language peer groups to mixed language groups. This change was facilitated by native Spanish-speaker's acquisition of English. As native

Spanish-speaking students acquired more English, they were able to speak to native English-speaking students. The interaction pattern changed from native Spanish-speakers speaking to native Spanish-speakers or native English-speakers talking to native English-speakers only to native Spanish-speakers conversing with native English-speakers.

Results also suggested a subordinate-superordinate relationship between native Spanish-speakers and native English-speakers in the observed classroom. This relationship mirrored their parents' status in the society (Delgado-Larocco, 1998). When students from different language backgrounds played together, they sometimes did not speak to each other or receive a response. Most of the time, English was the language used when mixed language groups played together, and the native English-speakers dominated the initiations. This early use of English as the language of peer social communication may set a pattern that is automatized. Even when the native English-speakers reach higher levels of Spanish proficiency, they may not be able to overcome such a pattern in the higher grades. The increase in the status of L2 in classrooms by itself may not override the effects of interacting sociopolitical factors and the existing power relationships outside the classroom (Delgado-Larocco, 1998).

This study made important contributions to the field of education. However, there are also some limitations as well. The author did not explore how immersion teachers' professional experience impacts their instructional practices. In addition, student language use was not quantified. During data collection, she held the video camera and followed a group of 30 students around the classroom. This approach of

video-taping may leave some students out. The included students may receive uneven amount of footage which could bias the result.

Recent Language Use Studies in Immersion Classrooms

Tarone and Swain (1995), as well as Genesee (1991), found that the need for in-depth observation of language use and interaction in immersion classrooms is urgent. In response to these calls, four major studies have been conducted systematically on student language use: Broner (2000), Potowski (2004), Ballinger and Lyster (2011), and Steele et al. (2015).

Broner's (2000) doctoral dissertation examined language use in a fifth grade one-way Spanish immersion classroom in Minneapolis, Minnesota. Her research questions were three-fold: (a) What languages were used by students in peer-peer and peer-teacher interactions? (b) What languages were used by students while carrying out academic content tasks? Did the interlocutor and tasks have a systematic effect on language choice? (c) How did a learner's developmental stage affect their language use? Did participants use slang words or phrases? If they did, was it in Spanish or English?

This case study took place in a K-5 immersion school where students represented different socioeconomic statuses. These students were fully immersed in the target language, Spanish, from kindergarten through the first-grade. English was introduced for the first time in second grade for a half an hour a day. This English instruction time gradually increased as children moved up in grade level, until 90 minutes a day was reached at the fifth grade. The school is not near a Spanish-

speaking community and most students in the program were monolingual English-speakers. This qualified the program as a one-way.

Teacher participants in Broner's (2000) study were bilinguals, but not necessarily native L2 speakers. From the second grade onward, the same bilingual teachers taught both Spanish and English curricula. Teachers team-taught several subjects to expose children to different teaching styles as well as different Spanish dialects. They also collaborated with aids, often young energetic native Spanish-speakers, who came through an exchange study program.

Student participants in Broner's (2000) study were purposefully selected, because fifth graders were the oldest students at the research site and "because observations suggested that children were using the L1 (English) to a greater extent in fifth grade than any other grade level" (p. 72). Three focal students, Leonard, Marvin and Caroline, were all 10 years old at the beginning of the school year. Leonard and Caroline were picked to represent different genders. Broner described them as "good students" and "talkative". Marvin was selected for his linguistic uniqueness of being the only child who consistently spoke in the L2. All three students had siblings and intended to continue Spanish after elementary school. Unfortunately, Broner did not mention their home environment, ethnic background, and culture which can also impact their school performance.

A special feature of this study was being more systematic than language use research done in the past. Data collection methods involved observations, video recording, lapel audio recordings, interviews and surveys. Observations were made

once a week for half a year. During the initial month, only a note-taking technique

was employed. In the following two months, test-taping was added in order to get the

children use to the presence of tape recorders. Then, lapel-taping the focal students

began. The consistent periodic observations included multiple contextual features of

student activities at school beyond linguistic interactions, not limited to the classroom.

For example: gestures used in the hallway and during a fire drill. This approach

strengthened internal validity, because it provided an overall linguistic behavior of

many other children in the school. In addition, two researchers collaborated on this

project, which made data collection more feasible and efficient.

For data analysis, Broner (2000) used both an utterance and a speech turn as

the linguistic unit. She defined a turn as a completion of one interlocutor's speech

with no interruption from another interlocutor, following Levinson (1983) and Ellis

(1994). She defined an utterance as a stretch of language bounded by pauses, under

one single intonation contour, and generally consisting of a single semantic unit,

following Parker et al. (1994). Four linguistic codes were used as the dependent

variables in analyzing conditions related to the research questions: Spanish, English,

Mix-Spanish Base, and Mix-English Base. She also conducted Chi-square, Binomial

Variable Rule Analysis (VARBRUL) and percentage analysis to statistically test the

existence of the systematic effects interlocutor and task had on language choice.

General findings of patterns of student language use in the classroom revealed

that 63% of the utterances were in Spanish, 35% in English, and less than 2% mixed in

L1 and L2. Marvin spoke less (15% of the time), but when he did he used more

Spanish than Leonard and Caroline. Leonard spoke most (53% of the time) among the three, but 42% of his utterances were in English.

Regarding language use in peer-peer and peer-teacher interactions, Broner (2000) sorted speech data according to eleven interlocutor groups including teacher, peer, other peer, self, microphone, and unknown. Within each group, the L1 and L2 use were compared. Interactions among focal students were also explored in terms of their role of being each other's interlocutor. Overall results indicated that: (a) When the interlocutor was an adult or an adult in vicinity, the three children used Spanish 98% of the time. When the interlocutor did not include an adult, the children, as a group, used Spanish 58% of the time. (b) The teacher was directly exposed to about 13% of the total language produced by the three children during the taped sessions. Around 87% of language use occurred during peer interactions. (c) During self-talk or private speech, Spanish was used 43% by Leonard, 57% by Carolina and 86% by Marvin. (d) Leonard and Carolina used equal to or more Spanish than Marvin when speaking to other peers. Marvin spoke less Spanish to Carolina (74%) than to other peers (87%) or to Leonard (97%). Broner (2000) concluded that they seem to be accommodating their L2 use to others' speech patterns. This explanation does not explain why Marvin spoke less Spanish to Carolina. Because Leonard used more Spanish (59%) when he was speaking to Carolina and much more Spanish (74%) when addressing Marvin than interacting with other peers, it appeared both Marvin and Leonard spoke less Spanish to Carolina. However, Broner did not explore a gender effect in social

interaction in this case, even though it was the main reason Carolina was selected as a participant for the study.

The fifth grade survey results provided further evidence of differences in language use according to interlocutor, which parallels but does not exactly duplicate the data reported for the focal students. The language behavior of the focal students seemed to be very similar to the self-reported behavior of other peers in the fifth grade classrooms.

Regarding language use during various academic content tasks, Broner (2000) defined a task as a goal oriented activity which participants must complete, following Pica, Kanagy, and Falodum (1993). She considered each task as having a goal and content. Students could either be on-task or off-task. Task goals were comprised of activities such as directions, desk work, whole class activity, follow -up, and review. Content of the task could be mathematics, science, creative writing, social studies, arts and crafts, etc. Thus, Broner reported findings related to tasks in three folds: task activity, content of the task, and on-task vs. off-task.

Findings on task activity suggest that utterances were allocated similarly for each type of task activity for all three focal students, though Leonard and Marvin contributed slightly more in whole-class activities than Carolina. They tended to raise their hands often when the teacher asked for volunteers. Transition was the context in which focal students used the least Spanish compared to the rest of activities.

Findings on content of the task revealed a general pattern that all focal students spoke more Spanish during creative writing and more English during transitions, also

categorized as "no content." The children were more focused on using the L2 when they needed to use the L2 to actually carry out the task. More of the L2 occurred during peer-peer activities where more negotiation of meaning, more dialogue co-construction and more language was produced. These features were found in all content areas but the percentage was highest in language-related content (e.g. creative writing). A speech sample was also used to illustrate that the increased use of Spanish was due to the content of the task, which was to write a group narrative in the L2. In the footnote, Broner (2000) stated it would be interesting to see if the same increase in L2 language use would occur if the children had to write a report in the L2 on a science or mathematics topic.

Findings on on-task and off-task language use indicated that Leonard and Carolina both spoke more in the L2 during on-task activities and more in the L1 during off-task activities. Marvin used more L2 in both on-task and off-task situations. This showed that not all students exhibit diglossic behaviors that were put forth by Tarone and Swain (1995).

Broner (2000) noticed another interesting phenomenon. Marvin and Leonard produced fewer Spanish utterances in mathematics, but Carolina's number is almost as high as for creative writing. These results need further analysis to be able to fully account for the differential language use according to content.

In analyzing language use during mathematics, Broner (2000) found that Carolina used the L1 to express basic mathematical operations like eight divided by four while in the L2 she counted the numbers. This is consistent with findings from

Parker et al.'s (1994) study of language use during mathematical problem solving.

Parker et al. suggest that this linguistic behavior could be due to the lack of

opportunity to witness other target language speakers modeling this type of discourse

in the external language environment. Broner added two more possible reasons for the

behavior that Parker et al. did not consider. One reason could be that the L2 is not

necessarily required to successfully carry out mathematical problems. Another reason

is cognitive load. Speakers may use the language that imposes the least cognitive load

when performing a cognitively challenging task. In Broner's speech data, counting

was in the L2 and mathematical operation expressions in the L1. Following the

cognitive load reasoning, the former is a memory task of vocabulary, but the latter is

to compose sentences or long phrases, an increased cognitive load. Surprisingly,

Broner considered the complexity of cognitive function in both examples to be equal

because she is doing a mental calculation of the problem. A valid instrument to

measure cognitive load is needed in order to compare the complexity of these

cognitive tasks.

Furthermore, Broner (2000) analyzed the complexity of oral language

produced when different subjects were taught. Data indicated that there seemed to be

greater complexity in creative writing and less complexity in mathematics, at least for

Carolina and Marvin. Broner pointed out that utterance complexity alone does not

seem to provide an explanation for the increased use of Spanish in some content areas.

Broner's (2000) study provides important insights into the language use of

fifth grade immersion students and a good model for future research. The

methodological strength includes the systematic data collection, including usage of technology in conjunction with the quantitative approach. However, it contains a few limitations. (a) Methodologically, this case study is more of a mixed research design due to the large proportion of quantitative analysis. (b) In data collection, all but two observations occurred in the morning. This limits the variation of student language use during different subject areas due to the time of the day. In addition, the recording devices required the subjects to sit together as a group. This limited the variation of their peer interlocutors who might affect their Spanish use patterns (Potowski, 2004). (c) In the discussion, the argument on gender, cognitive load, and social identity was weak.

Potowski (2004) borrowed some of Broner's (2000) research structure with the intention to compare language use data from a two-way immersion program to a parallel one-way immersion. She is the first researcher who used the identity investment concept in interpreting language use data, which is revolutionary in immersion research.

In Potowski's (2004) research, she investigated how much Spanish was used and for what purposes in a fifth-grade 80:20 two-way Spanish immersion classroom in Chicago, Illinois. She took a sociolinguistic perspective on language use and employed qualitative research methods to explore relevant factors external to the classroom. In this case study, in preschool through the third grade, 80% of the curriculum is taught in Spanish and 20% in English. In grades four through six, Spanish is used for 60% of the curriculum. Participants were two native Spanish-

speaking students and two native English-speaking students. Two girls and two boys were chosen to balance for gender, one of each L1. The selected students represented similar levels of oral Spanish proficiency and academic achievement. Carolina was one of the most fluent Spanish-speakers in class. Unlike the majority of her classmates, Melissa used a lot of Spanish during unsupervised peer talk. Matt's oral Spanish was very native-like, although he often used English words or shifted into English entirely. Otto is a gregarious, highly talkative African-American boy. "He was bright and competitive, which sometimes manifested as aggressive behavior toward other students (several of whom did not want to work with him) and toward teachers" (p. 83). His oral Spanish proficiency was rated ''average" by Center for Applied Linguistics (CAL) examiners, using oral Spanish assessment.

Potowski (2004) collected data through systematic observations with the aid of a stereo cassette recorder and a video camera, a written questionnaire, students' journal, and semi-structured interviews. Twelve and half hours of Spanish lessons were recorded over a five-month period. A total of 2,203 turns of speech were coded according to nine variables: language, class, participant structure, interlocutor, topic, selected-ness, mean length of turn, gender, and students' L1. Participant structures examined in her study were teacher-fronted activities versus student group work and/or transitions. Selected-ness referred to whether students' speech turns were selected or unselected by the teacher. Selected means the student had been called upon to speak, either voluntarily or involuntarily. Unselected means the student had shouted out an answer. Among these nine variables, selected-ness, gender, and mean

length of turn are new to immersion studies. It is important to note that "class" in

Potowski's (2004) research is referred to as content of the task, in the present study,

also known as a subject area.

The findings include the following: (a) Overall, focal students used Spanish 56%

and English 44% of the time. (b) The girls used Spanish more often than the boys,

regardless of L1. L1 was not related to the overall L2 use. (c) Spanish was used

primarily (68%) for on-task topics. Off-task social turns were made only 16% of the

time in Spanish. (d) Students' English covered a wider range of functions (including

playing, teasing, and other off-task activity) than did their Spanish. (e) About 82% of

the time when talking with the teacher these students used the L2, but only 32% of the

time with peers.

Because the present study focuses on language use when different subject areas

are taught, I closely reviewed Potowski's (2004) report on the same categorization.

Potowski selected Spanish language arts, Spanish social studies, and class transitions,

but she did not explain why these two subject areas were chosen. A total of 16 lessons

from the 22 recordings were selected for the data corpus. Among them, 11 were in

Spanish language arts and five in Spanish social studies because half of the social

studies curriculum was taught in English. Most recorded lessons in the corpus

included both video and audio and five were audio only. The author described the

curricular units. In Spanish language arts students read novels, analyzed poems, wrote

stories, and occasionally did activities focused on verb endings and parts of speech. In

social studies they used a fifth-grade textbook written in Spanish to study units such as

the western movement of the early American pioneers; the Great Migration of

African-Americans from the south to the north of the United States; the Aztec empire;

and the immigration of Mexicans, Poles, and Chinese to Chicago. Potowski

distinguished between public versus non-public speech and teacher-fronted versus

non-teacher-fronted oral language output.

Potowski's (2004) findings lend support to proposals that a kind of diglossia

also exists in two-way immersion classrooms with Spanish fulfilling mostly academic

functions and rarely is used for socializing. Additional ethnographic data suggested

that students who invested in identities as Spanish-speakers more frequently spoke

Spanish in the classroom, regardless of L1, and that opportunities to practice Spanish

were not equally distributed among students. Hence, students may use more Spanish

if teachers monitor them more closely during group work and if the school encourages

them to develop investments in identities as Spanish-speakers. Immersion schools

should encourage L2 use outside school walls and consider student attitudes, the

teacher's positioning of the student and the student's position within his/her peer

group.

Norton's (2000) identity investment theory was used by Potowski (2004) in

explaining focal students' language use behavior, particularly the idea of unequal

access to the floor. Potowski examined all the data she collected and explored the

issues of investment, identity, and power. She found there were common threads to all

students. For example, all four focal students like to portray themselves as

knowledgeable about classroom content and procedures. Yet, each student had their

own configuration of sometimes contradictory attitudes and linguistic behaviors, and each student was differently positioned by classmates and by the teacher. Students' classroom identities are a combination of the characteristics they develop in the home, the expectations and positioning they find at school, and the power they have to conform to or resist those expectations. In Matt's case, his frequent volunteering of answers reflected his investment in an identity as a conscientious student. At other times he wanted to be identified as resistant to the academic demands placed on students because he seemed to speak the minimal amount of Spanish required to stay on good terms with the teacher. A striking finding from Potowski's (2004) study is about an African-American boy Otto's school experience. He invested in an identity as knowledgeable and socially accepted by his peers, but his teacher disliked his tendency to go off task and talk too much as well as his aggressive interaction style, so the teacher called on him less often. Despite Otto's enthusiasm to participate, data showed that he was the only focal student who was selected less often than he bid. Not only his verbal bids such as shouting "I know," but also his hand raising was more likely to be passed over by the teacher. Cultural bias and social injustice were not explored in this case. Nevertheless, this young student was resilient. He did ask some questions by using similar strategies as other focal students, such as interrupting, stating that he had a question, or just asking his question. In one observed episode, he was so enthusiastic to participate in the discussion that he did not let his imperfect Spanish interfere with bidding for a turn. Potowski proposed that further investigation

is needed on whether African-American students experience greater challenges learning the minority language in dual immersion contexts.

The identify investment theory emphasizes that language learning is not simply a skill that is acquired with hard work and dedication, but a complex social practice that engages the identities of language learners in ways that have received little attention in the field of second language acquisition. Research in any type of immersion classroom becomes more complex when we acknowledge that classroom opportunities to use Spanish are influenced by teachers and by peers, may be created by the students themselves, and may also be resisted by students. Therefore, language production cannot be separated from contextual and historical factors.

There are inconsistencies in findings from Potowski's (2004) and Broner's (2000) studies. Focal students' overall Spanish output (56%) in a two-way immersion classroom was less than the findings (63%) in a one-way immersion classroom. Two-way immersion classrooms have more native L2 speakers who could model the L2 use, whereas one-way immersion program does not have such an advantage. It is surprising to see that students in a two-way immersion classroom spoke less Spanish than students in a one-way immersion. A minor but interesting disparity was that Potowski's findings suggested girls spoke more Spanish than boys, but in Broner's study, Caroline, as the only girl, did not have the highest percentage of L2 use, nor the highest number of L2 utterances.

Different from Potowski's (2004) study, Ballinger and Lyster (2011) conducted a cross-sectional study that involved two first-grade teachers, two third

grade teachers, two eighth grade teachers, and their students in a two-way Spanish immersion school. They investigated the Spanish use of students and teachers by focusing on the language choice, related factors encompassing students' L1, age level, and the nature of their interactions, as well as pedagogical methods of promoting reciprocal learning. In their study, reciprocal learning refers to language practice among students via student-student communication. A total of 45 hours of classroom observations and field notes, student questionnaires, teacher interviews, and students' focus group interviews were examined. Although students showed an overall preference for English, particularly in interactions with peers, findings indicated that students' language background, culturally relevant teaching activities, teacher language use and language expectations, and students' sensitivity to others' need for language accommodations influenced their use of Spanish with peers. Age and developmental stage seemed to play a major role in a teacher's language choice. First-grade teachers faced the reality that a portion of their students had not yet developed strong language skills in Spanish. Based on their experience, they believed that giving L1 support to their students was useful in preventing them from being frustrated in class. This seemed to be consistent with the explanation that Potowski (2004) gave because students' comprehension of the L2 generally precedes their production, so they are permitted to use English during the early stages of the program. The difference between these teachers was the degree to which and the manner in which they used the L1, and whether they consistently used English for a clear purpose. For example, the L1 was often used for classroom management, introducing a new

concept or a new vocabulary, explaining grammar, and so on. Whereas, the third

grade teachers used Spanish at all times. Consequently, the first-grade Native

English-speaking students in Ballinger and Lyster's (2011) study were never observed

speaking spontaneously in Spanish to their teachers. This language use behavior

contrasted sharply with the third grade Native English-speaking students, who almost

always spoke to their Spanish-medium teacher in Spanish during observations.

In comparison to Ballinger and Lyster's (2011) findings of first-graders'

language use, Garcia (2007) found that when the L2 exposure was less than an hour a

day, five-year-old children were still able to communicate in the L2 if the teacher

motivated them with activities that led them to use the L2 for some purpose. This

highlighted the important role of teacher's scaffolding (Vygotsky, 1987). Teachers

can facilitate activities that encourage children to use the linguistic functions and to

initiate interactions in the L2. Based on the functional categories identified by

Halliday (1975) and Painter (1999), Garcia (2007) found six linguistic functions

promote students to speak the L2 when the teacher scaffolds. They are adopted in this

current study and more details are provided in Chapter Three.

Steele et al. (2015) conducted a three-year study of dual-language immersion

(DLI) in July 2012 in collaboration with the Research and Development Corporation

(RAND), the American Councils for International Education, and Portland Public

Schools (PPS) with funding by the U.S. Department of Education's Institute for

Education Sciences. The study examined the effects of DLI on student achievement.

The term dual language immersion often refers to two-way immersion programs, but

in this case, it included some one-way immersion data. The research site, PPS, is the largest school district in the Pacific Northwest. It has operated an immersion program for over 25 years. Nearly a fourth of the district's schools are part of an immersion cluster. The number of students who enrolled in language immersion programs reached 3,860 in the school year of 2012-13. PPS maintained DLI programs in eleven elementary schools, four middle schools, and five high schools, with instruction in Spanish, Mandarin, Japanese, and Russian. The significance of the study resides in the lottery system for enrollment in immersion programs in PPS that reduces selection bias (Steele et al., 2015). This research focused on the seven cohorts of students who applied to a pre-k or kindergarten immersion slot in Portland for the fall terms of 2004 through 2010. Outcome data were measured through the 2013-14 academic year, so the oldest cohort was tracked through ninth grade, and the youngest was observed through third grade.

This research project employed mixed methods. In the quantitative phase, the Oregon Assessment of Knowledge and Skills (OAKS) was selected as the instrument to measure student content knowledge in reading, mathematics, and science. The Standards-Based Measurement of Proficiency (STAMP-4S) was selected to measure student target language proficiency level (Avant Assessment, 2015). Researchers analyzed immersion's impact on reading, mathematics, science test scores, attendance, and English language learner status.

In the qualitative phase, observations, interviews, and surveys assisted to describe classroom instructions, language use by teachers and students, classroom

activities, student behavior such as time on-task, and stakeholders' attitudes. From March to June 2014, a total of 119 observation sessions were conducted in grades one through seven immersion classrooms that covered all four target languages (Spanish, Chinese, Japanese, and Russian) in 13 schools, out of which, sixteen 45-minute sessions took place in one-way Mandarin immersion classrooms. Students in these classrooms range from receiving 50% of instruction in Mandarin in kindergarten through the fifth grade to two periods in Middle School and one period in High School. During the observation, two observers sat in the classroom and took field notes which recorded students' language use. No audio or video equipment was used in data collection. The data report showed what percentage of students used what percentage of which language.

Quantitative findings are consistent with results from other major longitudinal studies on the effects of immersion education in regard to student performance (Steele et al., 2015). After adjusting for baseline demographic characteristics, researchers estimated positive dual language immersion effects on reading performance in fifth and eighth grades, ranging from 13 to 22 percent of a standard deviation, reflecting seven to nine months of learning. Little benefit was found in terms of mathematics and science performance, but also no detriment was found. By sixth and seventh grade, immersion students' probabilities of remaining classified as English Language Learners were three to four percentage points lower than those of their counterparts. This effect is stronger for those whose native language matches the target language.

Qualitative findings include multiple aspects. Language use results relate to this present research. It was interesting to note that data revealed that PPS immersion teachers were very consistent in their use of the target language during observations. About 98% of the teachers being observed spoke the target language for 90% or more of the time. Among students who spoke aloud in class, 22% always spoke the target language, and 60% spoke the target language at least 90% of the time. Less than 4% of the immersion students spoke the target language less than 70% of the time. There were variations across grade levels, as well as variations across languages. However, the disaggregated data by language were not reported. Nevertheless, data collected in the Mandarin classrooms consisted of 13.4% of the entire language use data corpus. Due to the difference among data collection procedures and report formats, it is difficult to compare the percentage of the target language use from Steele et al.'s study to language use findings in other research studies such as Broner's (2000) and Potowski's (2004).

Steele et al.'s (2015) study contributed to the immersion literature in several key ways. First, it provided longitudinal, causal estimates of immersion education on both native English-speakers and native speakers of other languages, finding similar positive effects for both groups. Second, data suggested that immersion impacts may vary more by language than by two-way versus one-way models. Third, researchers found positive effects for English Language Learners whose native language matches the target language.

The generalizability of this study is limited to families who apply to an immersion lottery and the mechanism by which immersion programs drive achievement are not entirely clear, such as the student composition, class size, and teacher characteristics. Moreover, the implications for policymakers include that the implementation of dual language immersion requires efforts to ensure program quality which would entail many logistical and staffing challenges. In addition, promoting equitable access to these programs seems critical. Expanding access to language immersion from early childhood could become the next frontier in the struggle for educational opportunity in America.

African-American Student Language Use in Immersion Classrooms

African-American students' learning experiences in immersion programs were investigated by Holobow, Genesee, and Lambert (1991) as a part of the second year report of a four-year longitudinal evaluation of a partial French immersion program in Cincinnati, Ohio. The evaluated site is of particular interest because it includes children from lower socioeconomic groups and ethnic minority group backgrounds, namely African-Americans.

In Holobow, Genesee, and Lambert's (1991) research, participants were drawn from 11 classes in four French immersion schools. Researchers examined the performance of 108 immersion students in comparison to 118 students who were not in the immersion program. These students were purposefully selected from parent survey results with socioeconomic status and ethnicity as criteria. Socioeconomic categories were working class and middle class. Ethnic groups included African-

Americans and Caucasians. In kindergarten group, immersion participants were 27 working-class African-Americans, 5 middle-class African-Americans, and 18 Caucasian students from each socioeconomic group. In the first-grade group, immersion students encompassed 9 working-class African-Americans, 7 middle-class African-Americans, 13 working-class Caucasians, and 11 middle-class Caucasians. Kindergarten participants who were not in the immersion program included 14 working-class African-Americans, 14 middle-class African-Americans, 13 working class Caucasians, and 27 middle-class Caucasians. First-grade participants who were not in the immersion program included 13 working-class African-Americans, 7 middle-class African-Americans, 9 working class Caucasians, and 21 middle-class Caucasians. Facing the challenge of uneven sample sizes, Holobow, Genesee, and Lambert adjusted for discrepancies using statistical methods.

In comparing students' academic and language achievement, Holobow, Genesee, and Lambert (1991) assessed immersion students' first language development, academic achievement in mathematics, and French attainment. For kindergarten pretesting at the beginning of the year, researchers used (a) Raven's Colored Progressive Matrices, a test of nonverbal reasoning; (b) Peabody Picture Vocabulary Test, a test of English vocabulary; and (c) the Metropolitan Reading Tests. For kindergarten post-testing at the end of the year, researchers administered the Metropolitan Reading Tests for English and French Comprehension Test for listening and Test linguisticque maternelle for both listening and oral production in French. First-graders took the Reading and Mathematics subtests of the California

Achievement Test (CAT) Level II, Form C for English and the same French tests, but at a higher level.

The results from Holobow, Genesee, and Lambert's (1991) study showed that performance differences in English and mathematics between subgroups of students did not depend on the program of instruction they were receiving. Moreover, it was found that the working-class and African-American students scored as well as the middle-class and Caucasian students on the French language tests.

It is important to note that African-American students' French performance in Holobow, Genesee, and Lambert's (1991) study seemed to parallel the African-American boy's, Otto, Spanish attainment in Potowski's (2004) study. However, Otto's learning experience differed from other focal students in his class due to cultural differences. His teacher appeared to have prejudice towards him, limiting Otto's oral practice opportunities, and subtly discouraging him from developing an identity as a second language speaker. Yet, Holobow et al. (1991) found no significant correlation between instruction and student performance differences. It is important to note that such a causal relationship is very difficult to establish, especially when three chief evaluators are all Canadian Caucasians. Their own racial identity and experience may prevent them from understanding or identifying challenges African-American learners experience in public schools in the United States.

In explaining the achievement gap between African-American learners and their Caucasian peers in English tests, Holobow et al. (1991) argued that African-

American immersion students may experience larger cognitive loads, because many of them speak a nonstandard dialect and are thus functioning in a second language during half the school day and a second dialect during the other half. This explanation does not seem to answer why they made equivalent achievements in the second language, but not in a second dialect, English.

In summary, language use research in the past has made significant contributions to the body of knowledge on second language learning in immersion classrooms. Broner's (2000) study was systematic. Potowski's (2004) study used social identity investment theory for the first time. Ballinger and Lyster's (2011) cross-sectional study investigated factors that influenced student language choice. Steele et al.'s (2015) study aimed to explain the effect of dual language immersion on student achievement. Therefore, I would like to build upon this knowledge in the present study. I think it is important to select multicultural focal students, use advanced technology to assist data collection, and apply a sociolinguistic educational emic perspective.

Chapter Three: Methodology

This chapter provides readers the methods and techniques employed in this study and why they were employed. The procedures and timeline provides details to the point that others may replicate the study or verify findings. The organization of this chapter starts with the overarching research approach which is qualitative in nature, then narrows to explain the methodological focus of this study: a combination of interaction analysis and constitutive ethnography. I detail my role as a contributor to this study. Data collection procedures are explained including sample selection, participants, setting, source of data collection, and data analysis procedures that include methods and ways to enhance validity, reliability, and ethics. Furthermore, ways to report findings are communicated. Through the research process, I mainly use narrative and the first-person point of view to describe observed phenomena. The first person point of view assists in creating a personal milieu that provides a more vicarious reading for the audience and seeks to close the gap between the researcher and the audience (Hood, 2002). Due to the nature of the sociolinguistic perspective that I take, rich descriptions are emphasized with the goal of constructing meaning in context.

Research approaches are plans and the procedures for research, a systematic inquiry. They span the steps from broad assumptions to detailed methods of data collection, analysis, and interpretation. They may be mainly categorized into qualitative, quantitative, and mixed methods. The selection of a research approach is

based on the nature of the research problem, the researchers' personal experiences, and the audiences for the study (Creswell, 2014).

This present study is a qualitative investigation, because the research problem is descriptive in nature. The over-arching question of this research is: How do four first-grade students in a one-way fifty-fifty Mandarin immersion classroom in an urban public school in the Northwest United States orally use Mandarin when learning mathematics and Language Arts? In order to answer this question, I needed to describe student language use in a genuine classroom. Qualitative research describes a phenomenon and uses the researcher as the primary instrument in understanding how people interpret their experiences, how they construct their worlds, and what meaning they attribute to their experiences. Typically, findings inductively derive from the data and rich description characterizes the end product. In qualitative research, sample selection is usually purposeful and small (Merriam, 2009). Language use in a second language classroom is a dynamic phenomenon that cannot be simply quantified. Student-teacher and student-student interaction involve a social cultural aspect that demands rich detailed descriptions to uncover nuances and connections among non-predetermined factors. In order to understand the meaning of language use as a phenomenon, a qualitative research approach is needed to describe the learners' second language learning experience and second language acquisition process.

Creswell (2014) argued that the researcher's personal experience also affect the selection of the research method. My personal experience suggests that a rich description of the actual learners' language use and learning experience provides

significant and valuable information that can help teachers make pedagogical

improvements. I taught in immersion classrooms for eight years as a Mandarin

teacher. It was impossible for me to hear everything my students said, because I often

responded to one student at a time. I facilitated group discussions, but when multiple

students were speaking at the same time to their partners, I could only hear one idea at

a time. This implied that my instructional decision making was based on insufficient

information about my students' linguistic output. After reviewing language use

literature, I was fascinated by the idea of scientifically investigating student oral

language output in a natural classroom setting.

Another factor for choosing a qualitative method is research audience. The

primary audience for this study is language immersion educators. The descriptive data

in a natural classroom context allow teachers to socially construct knowledge about

language acquisition or make inferences and connections to their own practices.

Immersion teachers may benefit from my experience and my perspective. When I

invite the readers of this study to view student language use through my lens and who

I am, a researcher, a bilingual, a content-language immersion educator, and an

experienced first-grade teacher, they may join me in a learning journey to become

more informed. This can include other language educators, school administrators, and

other stakeholders.

Among various forms of qualitative research, I contend that ethnography suits

this research well, because it focuses on sociocultural interpretations of phenomena.

Merriam (2009) considers ethnography as both a process and a product. The factor

that unites all forms of ethnography is its focus on human society and culture. In order

to understand the culture of a group, one must spend time with the group being studied

and use rich description to produce a cultural interpretation of the phenomenon. This

approach originated in the field of anthropology, but today, researchers from many

fields and disciplines engage in ethnographic studies. Johnson (1992) stated that

ethnographic approaches have gained wider acceptance in research in second language

acquisition and teaching. Two general foci of these studies are educationally-oriented

ethnography and the ethnography of communication. The former emphasizes

educational processes including enculturation, acculturation, and learning an

additional language. The latter highlights the communicative behavior of a group.

Johnson (1992) stresses that although other approaches to research may involve

similar field techniques, many visits or long stays at the research site, and good

descriptive accounts, they are not ethnographies unless they involve a holistic study of

cultural phenomena and a cultural interpretation of behavior. In the present study,

learners' home culture, the teacher's culture, and the school culture are all under

investigation, as they are critical in understanding the relationship between language

use and social factors related to school and schooling.

     Ethnographic researchers pose broad questions at the onset of the study, but

they refine, refocus, and append them in the field as the study progresses. Like

naturalists ethnographers notice details and patterns of events, ideas, behaviors, and

other phenomena of the natural environment. They see richness in even the most

mundane details of ordinary existence and ask questions to construct meaning of the

world (Christen, 2013). The most important goal of ethnographic inquiry is to discover the insider's view of reality. The purpose of data collection is to provide a comprehensive and accurate picture of a cultural setting and to explain the implicit cultural knowledge of the participants (Johnson, 1992). During this process, attention to context is extremely crucial. This present study can be considered as a micro-ethnographic study, because it involves the analysis of small-scale events and processes such as dyadic communication in classroom lessons and in other communicative interactions. The context for such studies can be relatively narrower. They might include other interactions during the same or related lessons, interactions in other subject areas, the culture of the classroom, program culture, or school culture. These contexts holistically hold the answer key to the research question (Johnson, 1992).

More specifically, the present study is a constitutive ethnography. The term "constitutive ethnography" was first coined by Mehan (1979) who developed this research approach as part of his investigations into teacher-pupil interactions in school classrooms. This approach values the participants as the main contributor to the science being studied, while also recognizing the role of the researcher in navigating the procedure. In this case, the expert does not hold all the information, rather, participants understand both the central context and the subtle nuances involved during the interaction, the corollary – knowledge is socially constructed through such functions. In the present study, learners are the focal points. I acknowledge the classroom teacher's role and her impact on the learners, classroom dynamics, and

linguistic context. However, I highlight the learners' experience and language use to illustrate language acquisition from a different vantage point.

Constitutive ethnography has peculiar advantages that conventional ethnography lacks (Long, 1980). The criteria for selection of the samples are transparent. The original data are retrievable. When employed for classroom research on second language learning, its analysis can be used to discover participants' use of words or gestures to structure the organization of social events. For example, a study may focus on the implementation of a turn-allocation procedure and devices for its repair when needed (Long, 1980). In addition, constitutive ethnography tests the validity of an analysis during the data collection, as evidence is sought in participants' verbal, paralinguistic, or kinesthetic behavior, and nuances during the period of observation. However, this method has its limitations. First, ethnography is only as good as the person doing it and the qualifications needed include cross-cultural experience, a thorough training in the research methodology, various personal qualities, such as sensitivity, perceptiveness, skepticism, objectivity and curiosity, and the ability to write. Second, ethnographic findings maybe accused of lacking generalizability (Long, 1980). Because sample selection in qualitative research is usually nonrandom, purposeful, and small, as opposed to large, qualitative research is often criticized for the lack of generalizability.

Besides anthropological observation such as constitutive ethnography, I also employed interaction analysis. Interaction analysis is an approach that researchers use to observe, record, and analyze social interaction within classrooms. It adopts certain

kind of instruments to standardize the observers' data collection procedures and the focus prior to the observation. These instruments, known as category systems, consist of lists of behaviors which trained observers look for and record. In second language classrooms, these categories attempt classification of all verbal interaction in a lesson, such as teachers' feedback moves. The selection of categories is based on assumptions that they are the significant factors to the research problem. It is important to recognize that not all factors can be pre-identified – a fraction of the proliferation of categories in analytical systems is still a mystery to us. Therefore, the systems themselves are no less subjective than the ethnographic approach where I am the main instrument. It is also important to note that the roots of interaction analysis lie in ethnography. Observation provides the best foundation for knowledge, especially of the interaction of human beings with each other and with objects in their environment (Jordan & Henderson, 1995). Interaction analysis, too, has many limitations including the cultural bias in data collection or the interpretation process. In attempt to overcome this issue and shore up the internal validity, a strategy called "triangulation" was borrowed from ethnomethodology (Long, 1980). In the present study, a focus group interview helps triangulate the observation findings from the field notes and the transcription of video- and audio-recorded student language use.

Even though interaction analysis appeared contradictory to constitutive ethnography, there are features among the two that can be combined. I am aware that ideally, ethnography requires the researchers to be open to emerging themes and observe without pre-determined foci. Interaction analysis is often conducted in a way

that researchers adopt pre-identified instruments prior to the observation. However, it is possible to combine the features from these two very different approaches. First, constitutive ethnography allows me to go beyond the selected instruments and consider nuances or other themes shown in the authentic data. Second, interaction analysis helps me recognize experts in the second language research field and allows me to start data analysis with a few focus points. Third, I videotaped and audio-recorded the classroom interactions, so data are retrievable. I have the freedom to re-observe the same lesson and flexibility to re-select the observational instrument with consideration of the ethnographic findings. Fourth, the roots of interaction analysis lie in ethnography, because it is a structured observation. Observation provides the best foundation for knowledge.

The present study marries selective features of interaction analysis and constitutive ethnography to meet the purpose of the investigation. This style allows a descriptive approach of categorizing and provides frequency of counts. It is a systematic and structured way to describe and interpret numbers of speech turns, and quality and quantity of the speech sample.

I pre-selected four categories to focus on number of speech turns, vocabulary, grammar, and linguistic functions. In this research, a turn is defined as a completion of one interlocutor's speech with no interruption from another interlocutor, following Levinson (1983), Ellis (1994), and Broner (2000). Vocabulary means words that students used in their verbal interaction. Grammar refers to the set of structural rules governing the composition of clauses, phrases, and words in the natural language.

Linguistic functions refer to the general social uses of language, such as requesting objects and activities, initiating social interactions, expressing personal feelings, and so forth.

I acknowledge that the pre-selected categories can be considered as surface structures in the field of linguistics. However, these surface structures provide indicators for their underlying language acquisition. When these data combine with nuances and social context that are described in the ethnographic notes, it reveals connections in participants' learning experiences and how they socially construct meaning. Two major language use studies that influenced me to conduct the current research are Broner's (2000) and Potowski's (2004). They both quantified student language use during observations. In order to compare and contrast findings from one context to another, I also quantify some aspects of language use, but the quantification was descriptive in nature, no statistical analysis is operated. The research remains in its qualitative nature.

Rationales for pre-selecting these categories include: (a) Speech turns provide more details of the quantity of language used by focal students than merely a percentage. (b) Vocabulary and grammar indicates the complexity of language. In this research, vocabulary is divided into academic and conversational words (Cummins, 1980). Grammar is more intricate and covert in spoken language than written language, but just as useful and essential as vocabulary in the study of language use (Halliday, 2004). (c) Linguistic functions drive language development.

Information on language use in relation to functions is critical for language educators as they facilitate classroom activities (Garcia, 2007).

During the investigation, I was open to the emergence of other possible factors related to language use and produced a rich description that captures the essence of the phenomenon. Through a sociocultural lens, the data are analyzed and interpreted. In this way, the strengths of interaction analysis and constitutive ethnography are combined. At the same time, I keep the research qualitative in nature as it is most appropriate for the present study.

Role of the Researcher

Peshkin (1988) argues that researchers should systematically seek out their subjectivity, not retrospectively, when the data have been collected and the analysis is complete, but while their research is actively in progress. In a qualitative study, the researcher is the primary instrument to collect data, analyze data and interpret data (Merriam, 2009). Long (1980) points out that ethnography in classroom research on language learning is only as good as the person who is doing it and the qualifications needed.

My educational experience in China influences my assumptions on what challenges native Mandarin-speaking educators may encounter. In the 1990s, I started learning English in China. The English class was scheduled 45 minutes a day, two days a week and taught by native Mandarin-speakers. The frequency increased year by year, but the lack of an English-speaking context stayed constant. By the tenth grade, it was offered daily. The rigid and conventional curriculum consisted of whole

group instruction, a basal textbook, scripted lesson plans, and paper-pencil assessments. English learning was reduced to memorization of vocabulary, spelling, and grammar. Not until my sophomore year in college, did I encounter a native English-speaker. Because my major was English Education, I took linguistics, oral English, English literature, English grammar, English writing, American history, American geography, and other related courses. Only one or two of these courses were taught by native English-speakers, such as an exchange student from an English-speaking country. The rest of the courses were instructed by native Mandarin-speakers. As a result of this English learning experience, my English was more literary than communicative. My knowledge of the United States was more theoretical and historical than practical and contemporary. Relating to such conclusions, I assume that some native Mandarin-speaking educators experience cultural shock and challenges while participating in their daily professional life at American schools, especially those who have not attended teacher preparation programs in the United States.

Even when a native Mandarin-speaking teacher experiences an American teacher preparation program, the immersion teaching task can still be overwhelming. I came to America in 1998, a perfect time, because Mandarin immersion programs were beginning to rise. After completing an American teacher licensure program and obtaining a Master of Arts degree in Teaching, I dove into American public school language immersion education. It was definitely a sink or swim situation for the first few years. The university taught me how to be a teacher in the United States, but not

specifically as an immersion teacher. I was not prepared for teaching with no curriculum or materials for the first few months. In the public school where I worked, Mandarin immersion teachers followed the school district adopted curriculum, due to the availability of appropriate materials in the target language and the curriculum alignment needs. There were no appropriate Mandarin materials for the immersion classrooms in the United States at that time. I read at least three English books per month to figure out what to teach: teachers' manuals for mathematics, science, and writing. Consequently, I developed a Mandarin immersion curriculum as I taught. The challenge at my work compelled me to search for professional development to equip myself with knowledge and to reach out to the language educators' community for support. Through the years, I underwent professional development in American school subjects and pedagogy, as well as content-based instruction led by Professor Myriam Met. In addition, I went to China for linguistic training on teaching Chinese to foreign students. I was also involved in the establishment of a successful program model for replication by other schools. Collaboratively, I worked with many experts in the Mandarin language education field in the development of immersion curriculum, teaching materials, benchmarks, rubrics, and assessments. This process transformed me into an immersion educator who appreciates the balance of content and language in a concrete way. This unique experience provides me an emic perspective, that of the insider to the language immersion culture. I believe that it takes experience for a native Mandarin-speaking educator to learn the art of balancing content and language in the immersion setting.

I also believe it is important for Mandarin immersion educators to access some English Language Arts professional development. I taught seven years as a Mandarin immersion teacher. Because of our unique needs, immersion educators were rarely invited to the English Language Arts workshops. Yet, we are expected to align our curriculum and co-teach the same students. Based on the linguistic transfer theory, there are concepts underlying both English Language Arts and Mandarin Language Arts (Cummins, 1979). With the desire to uncover such a mystery, in 2007, I transferred into the mainstream classroom and taught seven years in English-only in a non-immersion first-grade classroom at a Title I school. About fifty percent of my students were identified as English Language Learners. I applied sheltered instruction that incorporates techniques for making content accessible to English Language Learners (ELLs) and develops students' academic English skills (Short, 2013). By serendipity, I realized being in a program composed of learners from advantaged families limited my perspectives as an educator. In addition, the mainstream teaching experience helped me become more confident in teaching content subjects such as Language Arts, mathematics, Science, and Social Studies in English, especially to first-graders. My identity metamorphosed from a Mandarin language educator into an American educator. This process provides a unique vantage point to this current study that most Mandarin immersion teachers or English-only teachers do not have in terms of understanding linguistic transfer theory in classroom teaching and learning, which owes to my experience in teaching first-graders in English for seven years.

My bias is clear. I believe learning is experience-based and knowledge is socially constructed. Kolb (1984) defines experiential learning as the process whereby knowledge is created through the transformation of experience. This is evidenced in my learning to be an immersion educator and is manifested in the merging of my knowledge learning in both immersion classrooms and mainstream classrooms. In 2014, I received a new assignment, to teach, lead, and support a newly implemented one-way fifty-fifty Mandarin immersion school in a Title I priority school with its largest ethnic group being African Americans. This experience is valuable and presents its unique challenges. (a) The home-school and teacher-student cultural differences and student-student cultural diversity interact with classroom teaching and learning. (b) Linguistic diversity interacts with teaching and learning. (c) Typical challenges a Mandarin immersion program face are also present at this site. My teaching experience at this school intrigued me to conduct this current research. This is not a typical Mandarin immersion program with students from advantaged families, but it has the potential to be the future typical dual language immersion program where all learners have opportunities to learn a foreign language. It is crucial for immersion researchers to understand more about teaching and learning in classrooms with such complexity. My research question narrowed from how students learn to how students use language in Mandarin immersion classrooms. In order to reduce my bias, the sample was purposefully selected to be a new teacher with students whom I have not taught.

However, it is important for me to document my relationship to the research site and participating educator, in order to explicitly state my subjectivity. In 2015, I became a curriculum specialist who works directly with the Mandarin immersion program where the research took place. My official roles are instructional support to Mandarin immersion teachers, curriculum development leader, and professional development provider. In this position, I serve as an intersection in terms of Mandarin immersion. I am accessible by students, parents, teachers, principals, departmental leaderships, community agents, support personnel, and other curriculum specialists. It broadened my horizon in understanding the political side of the program and helped me see how politics impact students in the classrooms. That cautioned me to consider carefully the impact the present research may have on the participants, the audiences, and the immersion field in general. My coaching experience made me realize each Mandarin immersion teacher represents a unique culture and contributes with their own personal strength. Though we are all Chinese, our personal and professional experiences vary, as a corollary, our perspectives vary. The caveat is to re-examine my assumptions and allow the data to unfold themes in immersion education.

Being a native Mandarin-speaker and a bilingual educator, I transcribe, analyze, and interpret data in a bilingual and bicultural manner. Even though as an English as a second language speaker, I still struggle in terms of how much to speak and what to say in conversations with native English-speakers. I sometimes wonder if native English-speakers like me, if they like to hear me speaking English, or if they like Chinese. I still consider my personal and professional experiences as being closely

associated to the field being explored: it is the strength in this investigation. A major limitation of language use research is that many researchers do not speak the target language and lack immersion teaching experience (Broner, 2000). In terms of acculturation, in order to keep my Chinese identity, I intentionally started learning more about my own language and culture. This cultural awareness increased my appreciation of other cultures and understanding of the relation between culture, language, and behavior. Peshkin (1988) defined subjectivity as an amalgam of the persuasions that stem from the circumstances of one's class, statuses, and values interacting with the particulars of one's object of investigation. As experience shapes my perceptions, my subjectivity is inevitable. By consciously attending to these orientations, I reduce biases.

I believe that the sociocultural context is critical in language education. There are multiple factors impacting student language use. In order to understand the connections and interaction among factors, a rich description of student language use in various contexts becomes necessary. My background in cross-cultural experience, teaching young children in various settings, teacher coaching and curriculum development, training in the research methodology, personal qualities, such as sensitivity, perceptiveness, skepticism, objectivity and curiosity, and the ability to write, is needed in the process of this present research.

Data Collection Procedures

It is important to develop a timeline. It helps me keep track of tasks involved in the investigation. In general, I followed the original data collection timeline. There

were a few modifications made to ensure the quality of the research, which prolonged

the process by three weeks. First, the school district Institutional Review Board (IRB)

committee provided me positive probing questions and concrete feedback, so I

developed a non-consent form for students who were not selected as focal students but

included in the video-taping process. Second, I contacted two teachers and they later

agreed to participate in the present study. Third, one Asian student the teacher

recommended declined, so we selected a different student who is half-Chinese and

half-Caucasian. Fourth, there was no school during the fourth week in November due

to parent-teacher conferences and the Thanksgiving holiday. The actual timeline is

illustrated in Table 1.

Table 1

Data Collection Timeline

Time	Data Collection Activity
September	Proposal defense → University IRB → School district IRB
October	Week 1-2: Contacted school principal and participating teacher → Reserved equipment and scheduled classroom visits → Distributed non-consent forms → Obtained Parental Consent Forms and Student Assent Forms
October	Week 3: Provided research orientation to first-graders Week 4-5: Classroom observations, video-taping, and lapel audio recording (Two sessions a week; one in Math and one in Language Arts; AM only)
November	Week 1-2: Classroom observations, video-taping, and lapel audio recording
December	Week 1: Focus group interview (taped)

In this study, the primary instrument was me. I believe the cultural context and historical background of the immersion program where the research took place plays a significant role in our understanding of students' learning environment and their learning experience. Therefore, I described the research setting and participants in great detail.

For the research setting, I chose an urban public school in the Pacific Northwest in the United States, because it has the Mandarin immersion program with students from diverse cultural backgrounds. It allowed me to investigate the research question I posed earlier. I was curious to find out how students learn and speak a target language in a culturally complex setting. Language use findings from such a setting can shed light on how linguistic factors interact with educational factors such as curriculum, instruction, and assessments. In addition, the data can reveal how multiple cultures interact and affect student learning opportunities and experiences. This can provide educators and policy-makers more information to consider for educational reform in achieving American dreams, social equality, social efficiency, and social mobility (Labaree, 1997).

The participating school is located in the heart of an African-American community in the city. According to the district's online public report, the demographics of this school were 43% African-American, 29% Hispanics, 14% Caucasian, 11% multiple races, and 3% others. English language learners represented about 30% of the student population. About 88% of students received free or reduced lunch. Student and teacher ratio was about 13.5. It was identified as a priority school placed among the lowest-performing five percent of Title I schools in the state over the past three years. In order to improve student achievement and close the opportunity gap, the district implemented a series of interventional programs at this site, including the International Baccalaureate Primary Years Program (IB PYP) and a newly implemented Mandarin Immersion Program. The enrollment increased, but

there were concerns about gentrification of the neighborhood. Administration and

staff also faced challenges of supporting multiple programs simultaneously and

effectively. An IB program helps students develop the intellectual, personal,

emotional and social skills to live, learn and work in a rapidly globalizing world. It

goes hand in hand with the language immersion program which also has cultural

competence as one of the goals. Besides, the immersion program is a research-based

language program that can potentially enhance students' academic achievement.

These immersion programs differ fundamentally from traditional foreign language

programs in two important ways: 1) teachers deliver regular curricular content through

a target language (such as Spanish, Mandarin, etc.), but do not generally teach the

target language directly; and 2) students receive instruction in the target language as

early as kindergarten and may continue to receive language instruction through high

school (Steele et al., 2015).

The immersion program at the research site is a one-way 50:50 Mandarin

program. It qualified as a one-way program, because less than four percent of the

immersion students are native Chinese-speakers. The majority of them are native

English-speakers. Some are native Spanish-speakers. Their home language is not

Mandarin. As a program model 50:50 refers to the instructional time allocation within

the program. Fifty percent of instruction is delivered in Mandarin and fifty percent in

English. As a cohort, the participating group learns multiple subjects in Mandarin in

the morning taught by Hong Laoshi (*Laoshi* means teacher) in Room A. Then

students go to Room B and learn multiple subjects in English in the afternoon taught

by Ms. Smith. Hong Laoshi is a native Mandarin-speaker from Taiwan. Ms. Smith is a native English-speaker. They both have more than three years of teaching experience in Mandarin immersion classrooms in a private school setting in the United States. Hong Laoshi and Ms. Smith collaborate on a daily basis and share the curriculum. Lessons are not duplicated. Concepts are introduced, reinforced, and developed in both languages. Considering most students' first language is English, concepts are often introduced in English first and later in Mandarin.

Professional support to Mandarin immersion teachers is provided at multiple levels. At the building level, besides whole staff professional development, immersion teachers have a weekly Professional Learning Community (PLC) meeting facilitated by me. We use the inquiry model to examine student data, quantitative and/or qualitative, and develop a plan to improve the students' learning outcomes. At the district level, I provide instructional support to all Mandarin teachers, including monthly literacy workshops and quarterly program alignment workshops. Literacy workshops focus on curriculum development, academic standards, balanced literacy, instructional refinement, and assessment development. Program alignment includes literacy alignment between Mandarin and English classrooms and mathematics content-allocation in which what lesson is taught in which language and why are discussed. Hong Laoshi is also involved in a Mandarin material evaluation process during which I provide further professional development in terms of Chinese literacy.

In addition to pedagogical support, I also assist the school with cultural promotional activities. Ballinger and Lyster (2011) researched Spanish use in a two-

way immersion school and found that the school's effort to expose the students to Spanish outside of the school walls and to reinforce Spanish language and culture positively influenced students' target language use. My experience supports the significance of cultural promotion in Mandarin immersion programs. Hong Laoshi is an active member in the Chinese New Year planning committee. The goal of the event is to promote multiculturalism at the school by using a traditional Chinese holiday as a fuse. Because only 89 out of 391 students in this school are enrolled in the Mandarin immersion program, acculturation becomes inevitable for all constituents at the site. Through a Chinese New Year event, I intentionally provided opportunities for peripheral members and bystanders to assume a role in the activity planning process.

Along these lines, the school administration implemented Chinese enrichment classes for students at pre-kindergarten to grade three who are not enrolled in the Mandarin immersion program, in order to build a strong cohesive culture throughout the entire school. A Confucius Institute scholar offers 30 minutes of Chinese as a World Language instruction two times a week with an exception that pre-kindergarten students receive it once a week. This supports the district initiatives in providing multiple pathways and entry points for students to become bilingual and bi-literate, as well as establishing a united culture at the research site.

The Confucius Institute offered additional support to the immersion program at the research site. Its headquarters are located in Beijing, China and administered directly by the Chinese Ministry of Education. As China's economy and exchanges

with the world have seen rapid growth, there has been a sharp increase in the world's demand for Chinese learning. Confucius Institutes collaborate with Universities around the world to provide support to Chinese language and culture education. They develop Chinese language courses, train teachers, hold the Hanyu Shuiping Kaoshi (HSK) Chinese proficiency exam, provide information about contemporary China, and provide Chinese teaching staff from mainland China. The first Confucius Institute opened in November 2004 in Seoul, South Korea. Ten years later, there were over 480 Confucius Institutes in dozens of countries in six continents. In the United States alone, there were 107 Confucius Institutes, 145 Confucius classrooms, 5,800 Confucius teachers from mainland China, and 22,000 students who are learning Chinese either as a world language or in an immersion classroom (Xu, 2015).

Four Confucius Institute teachers are assigned to the school where the present research took place. They often go through acculturation themselves and it takes time for them to adjust to American schools. Confucius Institute teachers professionally face challenges in terms of facilitating learner-centered activities and working with culturally and linguistically diverse learners. Personally they need support to find host families or residence, transportation through buses, and their children's schooling during their one to three years of stay in the United States. Nevertheless, they model the Chinese language, bring authentic Chinese culture to the school, and serve as a valuable resource to the Chinese learning community.

There are eight native Mandarin-speaking educators available at the research site where 91 students ranging from kindergarten to grade two are enrolled in the

Mandarin immersion program. Besides three Mandarin immersion teachers and four

Confucius teachers, the kindergarten bilingual educational aid is also a native

Mandarin-speaker. These educators vary in age, hometown, and teaching experience.

Most of them are around the ages of 25 to 35. Their teaching experience ranges from

one year to 25 or more years. They came from different regions of China including

Shanxi, Henan, Sichuan, Taiwan, and so forth. Some are new immigrants to the

United States. These teachers bring rich authentic diverse culture into immersion

classrooms.

Confucius Trainee Xiao Laoshi assists the participating research teacher Hong

Laoshi every day. He is 27, a native Mandarin-speaker from mainland China, and he

taught in South Korea last year. Mainland Mandarin and Taiwan Mandarin are

slightly different. Sometimes the word choice or sentence structures are different. I

consider it beneficial for first-graders to hear from two native Mandarin-speakers from

two different regions and of different gender.

In 2014, the implementation of the Mandarin immersion program was

successful at the research site, but it was a bumpy road. A teacher shortage was the

first road block. Participants in the present study had a first year teacher for Mandarin

instruction in kindergarten. Another Mandarin teacher did not obtain a visa, so I was

assigned to teach his class in October. With my busy schedule and workload, I had

limited time to assist the kindergarten teacher. However, our English side partner

teachers are experienced teachers on site and together we made the program flourish.

With support from the district and administration, multiple cultural promotional events

took place. Teachers collaborated and drafted useful materials and curriculum

frameworks. Students made academic gains. Parents were satisfied overall. However,

the program faced a number of challenges. The general staff at the school lacked

knowledge on the Chinese culture or language immersion education. The community

was concerned about the equity in the lottery system and gentrification in the

neighborhood. School personnel were worried about the change of racial proportions

of the school. Originally, teachers at the school advocated for a Spanish Immersion

Program, and some were disappointed that the district implemented a Mandarin

Immersion Program that did not meet the needs of Latino families in the community.

Even though some of these disappointed staff members began to recognize the

benefits of the Mandarin immersion program and started to support it, the efficacy of

Mandarin immersion programs on trilinguals such as a native Spanish-speaking

student who enrolled in a Mandarin immersion program as an English Language

Learner is yet to be explored (Steele et al., 2015).

Yet there is so much to be done. In 2015, the journey continued with joys and

tears. First, the school went through major staffing changes relating to immersion

classrooms, with a new principal, assistant principal, IB coordinator, kindergarten

Educational Assistant, first-grade Mandarin teacher, first-grade English side

immersion teacher, second grade Mandarin teacher, second grade English side

immersion teacher, librarian, and curriculum specialist. The new principal has

leadership experience in IB, immersion programs, and working with Latino and

Somali families. My role, as an Immersion Curriculum Specialist, is to support the

district paradigm shift to collaborate with mainstream activities facilitated by the Department of Instruction, Curriculum, and Assessment. The school district where the research took place has been intentionally addressing equity for about a decade, with the belief that racism impacts student achievement. Three major policies passed. The racial educational equity policy drove the decision making of implementing a Mandarin immersion program at the research site. This work also pushed the paradigm shift for the district to include multiple languages in conducting teaching and learning activities at the department level. This alignment was initiated by equity concepts through Critical Race Theory, but by serendipity, it synched well with Cummins' (1979) linguistic transfer theory. The present study describes the L1 and L2 relationship reflected in student language use in a Mandarin immersion classroom where content is aligned to the mainstream curriculum.

Second, new teachers in the immersion program face various challenges. Three out of six teachers in the Mandarin immersion program have less than two years of teaching experience in the United States. Hong Laoshi taught three years at a private Chinese immersion school where a 100% total immersion model was adopted and students learn Mandarin 100% of the school day. In that school, communicative skills and reading were emphasized more than writing. Students were homogeneous in demographics. However, Hong Laoshi is an excellent educator who adapts quickly to a new setting. She is knowledgeable, passionate, hardworking, creative, open-minded, and highly professional. Because Hong Laoshi is from Taiwan, her personal educational experience, including the teacher preparation program in Taiwan, is

culturally more aligned with American pedagogy than teachers from mainland China. It is important to understand the challenges immersion teachers face due to cultural differences and value the diversity they bring to American schools.

Third, in order to meet the unique needs at this school site, teachers are in the process of articulating the curriculum and searching for resources. That demands seamless collaboration, frequent communication, and extended hours of work. Regarding academic content, in mathematics, the Mandarin immersion teacher and the English partner teacher share the same curriculum, *Bridges in Mathematics* by the Math Learning Center in Oregon. A team of immersion teachers worked together to consult with each other and determine which lesson should be delivered in which language considering the transferability, resource availability, compatibility between content and language, and instructional schedules. Hong Laoshi teaches first-grade mathematics in Mandarin, but the curriculum only comes in English. She reads the Teacher's Edition in English, modifies the posters and charts with Mandarin labeling, and uses translated materials for students. The situation is not ideal, because inevitably she spends hours creating materials to scaffold the concepts she plans to teach. However, the alignment with the curriculum on the English side allowed learners to make connections through the day and improves the opportunities for meaningful transfers to Mandarin. In Language Arts, the alignment is underdeveloped. Both Hong Laoshi and Ms. Smith had only taught two months in the district. District-adopted Chinese materials do not align with the English curriculum. In the past, immersion teachers were not required or encouraged to participate in mainstream

content professional development, especially in English Language Arts. Immersion teachers received different types of professional development instead. This does not mean immersion teachers do not know how to teach literacy. On the contrary, many immersion educators are strong Language Arts teachers, which may attribute to the findings that immersion students outperform their non-immersion peers in reading by months (Steele et al., 2015). The impact of a lack of alignment in Language Arts curriculum has not been investigated. There is a movement within the school district that pushes this alignment. The articulation of this alignment is still in progress. In terms of language use, the school district adopted the Language Use Expectation Guidelines in Dual Language classrooms developed by a group of Russian immersion teachers who teach in a 90:10 model. Mandarin immersion teachers are expected to speak Mandarin 100% of the time except for emergencies. Students starting from the beginning of first-grade are expected to use Mandarin-only in class.

Fourth, parents crave for information on program updates and ways to support their children and school. Political events, such as school boundary changes and transportation services, bring complication to the parents' attitudes towards their commitment to the program. Some families, due to cultural and linguistic differences do not obtain equal access to information unless an intentional outreach effort is made by the district. The parent group dynamics also impact classroom interactions. Some students feel more empowered at school when their parents are more involved in the parent group. They feel more comfortable to associate with students they also associate with outside the school.

Fifth, the largest student racial group is African-American and the second largest Hispanic. Most Mandarin teachers are not well-prepared to teach culturally diverse populations in America. What Mandarin teachers learned in China about America inadequately represented the cultural complexity they now encounter in day to day life in American schools. Teacher preparation programs in America have not highlighted the acculturation that an immersion teacher encounters or ways to support learners from multiple cultural and linguistic backgrounds as they learn Mandarin.

Finally, attrition is a major barricade. Some families have difficulty in dealing with uncertainties emerging from political changes. Most parents do not control their children's future. Children normally do not know what they want to do when they grow up at the age of five, so attrition in the cohort group in middle and high school occurs. In a high poverty school, transient families can increase the rate of attrition. The effort to keep these students in the program and create multiple entry points to balance attrition need to be strategic.

Facing these issues, the stake-holders need to join forces and have faith in supporting the program. This faith and strength is energized by the young learners' school experience and academic progress. That is one of the reasons that it is not only critical, but also urgent, to maximize their learning opportunity and provide them a satisfying learning experience in the immersion classroom, including Mandarin classrooms. The present study is part of the effort to understand teaching and learning in Mandarin immersion classrooms.

Participants in the study were specifically selected, following the notion that purposeful sampling is based on the assumption that the investigator wants to discover, understand, and gain insight and therefore must select a sample from which the most can be learned (Merriam, 2009). Thus the sample criteria for this research included the following. (a) Participants are typical representatives in terms of academic achievement. (b) Participants reflect cultural and linguistic variation in the research setting. (c) There is gender balance among participants. (d) I take into account the dissertation time frame, my employment situation, the classroom teacher's recommendations and the availability of student respondents.

Focal students were four first-grade students in a Mandarin immersion program. All names in this dissertation are fictitious to preserve anonymity. I selected four students because this number of participants seemed to yield a manageable amount of data that was sufficient in answering the research question in a similar study conducted by Potowski (2004). Originally I contacted the second grade teacher, because grade two is the highest grade level in this new program. She was conscientious about the project and decided not to participate as a first year teacher in a challenging setting. Then I approached the first-grade teacher Hong Laoshi and overviewed my research. She agreed to participate and expressed her interest in the research dissemination.

I taught first-grade seven years, so I am familiar with their learning content and social development. These students enrolled into the Mandarin immersion program at their current school in September, 2014. By the time of the observations, November,

2015, they had received 11 months of instruction and 50% of that was in Mandarin. I have not taught these students, but I know their kindergarten teacher from last year. Their kindergarten teacher struggled in her first year teaching in the United States. Nevertheless, these students stayed in the program and their families continued to support the school.

The demographics of the participating first-grade group mirror the school overall profile. Because it is the second year of implementation of the program, the public awareness and confidence of a Mandarin immersion program in the neighborhood was relatively low. Thus, the pioneer group class size was smaller than current cohorts. All four focal students were selected from a class of thirteen students with demographics compared to the school and district demographics in Table 2.

Table 2

Student Demographic Comparison in October 2015

Ethnicity / Race	Participating Class	Participating School	Participating District
Asian/Pacific Islander	8%	2%	8%
African-American	31%	43%	10%
Native American	0%	1%	1%
Hispanic	23%	29%	16%
Caucasian	15%	14%	56%
Multiple/Unspecified	23%	11%	9%

Due to the fact that Hispanic students are learning Mandarin as a third language and they represent a large portion of the student population at the research site, it is important to investigate these students' learning experience in the program. Unfortunately, Hispanic students were not included in this study, because they receive English Language Development instruction through a small group pull-out program during the available observation time in the week that works with my normal employment schedule. It is a concern that they miss mathematics instruction in Mandarin on a regular basis. However, Hong Laoshi reported that their Mandarin progress was not impeded by their lack of Mandarin instruction. In the future, further examination is called for regarding trilingual students' learning experiences in immersion classrooms as immersion programs and an access to them expands (Steele et al., 2015).

Three out of four participants are native English-speakers with no Chinese spoken at home. One out of the four is classified in the multiple-race ethnic group. Her mother is a native Mandarin-speaker and her father a native English-speaker. For the purpose of balancing gender, two boys and two girls were selected. In order to reflect the racial, cultural, and linguistic diversity, two African-Americans, one Caucasian, and one half-Chinese and half-Caucasian student were chosen. These students were recommended by Hong Laoshi, according to the criteria aforementioned and students' availability during observations. Table 3 provides participating students' racial and gender information.

Table 3

Focal Students' Ethnicity and Gender Description

Focal Students	Ethnicity/Race	Gender
Abelina	African-American	Female
Mackay	African-American	Male
Dustin	Caucasian	Male
Yan	Half-Chinese and Half-Caucasian	Female

Focal students' academic achievement was measured by Hong Laoshi and me with teacher-designed assessments. No statistical analysis was conducted. These assessments were not a part of this research study, because the focus of the current study is to describe oral language use in a natural classroom setting. However, it is important to examine the relationship between students' classroom performance and their language assessment data (Steele et al., 2015).

Two types of Mandarin assessments were used, *Hanzi* recognition and *Hanzi* dictation. While individual Chinese characters, *Hanzi*, by themselves can be words, most words in Chinese are made up of two characters in combination, such as in the words "huo + shan"火山 (fire + mountain = volcano) or "da + ren" 大人 (big + person = adult) (Everson, Chang, & Ross, 2015). In the assessments mentioned here, focal students were tested on individual *Hanzi* in isolation, rather than combinations of *Hanzi*.

Before I started the present research, I assisted Mandarin teachers in collecting students' assessment data in early September 2015. These data were used for screening students' learning needs and identifying level of risk for not meeting end of grade level expectations. These expectations were: (a) By the end of kindergarten, students will be able to recognize, write, and use 50-70 core *Hanzi* characters. In terms of speaking, students will regularly attempt to use words and phrases being used in the classroom by teachers and peers, attempt to communicate in simple words with teachers and peers, attempt to use correct pronunciation, and attempt to create phrases and sentences. (b) By the end of first-grade, students will be able to recognize, write, and use 80-100 additional core *Hanzi* characters. In terms of speaking, students will regularly use words, phrases, and sentences being used in the classroom by teachers and peers, initiate communication with teachers and peers, attempt to self-correct and approximate teacher's speech, and create their own mini-presentations to peers.

In September, I obtained the *Hanzi* list that covered all the Chinese characters, 96 *Hanzi*, introduced during the focal students' kindergarten school year. Each focal student was pulled out of the classroom for assessment. Because these character-based *Hanzi* were mostly high frequency words without phonetic notation called *Pinyin*, students were asked to recognize *Hanzi* without applying phonics rules. Basically each student said aloud the *Hanzi* to which they pointed. I recorded accuracy and the quantity of the correctly recognized *Hanzi*.

Later in October 2015, concurrently with the present investigation, Hong Laoshi administered the *Hanzi* recognition assessment to the focal students with 36

new *Hanzi* that were introduced during the first quarter of first-grade. On the same day, a *Hanzi* dictation assessment was given to focal students who wrote down by memory the *Hanzi* Hong Laoshi read aloud. They were the same 36 *Hanzi* included for the *Hanzi* recognition assessment. Table 4 summarized four focal students' Mandarin assessment results.

Table 4

Focal Students' Mandarin Assessment Data

Assessment	Date Given	Abelina	Mackay	Dustin	Yan
Hanzi Recognition	09-02-15	38/96	33/96	67/96	96/96
Hanzi Recognition	10-28-15	22/36	16/36	31/36	36/36
Hanzi Dictation	10-28-15	19/36	22/36	22/36	31/36

Note. Assessment scores represent the number of correct *Hanzi* out of the total given.

Regarding instrumentation of this present study, I took copious notes during systematic observations and recordings of student Mandarin use. My subjectivity and biases are explicitly examined. Main data collection sources were observations, video and audio taping, and focus group interviews.

Observations are used as a primary source of data in this present study. It takes place in the setting where the phenomenon of interest naturally occurs. Observational data represent a firsthand encounter with the phenomenon of interest (Merriam, 2009). Originally I planned to take notes every three minutes, because when frequency is longer than that, instances of code-switching cannot be captured

(Potowski, 2004). During the actual data collection, this became difficult in conjunction with monitoring technology equipment. Initial classroom visits serve as the introduction of the researcher, so observed students can adapt to the intrusion. After the students resume their natural classroom behavior, classroom observations take place. As mentioned earlier, the focus of observation is pre-identified, but real world data collection does not limit these pre-identified items. The pre-identified items were number of speech turns, vocabulary, grammar, and linguistic functions.

During data collection, my role was participant-observer, because it is a part of my job responsibility to assist immersion students and teachers at the research site. Therefore, observer activities are known to the group, but participation in the group is secondary to the role of information gatherer. Once a focal student in class asked me to read a book to her in Chinese and I did. Another time, Hong Laoshi asked me to assist a student with mathematics. He was not a part of the study. So, my participation in the classroom was established beyond a pure researcher. Nevertheless, being a participant-observer does not alter the fact that the level of the information revealed is controlled by the group members being investigated (Merriam, 2009).

During the early stage of classroom observations I conducted a mock taping, both video and audio in order to eliminate participants' unnatural behavior caused by the introduction of recording equipment. Afterwards, I began the real collection of speech samples and kept a detailed observation log as a record.

Because focal students only have Mandarin instruction for half of the day, speech samples will not reflect their variation according to the time of the day as in the

study conducted by Steele et al. (2015). I conducted this research while I was a full time employee at a public school district. My employment schedule limited my availability to collect research data. All recorded lessons took place on Monday mornings. Mathematics lessons followed a weekly routine, so the data did not reflect the variety that occurred during the week. Due to the limitations presented in the equipment loaning system, I collected as much data as possible in a short period of time. Therefore, two observational sessions per week took place. One observation occurred during mathematics time and the other during Language Arts instruction time in the first-grade Mandarin classroom. In the end, eight sessions of speech samples were collected, somewhat comparable to Broner's (2000) data size.

The collection of the speech samples was affected by the observation schedule, because Hong Laoshi developed routines in her classroom. In Mandarin Language Arts, she previewed on Mondays, introduced new vocabulary on Tuesdays through Thursdays, and reviewed on Fridays. In mathematics, Hong Laoshi follows the *Bridges in Mathematics* lesson plans and teaches the lessons that have been allocated to the Mandarin side after the teacher team discussions. On Mondays, she often teaches the calendar section. From Tuesdays to Fridays, she introduces new mathematical concepts and conducts mathematical work place activities. In the present study, Calendar Math was recorded, during which Hong Laoshi discussed days at school, days in a month, shapes, pattern, money, and calculation of money with her students.

The observation schedule was also impacted by the availability of equipment. Through the university library, I reserved equipment within a two-week frame. I picked up equipment on Sundays, used them on Monday mornings, and returned them by Tuesday evenings. Each time, I borrowed 11 items. Sometimes the same equipment was unavailable. I used whatever equivalent replacement the Digital Initiatives Coordinator could locate for me. When I dropped off equipment, I also made one more reservation. During transcription time, I was allowed to use the headphones longer. I was trained on how to check the equipment, erase files, make the settings, monitor recordings, transfer files, and synch the audio and video files. There were small glitches for every recording session. Once, I did not reset the date. The sound recorders were different from the ones I reserved on another occasion. When students used the bathroom, I did not mark their sound recorders. This created extra work during the transcription stage. In November, a participant was absent for a day. On the last day of observation, two lapel microphones were not available, so I used wireless transmitters. Due to a technical operation error, they did not record at all. Nevertheless, in the end, I video and audio recorded eight sessions of speech samples on four focal students and tape recorded the focus group interview data, in addition to observation notes, using them as raw data to be analyzed.

Table 5 presents the observation log. The time record of each lesson was the actual time Hong Laoshi taught. She signaled students when the lesson started and when it ended. A Chinese transition song was used between activities and she erased the item off the board when the lesson ended.

Table 5

Observation Schedule and Equipment Used

Date	Participants	Subject Area	Equipment Used
10-19-15	Abelina, Mackay, Dustin, Yan,	Math (40 min) Language Arts (35 min)	1 Tripod; 4 Tascam Sound Recorders DR-03; 4 Lapel Microphones; 1 JVC Camcorder Kit (Everio: GZ-MG750BU); 1 Headphone
10-26-15	Abelina, Mackay, Dustin, Yan,	Math (30 min) Language Arts (30 min)	1 Tripod; 4 Zoom H1 Handy Recorders; 4 Lapel Microphones; 1 JVC Camcorder Kit (Everio: GZ-MG750BU); 1 Headphone
11-02-15	Abelina, Mackay, Dustin, Yan,	Math (24 min) Language Arts (40 min)	1 Tripod; 4 Zoom H1 Handy Recorders; 4 Lapel Microphones; 1 JVC Camcorder Kit; 1 Headphone
11-09-15	Mackay, Dustin, Yan,	Math (26 min) Language Arts (30 min)	1 Tripod; 4 Zoom H1 Handy Recorders; 4 Lapel Microphones; 1 JVC Camcorder Kit; 1 Headphone
11-16-15	Abelina	Math (36 min) Language Arts (30 min)	1 Tripod; 3 Zoom H1 Handy Recorders; 1 Tascam Sound Recorder DR-03; 2 Lapel Microphones; 2 Canon Wireless Microphones (WM-V1); 1 JVC Camcorder Kit; 1 Headphone

In order to observe and record genuine speech in a natural classroom, teachers and students were asked not to do anything different from their typical day for the research's sake. Focal students in this study work within the natural procedures of the classroom. They were not placed together intentionally. Field notes were taken during observations. In addition, I used tape-recorded and transcribed data to verify the existence and the strength of those patterns (Blanco-Iglesias et al., 1995).

When using the video-camera and tape-recording system, I intended to follow Broner's (2000) system. However, Broner (2000) used small lapel wireless microphones and transmitters (Telex). Transmitted data were recorded on 3 Marantz (model PMD101) tape recorders which are positioned in the adjacent room. I was unable to obtain those equipment items. Instead, in the present study the equipment setup completely took place in the classroom. The video camera attached to a Tripod was positioned at the corner of the room. The audio recorder was inserted into a fabric pouch typically used for eyeglasses. The pouch was tied to a belt. I prepared pouches and belts in fun colors. If a student wore a belt from home, the pouch was simply tied to the belt loop on the pants. The setup took about 15 minutes each time in the morning before students entered the classroom. I made sure Hong Laoshi and Xiao Laoshi did not get distracted by me. Assisting focal students to attach the lapel mike and the sound recorder took about five minutes per visit during their morning quiet read or bathroom break time. Each Monday, I recorded the whole morning's lessons which included mathematics and Language Arts.

Prior to the actual data collection, an orientation was requested by Hong Laoshi and I provided it to the whole class on October 12, 2015. I drew pictures on the whiteboard while explaining the present research project and data collection method to Hong Laoshi's first-graders. Afterwards, I showed them how I would use the equipment to collect data. Students were excited about it and many hands went up when I asked if they would like to be focal students. I told them we had criteria to follow and their teacher would recommend four students to wear the lapel mikes at this point. Then I left the video-recorder and tripod in the classroom without turning it on, so students could get used to have them around like a new piece of furniture. This orientation helped reduce research intrusion, as the goal was to capture students' natural classroom behavior, language use, and learning experiences.

Collecting speech samples was the most important element of data collection in this study. During classroom observations, speech samples were collected for two Mandarin instructional time periods: mathematics and Language Arts. The rationale for selecting these two subjects were three folds: 1) Mathematics is traditionally taught in the target language as well as in English in early grades at this research site. 2) Mathematics is often perceived as a non-language-related subject whereas Language Arts is language-related. Language-relatedness is associated with the power of promoting the target language use (Broner, 2000). 3) The school district requires these two subjects to be instructed on a daily basis. This ensured a higher rate of availability for data collection.

Focused aspects in the present study included the number of speech turns, vocabulary, grammar, and linguistic functions. They were analyzed first. Additional information emerging from the data was also coded for themes. For example, some sort of shorthand designation was assigned to various aspects of the data so that I could easily retrieve specific pieces of the data. The designations were single words, letters, numbers, phrases, colors, or combinations of these (Merriam, 2009).

After the collection of classroom language use samples, I conducted a focus group interview with the four focal students. Interviews are necessary when we cannot observe behavior, feelings, or how people interpret the world around them (Merriam, 2009). A focus group is an interview on a topic with a group of people who know the most about the topic (Merriam, 2009). Valuing learners' metacognition, in this case, premises were made that these first-graders were the experts of knowing about their own language use. As a group, subjects were allowed to socially construct the concept of their own language use. This process alone increases the quality of the data. Interview data were used in conjunction with observation notes to substantiate the findings (Merriam, 2009).

Four focal students were interviewed in a group on December 1, 2015 at my office down the hall from their classrooms. I consulted with Hong Laoshi to make sure this interview was scheduled at a time when students would not be missing out on instructional time. The interview took about 16 minutes (11:10am-11:26am) right before their recess and lunch time.

Questions in this semi-structured interview were adapted from Potowski's (2004) *Interview Guides*. This semi-structured interview is usually used to collect specific data required from all respondents (Merriam, 2009). Questions do not follow a fixed order. I have the flexibility to respond to the situation at hand, to the emerging perspectives of the participants, and to new ideas on the topic. The combination of semi-structure and focus group format fit the need of the present research in terms of conducting an interview. An Olympus digital voice recorder (Model: VN-2100PC) was utilized to record the information.

The goal in development of the focal group interview protocol was to collect the most important information relating to the research question in the present study within a reasonable amount of time constrained by the age of the focal students. In Potowski's (2004) study, she used 12 interview questions. Because her focal students were fifth-graders, I narrowed the list down to eight questions to meet the needs of first-graders in the present study. Some questions are eliminated or modified. Potowski asked her participants about what TV shows they watched and what radio stations and music they listened to. Public television and radio stations in the research state offer English and Spanish channels, but none in Chinese. This question is pertinent to Spanish immersion students, but not necessarily to Mandarin immersion students. I modified it into whether they read Chinese books at home. Potowski (2004) also asked students to evaluate their peers in terms of language use. Instead, I asked my focal students to only conduct a self-evaluation.

   This focus group interview focused on four aspects, home language environment, learners' Mandarin learning experience, their perception of their own language use, and their awareness of language expectations in the classroom. Eight questions were asked to support data collection on these four aspects as in Table 6.

Table 6

Student Focus Group Interview Questions

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1) 你在家里说什么？是说中文还是说英文？跟谁说？什么时候说？

   What language do you speak at home? With whom, when?

2) 还有谁你跟他说中文？你在家里或者在学校，或者在学校外面。

   Is there anyone else with whom you speak Mandarin?

3) 你在家里读不读中文书？要是读的话，多久读一次？

   Do you read Chinese books at home? How often?

4) 来这里之前，你会不会中文？你在哪里学到的中文？

   Did you know any Mandarin before you came to this school? How did

   you learn it?

5) 会中文有多重要？How important is it to know Mandarin?

6) 比如说，你在学校里学中文。 你的老师都教你些什么？而且你说

   多少中文？What kind of things do you learn in Mandarin? How much

   Mandarin do you speak in your class?

7) 为什么有些学生在中文课上说英文呢？Why do you think that

   students sometimes speak English during Mandarin class?

8) 洪老师听到有学生说英文的时候，她做什么？你感受如何？

   What does the teacher do if she hears English during Mandarin class?

   How do you feel about that?

I conducted the focus group interview in both English and Mandarin. Interviews in Mandarin alone may limit the extent to which participating first-graders could truly express themselves and influence them to make positive comments about the target language use (Potowski, 2004). Interviews in English alone may prime the participants and affect the data collected (Broner, 2000). Thus, I interviewed in both languages to increase the validity. Sometimes I probed for more information. Sometimes I repeated multiple step questions or paraphrased them for individuals who needed additional support. My years of experience as a first-grade classroom teacher aided me in identifying students' needs and adjusting my approach in eliciting responses.

Data Analysis

It is important to declare my subjectivity in the process of data analysis, as I see myself as an emic cultural participant in this project. As an experienced immersion and first-grade educator, I analyzed these data from a researcher and educator combined role. This process was truly exciting for me as a language educator. Earlier, as I reviewed past language use research conducted in the field, I was surprised to notice that none of the systematic language use studies has been analyzed by a researcher who has been an experienced immersion educator.

I used research questions to guide the data analysis process and focused on student language use. All qualitative data analysis is primarily inductive and comparative. The goal of data analysis is to make sense out of the data. It involves consolidating, reducing, and interpreting what people have said and what I have seen,

heard, and read. Therefore, data analysis is the process of making meaning (Merriam, 2009). Data needs to be exhaustive. Findings are the answers to the research questions.

In the present research, I started informal data analysis early. Some emerging questions led me to modify the data collection process. Merriam (2009) contended that data collection and analysis should be a simultaneous process in qualitative research. Originally I did not collect data on equipment models. When I realized different equipment can be linked to variation of data quality and data collection timeline, I used a library reservation record to add equipment data into the observation notes. As I was observing in the classroom, it occurred to me that students sometimes simply repeated the teacher. The grammar of that language use of course was accurate, which is different from language that the student generated by himself or herself with no assistance from a native Mandarin-speaker. Consequently I added additional information as I was transcribing to indicate the language use situations. The timing of transcribing impacts the quality of transcription. I transcribed a few days after the recording sessions, so my memory of the lesson was still vivid. The video and audio record brought me right back to the day the lesson was delivered. After one or two synching practices, I became more fluent in transcribing.

The principal source of data in the present study were observations, tape recorded lessons, and the focus group interview. When I listened to the audio files alone, it was difficult to distinguish which participant was speaking. I used Adobe Premiere Pro CC (2015) to synch the video file with each individual focal student's

audio file. With the video record as the context, it was much easier to understand each participant. When certain words were unintelligible, I replayed it a few times or continued on and then went back to verify and update. I only transcribed student language use with notations on the language use situation such as repeating after the teacher, responding to another student, and so on. Occasionally I added the students' action in parentheses for additional information next to student language use. The data are retrievable and available for further exploration of teacher language use. When I transcribed student language use, if the participant spoke English, I typed them in English. If the participant spoke Mandarin, I then typed in *Hanzi*, Chinese characters. The transcription thus clearly reflected code-switching as well.

For data analysis, I pre-identified some areas of focus. Those foci were treated as the primary categories. Then the remainder of the data could be analyzed as secondary categories, such as themes derived from the focal group interview data. For the primary categories, I utilized Microsoft Excel 2010 to organize and analyze data. I kept Merriam's (2009) caveat in mind to have a tolerance of ambiguity. Original data were categorized into date, speaker, and the subject area. I coded them with numbers for date, initials for the speaker's name, LA for language arts, and MA for mathematics. For example, 1109MKMA refers to language used by Mackay during mathematics lesson on November 9, 2015. I also coded language use situations, language types, vocabulary, grammar, grammatical accuracy, and linguistic functions.

As to emerging data that were not pre-identified as foci for the present study, such as disfluencies and code-switching, as well as secondary categories from the

interview feedback, I considered their relationship to the research questions, the significance in language education, and the recurring frequency, when I prioritized them. The constant comparative method was utilized in data analysis (Merriam, 2009). It involved comparing one segment of data with another to determine similarities and differences. This ongoing comparative process was not only used for speech sample analysis, but also for comparing current data to prior data, one data source to another source, as well as to data collected in other related studies (Merriam, 2009).

Speech samples of classroom language use and focus group interview data were transcribed, translated, and coded by me. Table 7 summarized the conventions used in the study.

Table 7

Transcription Conventions

Numbering of files: Month, day, year, child

    Example: 10-19-15 MK

Filing of data sets: Time, subject area, language use situations

    Example: Time: 9:12am-9:52am (00:29:52-01:08:16 = 40 minutes)

    Subject: Mathematics

    Language use situations: E = echo; RTG = respond to teacher in a group;

        RTI = respond to teacher as an individual; RS = respond to a student;

        I = initiate; ST = Self talk

Symbols:

    1.   ( )   Gestures or additional information on the speaker

    2.   …   Unintelligible

    3.   中文   Chinese fonts for Mandarin speech.

    4.   English   English fonts for English speech.

    5.   [ ]   The data source of a turn, including month, day, subject

    6.   (*Italic*)   English translation of the Chinese transcription

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    Speech sample examples are used to describe certain categories and features. Additional conventions are used for reporting these data. The data source of a speech turn is indicated in square brackets with month, day, subject area abbreviations.

Because the transcription was in two languages, an English translation is provided for Chinese transcriptions in the parenthesis in Italic font.

Data analysis processes varied across five categories in this current study. Below I describe them separately. As I analyzed each set of data, themes emerged and interrelations among themes began to surface. It was exciting to connect the dots and make sense of the data. Often an emerging theme led me to re-examine the data from a different vantage point.

Number of speech turns. In this research, a speech turn is defined as a completion of one interlocutor's speech with no interruption from another interlocutor, following Levinson (1983), Ellis (1994), and Broner (2000). Speech turns provide more details of the quantity of language used by focal students than merely a percentage. In this section, I calculated the speech turn totals, by language type, by subject areas, and by language use situations. Data were also disaggregated by focal student.

Observations encompassed ten sessions in a span of five weeks. Only eight sessions per student were transcribed, due to attendance issues and equipment malfunctions. Data included 156 minutes of mathematics instruction and 168 minutes of Language Arts instruction.

After individual focal student's audio files were transcribed, data were transferred into a Microsoft Excel 2010 spreadsheet for further analysis. Each speech turn is coded with month, day, initials for the speaker's pseudonyms, and a subject code, LA for language arts, and MA for mathematics.

Language types encompassed English, Mandarin, and Blended. When a speech turn was 100% in English, it was considered an English turn. When a speech turn was 100% in Mandarin, with occasional meaningless hiatus such as "um" or "uh", it was counted as a Mandarin turn. When a speech turn had a mixture of English and Mandarin, it was labeled as a Blended turn. Each language type in the present study was coded as

E English

M Mandarin

B Blended

When a hiatus, a pause in oral speech, involved no semantic features, such as *uh*, *um*, the speech turn was counted as a monolingual turn rather than a codeswitched or blended turn. For example, "*Um. Uh. 读书*" was considered as a Mandarin turn.

I counted speech turns by language type and then disaggregated the data by individual focal students. Student language use by subject area was also analyzed. After I made a copy of the master data, recoding and regrouping took place. For example, 1019MKMA, 1026MKMA, 1102MKMA, and 1109MKMA were replaced with MKMA on the Excel spreadsheet. Thus, all Mackay's speech turns during mathematics were coded as MKMA and all his turns in Language Arts were coded as MKLA. This goes for all focal students' speech turns. I also took the ratio of instructional time into consideration as I compared individual students' oral language output by language type when different subjects were taught.

Both Broner (2000) and Potowski (2004) emphasized the impact of interlocutor in student language use. They focused on teacher versus peer as the interlocutor. I built upon their classifications and provided more details that, based on my professional experience in a language immersion setting, could benefit classroom teachers with more information on the content of student language use as well as on variations of language use situations. Even with the same interlocutor, student language use varied. I saw differences between student language used to repeat after the teacher with responding to the teacher. When a student repeated after the teacher, the student language was the same as the teacher's such as in Example 1. When a student responded to a teacher, the student language was initiated by the student such as in Example 2:

Example 1. (A student repeated after the teacher.)

Teacher [1019MA]: 树干 (*tree trunk*)

Dustin [1019MA]: 树干 (*tree trunk*)

Teacher [1019MA]: 树叶 (*leaf*)

Dustin [1019MA]: 树叶 (*leaf*)

Example 2. (A student responded to the teacher with the group.)

Teacher [1019MA]: 这里写什么？ (*What do we write here?*)

Abelina [1019MA]: 写名字和日期。 (*Write name and date*.)

Teacher [1026MA]: 我们来十个十个地数。 (*Let's count by tens.*)

Dustin [1026MA]: 十，二十，三十，三十一，三十二，三十三，三十四，

三十五，三十六，三十七，三十八。(*Ten, twenty, thirty, thirty-one,*

thirty-two, thirty-three, thirty-four, thirty-five, thirty-seven, thirty-eight.)

Teacher [1026MA]: 一共是多少？ (*How much is it together?*)

Yan [1026MA]: 十加十加五加一等于二十六。 (*Ten plus ten plus five plus*

one, equals twenty six.)

In the present study, language use situations included repeat after the teacher, repeat followed by initiate, respond to a student, respond to the teacher with a group, respond to the teacher individually, and self-talks. In self-talk turns, I included six speech turns when students talked into the lapel microphone. Among these situations, student-initiated speech turns were highlighted.

Type of vocabulary. The complication of *Hanzi* and word relationships posed new challenges in defining the unit of analysis in terms of vocabulary in the transcribed data. Therefore, it does not serve the purpose of analysis if I separate speech turns into a series of units which contains only prepositional words such as *of*, *over*, or disfluencies such as *uh*, *um*.

Instead, based on my educational background and knowledge of first-grade curriculum, I identified whether key vocabularies in each speech turn were academic or conversational and then coded them as such according to Cummins (1980). Some

speech turns contained both academic and conversational vocabularies. They were

coded as blended. In order to avoid confusion between blended vocabulary types and

blended language types, I used the asterisks to designate the difference.

I adopted Cummins' (1980) division of vocabulary types in the present study.

He distinguished Basic Interpersonal Communicative Skills (BICS) and Cognitive

Academic Language Proficiency (CALP) and drew attention to challenges that second

language learners encounter at school. In a one-way Mandarin immersion classroom,

most students do not have access to Mandarin outside the classroom. Therefore, their

BICS in Mandarin depend on classroom instruction and interaction.

I do not believe that BICS and CALP should be taught separately. Immersion

curricula tend to focus on the content, which is academic-oriented (Tarone & Swain,

1995). Yet, the immersion setting is really designed to immerse students in the target

language. This includes opportunities for students to use BICS in an authentic school

setting. However, if BICS are not purposefully built into the curriculum, those

opportunities become either incidental learning or socializing in the native language

due to lack of social vernaculars in the target language. Such a situation leads to three

questions. First, should BICS be taught at school? Second, if yes, what kind of BICS

should be included? Third, how do we include BICS into the curriculum? These

questions go hand in hand with the earlier discussion on whether social vernaculars

should be taught in school. Findings in vocabulary types are consistent with results

from student language use situations mentioned previously in Table 13 where I found

students in this study initiated more English turns during social interactions with their

peers.

Along these lines, vocabulary can also be viewed in their relationship to the

subject area content. Snow, Met and Genesee (1989) described two types of

vocabulary to be taught in the immersion curriculum. Content-obligatory vocabulary

is essential for understanding and talking about the content. Content-compatible

vocabulary emerges directly from the foreign language curriculum and can be taught

within the context of a given content, but is not required for successful content

mastery. They also claimed that a language-content integrated approach where the

language objectives are specified with deliberate, systematic planning and

coordination of the language and content curricula is more effective than one where

the language objectives arise spontaneously.

Although Cummins' (1980) theory and Snow et al.'s (1989) theory are not

identical, there is some overlap in terms of vocabulary divisions. Through a classroom

teacher's perspective, Cummins' BICS parallels Snow, Met and Genesee's content-

compatible vocabulary. According to Snow, Met and Genesee, conversational

language and academic language should be purposefully mapped into the immersion

curriculum, because this helps students make connections between social and

academic language. These connections are crucial for learners to acquire the whole

language and comprehend Chinese at a deeper level.

In the present study, I used Cummins' (1980) concepts on academic versus

conversational vocabulary to analyze the speech turn data. If words are related to

mathematics or Language Arts content, they were classified as academic vocabulary, such as 大 (*big*)，小 (*small*)，多 (*more*)，少 (*less*)，读书 (*read*)，写字 (*write*)。 If words are associated with social interactions, not school subject areas, they were categorized as conversational vocabulary such as 再见 (*goodbye*)，谢谢 (*thanks*)。 Example 3 presents some examples of speech turns that contained academic vocabulary, whereas Example 4 presents speech turns with conversational vocabulary. In addition, Example 5 presents speech turns with blended vocabularies that are academic and conversational.

Example 3. (Students used academic turns.)

Abelina [1019MA]: 这是 nickels, 五分钱。 (*This is nickels, five cents.*)

Dustin [1019MA]: Five plus four … Seven.

Dustin [1019LA]: 上学。 (*Go to school.*)

Yan [1019MA]: … 贴，剪，贴。 (*Paste, cut, paste*.)

Mackay [1102MA]: 这是长方形。 (*This is a rectangle*.)

Example 4. (Students used conversational turns.)

Abelina [1019MA]: 我肚子疼。 (*My tummy hurt*.)

Dustin [1019LA]: I'm just stretching.

Mackay [1102LA]: Stop spitting on me.

Dustin [1109LA]: Hey, who wants to play tic-tac-toe with me?

Yan [1109LA]: 你还好吗？ (*Are you alright*?)

Example 5. (Students used blended turns.)

> Dustin [1019MA]: Can I also wash my hands, because I have glue.

> Abelina [1026MA]: Your turn. 蝴蝶在哪里？ (*Where is the butterfly?*)

In Example 5, asking permission to wash hands is conversational, but glue is an academic term as a school supply. "Your turn" is conversational while butterfly is an academic term from the first-grade science unit on insects. Speech turns like these were counted as blended. I counted all the speech turns by vocabulary type and also cross-examined them with language types. Percentages were calculated. Individual student data on vocabulary use in each language type were divided by subject areas and compared for patterns. Furthermore, I conducted a vocabulary search relating to student life at school, such as words pertaining to enjoyment, pain, love, politeness, hunger, and so forth.

Grammatical accuracy. I could not use speech turns as a unit for grammatical analysis, because some speech turns contained multiple sentences. Thus, I broke down those speech turns into a series of single sentences while leaving other speech turns untouched. In this way, each analyzable unit becomes a word, a phrase or a sentence, similar to using an utterance as a unit in Broner's (2000) study.

In this study, an English word is a single distinct meaningful element of speech. A Chinese word can be composed of a single *Hanzi* or multiple *Hanzi* that express a semantic unit. Grammatically it is the smallest language use unit (Everson, Chang, & Ross, 2015). An English or Chinese phrase is a small group of words standing

together as a conceptual unit, typically forming a component of a clause, not a complete sentence. A sentence is a set of words that is complete in itself, typically containing a subject and predicate, conveying a statement, question, exclamation, or command, and consisting of a main clause and sometimes one or more subordinate clauses.

For the purpose of this current study, I found it unnecessary to separate all the words in each speech turn. Therefore, in terms of grammatical units, when I report the word category, the quantity represents speech turns that contained words only, not a phrase or a sentence. A word speech turn can be a single word or a list of words that do not form a phrase or a sentence. Example 6 represents some variations in the word speech turns.

Example 6.

1. Abelina [1019MA]: okay

2. Abelina [1019MA]: 瓢虫 (*ladybug*)

3. Dustin [1026LA]: look, look, look

4. Mackay [1026LA]:个、读、书、done (*measure word, read, book*, done)

5. Yan [1026MA]: 五、十、十五、二十、二十五 (*five, ten, fifteen, twenty, twenty-five*)

In Example 6, Turn 1 is a single English word turn. Turn 2 is a single Chinese word turn. Turn 3 is an English word speech turn that contained repeated words.

These repeated words do not come together into a phrase. Turn 4 is a blended word speech turn. The Chinese words and the English word are independent words, random and parallel with distinct functions. They do not connect into a phrase. Turn 5 is a list of words in Chinese that function as skip counting in mathematics.

In a similar fashion, I considered a speech turn that has only a phrase as a phrase speech turn, grammatically speaking. This phrase can be a simple phrase or a complex phrase as shown in Example 7.

Example 7.

1. Abelina [1019LA]: 上学校 (*go to school*)

2. Dustin [1019MA]: nice shoes

3. Dustin [1019MA]: 肚子疼 (*tummy ache*)

4. Mackay [1019MA]: the little 叶子 (*leaf*)

5. Yan[1019LA]: 写名字和日期 (*write the name and the date*)

6. Dustin [1102LA]: dragon tear, my dragon tear

In Example 7, Turn 1 is a simple phrase Chinese speech turn containing a verb and a noun. Turn 2 is a simple phrase English speech turn containing an adjective or descriptor and the object. Turn 4 is a simple phrase blended speech turn. Turn 5 is relatively more complex, because this speech turn is a phrase that has the action verb followed by two objects in a parallel structure. Turn 6 is a speech turn with two phrases while the latter is a revised phrase of the former by adding a descriptor '*my.*'

Some speech turns have only one sentence per turn. Some speech turns have multiple sentences in a turn. After counting all the sentences in the total speech corpus, I divided sentences in the speech corpus into complete sentences and incomplete sentences.

I did not include the analysis of the grammatical accuracy of songs and rhymes, because they do not follow traditional grammatical conventions. Most of the time, authors of songs and rhymes adopt creative techniques when it comes to grammar. There were 61 songs and rhymes, of which 38 were in Mandarin or blended languages. It is important to know which student is singing what kind of songs. Data like that show aspects of a learner's identity and provide teachers information on the learner's interests. For example, Mackay liked to sing Michael Jackson's and Hip-hop songs. Abelina sang rap occasionally. Yan sang a Chinese tune. Dustin made up songs as in Example 8, a Mandarin and English blended version with a Chinese tune of which Hong Laoshi used for transitions.

Example 8.

Dustin [1026LA]: (singing) Is anybody hungry? Because I am. 噔噔噔噔钟响 (*Ding, ding, ding, ding, the clock rang*.) Begin lunch. I am so-o-o starving.

Dustin [1026LA]: Starving. I'm starving. 噔噔噔噔钟响 … 噔噔噔噔钟响 (*Ding, ding, ding, ding, the clock rang … Ding, ding, ding, ding, the clock rang*.)

It is natural for spontaneous speech to have disfluencies (Clark & Wasow, 1998). Sometimes, a speech unit contained disfluencies, but students self-corrected and finished their sentences. Therefore, they were counted as complete sentences in this case. Some examples are presented in Example 9.

Example 9.

Abelina [1019MA]: 二零一五年九 uh 十 um 十九日 (*Sept, uh, Oct, um, 19ᵗʰ, 2015*)

Dustin [1019LA]: I actually didn't want to do … I didn't want to copy yours.

Yan [1026MA]: 他不，他不听我。 (*He doesn't, he doesn't listen to me*.)

Yan [1109MA]: 那个是，是 quarters, quarter. (*That is, is, quarters, quarter*.)

I counted all the speech turns that contained only word(s), turns that had only phrase(s), the number of complete sentences, and the number of incomplete sentences. Then I cross-examined them with language type and subject areas, and disaggregated data by each individual student.

Only the grammatical accuracy of complete Mandarin or Mandarin and English blended sentences were analyzed and reported in this dissertation, with the assumption that students at this age have mastered most of the grammatical structures in their native language, English. In addition, the research question implied a focus on Mandarin use.

Among accurate Mandarin or blended sentences, some sentences were generated by students while others were simply repeats or imitation. In order to separate those two groups, I recoded and regrouped each sentence. The results were presented in two categories only: repeat/imitation and student-initiated. This reorganization of data allowed me to focus on student-initiated sentences, such as Mandarin sentence initiation by subject matter. Student-initiated Mandarin or blended sentences were further described in detail including sentence types, code-switching, and error analysis.

Linguistic functions. Words and phrases do have functions, but they are not complete ideas. In this dissertation, only linguistic functions of the student-initiated complete sentences were analyzed and reported. When a student repeats after the teacher, the ideas were borrowed from the teacher, the function of such ideas therefore are not authentic. That is why only student-initiated sentences were analyzed for linguistic functions in this present study. Because the focus of the present study is on student Mandarin use, I analyzed and presented the linguistic functions of Mandarin sentences first, then Mandarin and English blended sentences, and finally English sentences.

In this present study, I adopted Garcia's (2007) categorization of linguistic functions for three reasons. First, she based her categorization on the functional categories identified by Halliday (1975) and Painter (1999). Halliday (1975) has been internationally influential for the systemic functional linguistic model of language. He describes language as a semiotic system, a systemic resource for meaning. He has

tried to look at language from multiple perspectives, but his favorite vantage point is from a social angle, language as the creature and creator of human society. Because I take a sociolinguistic perspective in this study and was influenced by his language-based theory of learning (Halliday, 1993), it is fitting for me to use functional categories connected to him.

Second, these categories were developed by Garcia (2007) after her analysis of classroom interaction in the speech corpus collected from different types of immersion classrooms. They were used in her experiment to analyze the ways in which teachers can promote the use of the target language to express different functions in immersion contexts. The setting in the present study has common features with her study.

Third, the six categories that Garcia (2007) developed are sufficient to describe student language use in terms of linguistic functions and to answer the research questions earlier posed for this investigation. These six linguistic functions used to code student-initiated complete Mandarin or blended sentences are: (a) Heuristic function: the use of language to ask for information about things; (b) Informative function: the use of language to inform about external things; (c) Personal function: the use of language to inform about oneself; (d) Regulatory function: the use of language to demand actions; (e) Instrumental function: the use of language to demand actions for a personal benefit; and (f) Interactional function: the use of language to interact socially with others.

Sometimes, a sentence contained a minor grammatical error. I still included the sentence for linguistic functional analysis, because the function is clear, such as in

小兔子的耳朵是小。 (*The little rabbits' ears are small.*). In Chinese, the verb 是 (*is*) is not needed in a subject and descriptor structure. The correct Chinese form is 小兔子的耳朵小。 In the Chinese culture, a rabbit's ears are considered as long, not small. It is unclear why the focal student chose small as the modifier. Nevertheless, the function of this sentence can be classified as informative, the use of language to inform about external things.

Focus group interview. Focus group interview data were transcribed and analyzed. Themes were extracted from the data. In addition, I counted the speech turns and compared them with the classroom language use data. I also conducted a word count of each individual student's total interview language use.

It was very exciting to go through this research process. Naturally one result led to another analysis. Each finding can be interpreted and examined from different viewpoints. As I compared findings, patterns and themes emerged. While I explored relationships among results and themes, more questions arose. While data collected in this research and my analyses answered the research question at the best of my ability, further investigation is still needed to better understand student language use, learning experience, home environment, school curriculum, and instruction.

Issues of Trustworthiness

Internal validity deals with the question of how research findings match reality (Merriam, 2009). I utilized triangulation to increase the credibility or internal validity of the findings. Triangulation was evidenced in the use of multiple methods and multiple sources of data. The present research utilized a semi-structured qualitative

design, using a combination of constitutive ethnographic approach and interaction analysis, which functioned as a way of triangulation. In the data collection process, observations of participants' natural classroom behavior and the frequency of observations helped to capture the reality. The focus group interviews with four participants were used to triangulate emerging findings from observations.

A second strategy that I employed in strengthening internal validity is member checks. Normally member checks refer to the process in which the researcher solicits feedback on emerging findings from some of the people who were interviewed (Merriam, 2009). However, in the present research, participating students are only six years old. Instead of having them provide feedback on my interpretation of their responses, I consulted with their teacher, Hong Laoshi. I asked her to look at my description of her instruction and the themes that emerged from student language use data. Then I politely requested her to give me written feedback on whether my conclusions "ring-true" or seem accurate.

During the whole research process, I frequently reflected on my own position, the human being as instrument. I explained my biases, my culture, and my assumptions. Even though I have never taught the participants, I worked at the research site as a teacher last year and work as a teacher's coach this year. This relationship impacted the participants' classroom behavior and my perceptions. Therefore, a constant check on my subjectivity was necessary. By being aware of my subjectivity, it helped reduce variance between personal values and expectations that were brought to the study.

Reliability, or dependability, refers to the extent to which research findings can be replicated (Merriam, 2009). The most important question for qualitative research is whether the results are consistent with the data collected. Lincoln and Guba (1985) suggest the audit trail. All data came in different formats, observation field notes, audio files, and video files. These data can be retrieved, re-transcribed, and revisited at any time. I described in detail how data were collected, how categories were derived, how decisions were made throughout the inquiry. Rich description provided a clear path for people to review and reexamine the study.

External validity is concerned with the extent to which the findings of one study can be applied to other situations (Merriam, 2009). Generalizations, external validity, have been one of the greatest challenges in qualitative research, because the sample size is small and sample selection is purposeful. In this research, four students were selected with specific criteria. They are individually unique, in a unique program, and a unique setting. The transferability of the findings derived from this study can only be made within specified levels of confidence. However, it is still significant, because the school district is looking at another Mandarin immersion site in a neighborhood with high poverty and a high number of English language learners. There has been predicted another tidal wave of Mandarin immersion programs sweeping throughout America. When China's President Xi Jinping visited the White House in September, 2015, U.S. President Barack Obama announced the "One Million Strong" initiative to grow the number of K-12 students studying Mandarin from approximately 200,000 to one million by 2020 (Yap, 2015). More inner city schools

with culturally diverse student populations may consider Mandarin immersion. This present study contributes to our understanding of the Mandarin immersion student learning experience in a culturally diverse setting. The more we understand students' learning in various contexts, the better we can support teachers including exchange teachers through the Confucius Institute who are placed at schools with a high percentage of African-American learners and other minorities. Therefore, it is up to the readers to decide whether findings from this study are transferable. In order to enhance transferability, I provide as rich and thick description as possible, so the data are sufficient for the readers to selectively transfer. Participants are carefully selected, so in terms of gender and race they cover a range of variety. Academically they are typical learners, so cultural factors become the main variance.

Ethical guidelines were closely followed. The proposal was submitted to and approved by the university's Institutional Review Board (IRB) and the school district IRB. Actual documents including consent and assent forms are included in the IRB application. Amendments were made in terms of providing non-consent forms to non-focal students' families and the agreement to have a translated version of parent consent form and student assent form available for focal students whose home language is not English. Participants' identifies are protected and kept confidential in the report during the dissemination phase. National and local policies and procedures in conducting an educational research study are followed as well.

Research participants, the classroom teacher, and participants' families are also respected. Because research subjects are first-graders, six years old, both their parents'

written consent and the students' verbal assents were to be obtained prior to the data collection. During the data collection, natural classroom activities were respected. I did not ask the classroom teacher or participating students to change for the research study's sake. In order to reduce intrusion, the equipment set up occurred before students entered the classroom. During students' morning warm-up, I quickly helped them install the lapel mike and the sound recorder.

Data on hard drive, such as field notes, sound tracks, video clips, transcriptions, and analyses are kept in a secure file on a personal computer with password protection. A backup copy is stored in an external drive in a safe.

Results are presented in a combination of narrative description and graphic organizers. The dissemination varies depending on the audience. A meeting and a short report were provided for participating families, the teacher, and the school administrators. A written report and copies of the focal students' parent consent and student assent forms were submitted to the participating school district. A journal article may be submitted, peer reviewed, and hopefully published, for the immersion and research community.

Chapter Four: Results

In this chapter, results were reported in five categories including number of speech turns, type of vocabulary, grammatical accuracy, linguistic functions, and focal group interview data. It is qualitative in nature, because I presented and analyzed speech samples through multiple perspectives. When I analyzed a speech turn, I examined the grammatical accuracy through the linguistic lens, the content of the speech through the sociolinguistic lens, and the learning strategies reflected in the speech via an educator's lens. I compared results to related studies and made connections to different theories as appropriate. Themes related to those categories were discussed and narrated. Together these findings answer the research question – How do four first-grade students in a one-way fifty-fifty Mandarin immersion classroom in an urban public school in the Northwest United States orally use Mandarin when learning mathematics and Language Arts?

Number of Speech Turns

Results indicated that a total of 3,090 speech turns were spoken by four focal students in the researched first-grade Mandarin immersion classroom during transcribed sessions. These students spoke more in Mandarin than in English. Sixty-one percent of the total speech turns were in Mandarin, which was almost twice as much output as in English.

Table 8 summarizes the total language use by four focal students regarding language type and number of speech turns. Percentages represent the proportion of number of turns in that language type to the total number of speech turns. Blended

refers to speech turns that contained both English and Mandarin. Only focal students' speech turns are counted. Their interlocutor's speech turns are not included.

Table 8

Total Language Use by Four Focal Students

Language Type	Number of Turns	Percentage
English	1,060	34
Mandarin	1,880	61
Blended	150	5
Total turns	3,090	100

In the process of differentiating language types, two other themes emerged from data: disfluencies and code-switching. It is important for me as a language researcher to understand these types of language use and to clarify how data are treated.

Monolingual speech turns often contained disfluencies – unwanted pauses, elongated segments, fillers (such as *uh* and *um*), editing expressions (such as *I mean* and *you know*), word fragments, self-corrections, and repeated words (Clark & Wasow, 1998). Clark and Wasow (1998) studied repeating words in spontaneous speech. They proposed a commit-and-restore model of repeated words and argued that repeating a word is a sequence of processes, each with its own options and limitations. Clark and Wasow contended that speakers often repeat the first word of major

constituents, as in, ''I uh I wouldn't be surprised at that.'' Repeats like this divide into four stages: an initial commitment to the constituent (with ''I''); the suspension of speech; a hiatus in speaking (filled with ''uh''); and a restart of the constituent (''I wouldn't . . .''). These four stages reflect different principles relating to complexity of language, continuity of delivery, commitment to constituents in the utterance, and strategies and processes related to oral speech.

Disfluency is often viewed from two perspectives. Both views relate to speech delivery skills and strategies. In one tradition, disfluencies are treated mainly as the outcome of processes that, once initiated, run off without intervention. The speaker could not help but produce disfluencies unintentionally. In a second tradition, disfluencies are viewed mainly as the result of certain strategies with options under a person's control. The speaker uses disfluencies to control and monitor the audience (Clark & Wasow, 1998).

The current speech data contained much disfluency in students' language use, especially in student-initiated speech turns. The occurrence of disfluency was predictable. However, the frequency and description of disfluency is worth further research to understand factors that cause such phenomena specifically related to second language acquisition. In the present study, disfluencies often took place in student generated speech turns such as in Example 10:

Example 10.

Abelina [1019MA]: Mackay! (Partner share.) The bug is not in that side,

because the bug … anyway the first day of school is that little bug on the

top, then the bottom, then the side, and then, the middle, then the side, and

then, and then, yeah, the side, and then, the middle, and then the

butterfly … then we went back to bugs, ladybugs, so the ladybugs are only

five.

Dustin [1026MA]: 今天是二零一五年十月二十六日星期二，一。 (*Today*

is Tue-, Monday, October 26, 2015.)

In Example 10, Abelina used repeated words and Dustin used self-corrections

within one single sentence. These disfluencies indicated that spontaneous speech is a

complex task. This task relates to the speaker's understanding of the semantics of

language and the concepts the speaker attempted to communicate. In other words, if

language is to name the concept, spontaneous speech requires the speaker to know the

language and the concept, so he or she can choose the language to match the concept

he or she meant to express.

In the case of a bilingual individual, code-switching could add another layer of

complexity to spontaneous speech, because when the bilingual speaker is unsure of

committing to one language or another, this indecisiveness may cause disfluency

(Rieger, 2003). Furthermore, Rieger (2003) investigated disfluencies and hesitation

strategies in oral L2 tests. She found participants used a variety of fillers to signal to

the interlocutor that they were hesitating or self-repairing their oral L2 output. Code-switching was one of those strategies. This confirmed that code-switching is not an indication of inferior language skill but a natural part of bilingual speech.

As to code-switching, Myers-Scotton (1993) defined code-switching as the use of two or more languages in the same conversation, usually within the same conversational turn, or even within the same sentence of that turn. In this present research, they were referred to as English and Mandarin blended speech turns. Myers-Scotton suggested that there are two types of switches: inter-sentential or intra-sentential. In inter-sentential switching a speaker switches from one language to another between different sentences. In intra-sentential switching, a speaker switches from one language to another within the same sentence. Thus a sentence will be made up of two or more languages. When considering intra- sentential switching it is important that the analyst also establishes the matrix and embedded languages in the code-switched speech. The matrix language (ML) is the main language of code-switched utterances unlike the embedded language (EL) which is the less dominant language and plays a less significant role. According to Myers-Scotton, there are two principles that may guide one in determining the ML and EL: (a) The ML provides the largest proportion of lexical items in the code-switched sentence while the EL provides fewer items. (b) It is the ML that sets the morpho-syntactic frame of the sentences in code-switched sentence. Morpho-syntactic frame refers to word, phrase, and sentence formation structure. When the ML is in English, it is an English-based code-switch. When the ML is in Mandarin, it is a Mandarin-based code-switch.

In the present study, five percent of the total speech data shown in Table 8 was blended in English and Mandarin, also known as code-switching as in Example 11:

Example 11.

Abelina [1026MA]: Your turn. 蝴蝶在哪里？(*Your turn. Where is the butterfly?*)

Yan [1026MA]: 洪老师，he barged in without saying 你可以过去一点吗？(*Hong Laoshi, he barged in without saying "Would you please move over a little?".*)

Mackay [1109LA]: 你喜欢动物 something, something. (*You like animals, something, something.*)

Dustin [1109LA]: 我可以擦掉 um (covering up the Hanzi he meant to erase with his two hands), and this would be 日。 (*I could erase um … and this would be Hanzi sun.*)

In Example 11, Abelina's turn is an inter-sentential code-switch. Yan's turn is an English-based intra-sentential code-switch. It suggested that students might use a borrowed phrase from the target language to complete or supplement a communication that was initially intended to be in the native language. Mackay used 'something, something' to substitute 什么 (*what*). This code-switch is a Mandarin-based intra-sentential switch. It indicated that when students did not know the target language, they were likely to use the native language to substitute and generate blended speech

turns. Dustin skipped the unknown target language, used gestures to supplement, and then used his native language to assist him. This indicated that students may use multiple strategies to complete a complex Mandarin-based intra- sentential code-switch. Linguistically, these processes make total sense.

Most code-switch turns were intra-sentential. Only a few were inter-sentential. I considered the intention of the speaker and the proportion of the lexical items in sentences to divide them into English-based or Mandarin-based turns. I then counted them. Results are represented in Table 9.

Table 9

Code-switched Turns

Categories	Mandarin-based Turns	English-based Turns
Code-switched turns	96	54

Potowski (2004) separated her code-switched turns based on ML+EL situations. If I adjust my results using a similar method by adding Mandarin-based code-switch turns with Mandarin turns and English-based code-switch turns with English turns, findings are presented in Table 10.

Table 10

Total Language Use by Four Focal Students after Code-switch Adjustment

Language Type	Number of Turns	Percentage
English	1,114	36
Mandarin	1,976	64
Total turns	3,090	100

Comparing the percentage of the L2 versus the L1 usage in this study to Broner's (2000) and Potowski's (2004) language use investigations in fifth-grade Spanish immersion programs, students in the present study spoke 64% of the time in Mandarin after code-switch adjustment as in Table 10, which is higher than Potowski's 56% and close to Broner's 63%.

However, I caution readers that there is no clean comparison when it comes to contrasting results from two research studies. The nuances in each research study make it unique, so simply comparing two percentages reduces the power and the richness of a scientific study. Potowski (2004) used speech turns in reporting the percentage of student Spanish use, but Broner (2000) used utterances. An utterance refers to a stretch of language bounded by pauses, under one single intonation contour, and generally consisting of a single semantic unit. A speech turn refers to a completion of one interlocutor's speech with no interruption from another interlocutor. Therefore, a speech turn at times could contain more than one utterance. In addition, Both Potowski and Broner took out the Spanish-English mixed turns. If I take out the

blended speech turns or add code-switch turns into the monolingual speech turns, the adjusted result would be that about 64% of the time focal students used Mandarin in class.

As I compared overall findings with those of other researchers, an important issue emerged. It was interesting that the percentage of target language use in this one-way 50:50 first-grade Mandarin immersion classroom was nearly equal to that of a one-way 90:10 fifth grade Spanish immersion classroom in Broner's (2000) study. First-graders in the present study had only studied Mandarin for a year whereas fifth-graders in Broner's study had studied Spanish for five years. During their experience, students in this study received instruction in Mandarin for 50% of the day whereas students in Broner's study received instruction in Spanish for 100% of the day in kindergarten and first-grade. Broner's participants did not receive any English instruction until second-grade. English instruction increased from 30 minutes in second-grade to approximately 60 minutes in third and fourth, then on to 90 minutes in fifth-grade. Even in fifth-grade, they received instruction in Spanish more than 70% of the day. Data collected in the current study confirmed that time alone cannot account for L2 outcomes in the immersion programs (Genesee & Lindholm-Leary, 2013).

It was also surprising that students in this one-way program produced a higher percentage of target language than fifth graders in a two-way Spanish immersion setting in Potowski's (2004) study. A majority of students in a one-way program are native English-speakers who do not have a target language environment at home. In

the present study, except for Yan, all other participants are native English-speakers. However, in Potowski's study, nearly half of the participants were native Spanish-speakers. Despite the presence of these students, Potowski's fifth-graders did not produce as much target language percentage-wise as the first-graders in the present study.

I cannot compare the percentage of the target language use versus the native language use with Steele et al.'s (2015). They used a field-notes-only approach in collecting data and their report of findings described what percentage of students spoke what percentage of which language. Besides, they visited multiple classrooms and no focal students were selected in their study. The purpose of their language use study was to profile classroom practices and examine factors that attributed to the effect of dual-language immersion on student achievement. That investigation focused more at program level, rather than on individual student's language acquisition and learning experience. Therefore, it is unfeasible to compare their results to mine.

In order to look at each individual student's data for patterns, student language use data by type such as English, Mandarin, and blended, was disaggregated by individual focal student. I recoded all speech turns from a focal student with their first name. Then I sorted by name and by language type. Table 11 presents a comparison among four focal students' language use in terms of language types.

Table 11

Language Use Comparison among Four Focal Students

Name	Language Use	English	Mandarin	Blended	Total
Abelina	Number of Turns	472	486	64	1,022
	Percentage	46	48	6	100
Mackay	Number of Turns	255	233	28	516
	Percentage	50	45	5	100
Dustin	Number of Turns	250	432	40	722
	Percentage	35	60	5	100
Yan	Number of Turns	83	729	18	830
	Percentage	10	88	2	100

Overall, Abelina and Yan spoke more than Dustin and Mackay. The relationship between oral language output quantity and gender is to be further investigated. Abelina had the highest number of total speech turns, but Yan had the highest number of Mandarin speech turns. Yan and Dustin spoke Mandarin more than 50% of the time. Abelina and Mackay spoke Mandarin slightly less than 50% of the time. They both are African American students. The relationship between ethnicity and language use is yet to be explored. However, one must be very careful in making any generalizations, especially when the sample size was so small. It is important to note that although the percentage of Abelina's Mandarin use is lower than Dustin, the number of her Mandarin speech turns was higher than his.

Yan spoke Mandarin the most and used less code-switching. This probably relates to the fact that her mother is a native Mandarin-speaker. None of the other three participants has Mandarin-speaking family members at home. Her motivation in speaking Chinese is higher than her peers in class, supported by the focus group interview data. She invested in the identity of a Mandarin-speaker in class and took pride in her behavior.

After intersecting subject areas with language types, language use results were sorted and summarized in Table 12. The percentage represented the proportion of speech turns in a language type to the total speech turns in the same subject area.

Table 12

Four Focal Students' Language Use by Subject Areas

Language Type	Mathematics		Language Arts	
	Turns	Percentage	Turns	Percentage
English	498	36	562	33
Mandarin	809	58	1,071	63
Blended	83	6	67	4
Total Turns	1,390	100	1,700	100

Speech corpus in this study covers 156 minutes of mathematics instruction and 168 minutes of Language Arts instruction. Data showed 1,700 out of 3,090 speech turns took place during Language Arts time. Comparing the proportion of speech

turns in relation to instructional time, more language output, especially Mandarin, was

associated to Language Arts.

It is possible that students spoke more target language during Language Arts

because it is a language-related subject and the structure of the lessons contained more

teacher-fronted activities. Based on the video recording and my observational notes,

the following description of Hong Laoshi's Language Arts instruction may help

substantiate student language use findings associated to subject areas. In her

Mandarin Language Arts class, Hong Laoshi taught *Hanzi* recognition, pronunciation,

reading, writing, and the use of *Hanzi* such as in making phrases and sentences.

Students had access to a textbook, its digital version, the activity book filled with

textbook-related exercises, and supplemental readers that were not a part of the

textbook series. Hong Laoshi often created materials to scaffold students' learning.

She facilitated activities for student to read short passages, write *Hanzi* messages, and

converse with different interlocutors during teacher-fronted activities. Vygotsky

(1978) introduced the concept of the Zone of Proximal Development (ZPD). It refers

to the difference between what a learner can do independently without support and

what he or she can do with help. In a traditional classroom setting, scaffolding refers

to the help or guidance received from an adult or more competent peer to permit the

learner to work within the ZPD. This concept played a major role in second language

education. In the researched classroom, Hong Laoshi gradually released responsibility

to her students, so they could eventually perform in the target language independently.

She presented vocabulary with gestures, visual cartooning, speech variations, and a

variety of techniques to increase the comprehensibility of the input. After she

modeled language use, she invited the class to practice with her. Then, she led

practice activities. She provided sentence frames, such as 你喜欢什么动物？我喜欢

_____。 (*What animal do you like? I like* _____.). Students practiced with partners

before they moved onto independent work. Sometimes, Hong Laoshi designed slides

with visuals to support textbook content. She guided student speaking practice with

those visuals in a whole group setting. In conclusion, all this scaffolding may have

been the reason for more speech turns in Language Arts, because language was more

carefully guided by Hong Laoshi to permit students to produce more oral Mandarin

output.

Data showed students spoke less target language during mathematics sessions

than Language Arts. Interestingly, less teacher-fronted language activities were

observed during mathematics, based on the video record and my observational notes.

Following the school district guideline, Hong Laoshi utilized the *Bridges in*

Mathematics lesson plans and the content-allocation planner developed by her and Ms.

Smith. This planner specified which lesson would be taught in Mandarin by Hong

Laoshi, which lesson would be taught in English by Ms. Smith, and which lesson

would be taught in both languages by both teachers. Most lessons that were taught in

both languages focused on the same mathematical concept, so the concept was

reinforced and examined via two languages. However, the lesson was neither repeated

nor identical. Hong Laoshi taught math lessons in Mandarin. Lessons in this study

were recorded during Number Corner where she discussed with her students days at

school, days in a month, shapes, patterns, money, and calculation of money.

Sometimes, she designed worksheets as a follow-up activity to further reinforce

mathematical concepts. However, the focus of the lesson was more on the

mathematical content rather than language instruction. In addition, the district-

adopted mathematics curriculum included Teachers Guides that were designed for

English-speaking classrooms. In the Teachers Guides, lesson plans with step-by-step

instructions limited the degree of implementation of teacher-fronted language

activities.

Individual focal students' language use is also disaggregated by subject area.

These results are illustrated in Table 13-16.

Table 13

Abelina's Language Use by Subject Areas

Language Type	Mathematics		Language Arts	
	Turns	Percentage	Turns	Percentage
English	241	52	231	41
Mandarin	186	41	300	53
Blended	33	7	31	6
Total Turns	460	100	562	100

Table 14

Mackay's Language Use by Subject Areas

Language Type	Mathematics		Language Arts	
	Turns	Percentage	Turns	Percentage
English	125	51	130	48
Mandarin	103	42	130	48
Blended	16	7	12	4
Total Turns	244	100	272	100

Table 15

Dustin's Language Use by Subject Areas

Language Type	Mathematics		Language Arts	
	Turns	Percentage	Turns	Percentage
English	84	27	166	40
Mandarin	211	68	221	54
Blended	16	5	24	6
Total Turns	311	100	411	100

Table 16

Yan's Language Use by Subject Areas

Language Type	Mathematics		Language Arts	
	Turns	Percentage	Turns	Percentage
English	48	13	35	8
Mandarin	309	82	420	92
Blended	18	5	0	0
Total Turns	375	100	455	100

All four focal students produced more total speech turns during Language Arts lessons than mathematics. Yan and Abelina spoke more turns in Mandarin than Dustin and Mackay during Language Arts. In regard to the ratio of the target language turns to the total turns in that subject area, Yan and Dustin had a higher percentage than Abelina and Mackay. Proportionally they spoke more Mandarin than English in class irrespective of the subject areas. Abelina and Mackay spoke less Mandarin than English during mathematics. The data showed that Yan spoke almost exclusively in Mandarin in class, especially during Language Arts.

In order to further explore the ratio relationship among students' speech turns in relation to subject areas, I compared each student's Mandarin turns during mathematics with Mandarin turns during Language Arts, English turns during mathematics with English turns during Language Arts, as well as the total speech turns during mathematics with total speech turns during Language Arts.

Table 17 presents such comparison of ratios between speech turns by subject areas. In the column heading, Mathematics: Language Arts means the ratio of speech turns between mathematics and Language Arts in a percentage format.

Table 17

Ratio of Mathematics to Language Arts Speech Turns

Language Type	Ratio (Mathematics : Language Arts)			
	Abelina	Mackay	Dustin	Yan
English	104%	96%	51%	137%
Mandarin	62%	79%	95%	74%
Blended	106%	133%	67%	NA
Total Turns	82%	90%	76%	82%

Note. NA is because Yan did not speak blended turns during Language Arts.

It is important to note that without knowing the content of these speech turns, such as whether they are academic language or conversational vernaculars, the interpretation has its limitations.

When looking at Table 17, I considered that the total class time between mathematics and Language Arts were different. Based on the recorded data of the starting and ending cue Hong Laoshi implemented as a routine in her class, mathematics language use data covered 156 minutes while Language Arts covered 168 minutes. The time ratio between mathematics and Language Arts was 93%. Taking this instructional time difference into account, any value above 93% in Table 17

indicates that the student spoke more in that language during mathematics than Language Arts.

Data showed that three out of four focal students spoke more English during mathematics than Language Arts after the time ratio adjustment. Dustin is the only student who spoke more Mandarin during mathematics than Language Arts. As an outlier in the data, he represented a counter narrative to the above interpretation. He had the highest ratio (95%) of Mandarin use during mathematics in relation to Language Arts. It is possible that linguistically, mathematics at this grade level traditionally involves more numerals. Most first-graders in this class knew the numerals in the target language. Dustin did as well. This enabled him to participate in speaking tasks during mathematics more proportionally in Mandarin than the other three focal students. His total speech turn ratio between mathematics and Language Arts was the lowest (76%), which could suggest that he did not necessarily prefer mathematics over Language Arts, but he seized opportunities to use Mandarin during mathematical instructional time.

Mackay spoke the least number of turns during mathematics, but when comparing the ratios in Table 17, he had about the same percentage of total oral output for mathematics and Language Arts. He had the highest ratio (90%) of mathematics to Language Arts regarding total speech turns. This could indicate that Mackay had more interest in mathematics than other focal students. When pairing information from Table 17 and Table 14, Mackay used a considerable amount of English during mathematics. From a sociolinguistic perspective, it is possible that in this case

Mackay's identify investment impacted his language use. During his Language Arts class, Hong Laoshi structured more teacher-fronted activities. Mackay did not invest in being a rule follower, so he did not take advantage of the language output opportunities the teacher offered. Recorded individual audio data showed he did not repeat after the teacher when expected, nor did he respond to the teacher in a group situation. During mathematics, less teacher-fronted language activities were involved. Though Mackay produced less turns than others, he had the highest ratio.

Yan had the highest ratio (137%) in English use during mathematics. It is important to combine this information from Table 17 with findings presented in Table 16. Because this ratio only illustrated the difference of her language use between two subject areas, it did not represent the amount of English she spoke. In fact, Yan spoke in Mandarin 92% of the time during Language Arts and 82% of the time during mathematics.

Besides language type and subject area, I also examined the speech turns by language use situations. Table 18 summarized four focal students' oral language use in various situations with an emphasis on target language use.

Table 18

Four Focal Students' Language Use in Various Interactional Situations

Language Use Situations	Total Turns	%	Mandarin Turns	%
Repeat after Teacher	540	17	524	27
Repeat, then Initiate	16	1	12	1
Initiate	570	18	202	11
Respond to a Student	558	18	56	3
Respond to Teacher with Group	956	31	879	47
Respond to Teacher Individually	267	9	129	7
Self-talks	183	6	78	4
Total Situations	3,090	100	1,880	100

In Table 18, I found an overall pattern that students spoke more in the native language when the interlocutor was a peer and more in the target language when the interlocutor was the teacher. This pattern is consistent with findings from Broner's (2000) and Potowski's (2004) interlocutor analyses. However, in their studies data were sorted differently. In Broner's investigation, she examined student language used to address the teacher, the whole class, other adults, and peers. In Potowski's research, she looked at language used when students spoke privately with the teacher, publically with the teacher, and with peers. Comparing their classifications to

language use situations in the present study, a unique finding resided in speech turns that were produced as imitations or repeat after the teacher.

Repeating after the teacher differs from responding to the teacher, because the former is imitating native pronunciation whereas the later involved information retrieval. Kang, Gollan, and Pashler (2013) contrasted the effectiveness of imitation and retrieval practice drills on learning a second language spoken vocabulary, wherein the learners were required to produce the words from memory and given feedback. They conducted two experiments. Two groups of university undergraduates, 41 in one experiment and 59 in another were tested on learning forty Hebrew nouns in two conditions: imitation or retrieval practice. In the imitation condition, participants heard and then repeated aloud each Hebrew word. In the retrieval practice condition, participants tried to produce the name before hearing it. On a final test administered either immediately after training in the imitation condition, or after a two-day delay in the retrieval practice condition, retrieval practice produced better comprehension of the Hebrew words, better ability to produce the Hebrew words, and no loss of pronunciation quality. Kang, Gollan, and Pashler proposed the neural-network model of the test-enhanced learning. According to this model, learning entails a comparison between a desired output and the actual output, upon which the connections between input and output units are adjusted so as to reduce the discrepancy between the desired and actual outputs. During imitation, the error correction mechanism is short-circuited, reducing the efficiency of learning, but when the network is allowed to produce a

response to a cue and then receives feedback during retrieval practice, error correction is facilitated and the learning system reaches the desired state more quickly.

While imitation is generally disparaged in the west, some learners in China ascribe to mimicking as a very effective learning strategy associated to their extremely high level of L2 competence (Ding, 2007). In Ding's research study, interviews were given to three university English-major students who had won prizes in nationwide English-speaking competitions and debate tournaments in China. The interviewees regarded text memorization and mimicking of native target language speaker(s) as the most effective methods of learning English. They said the practice enabled them to attend to the sequences, to borrow these sequences for productive use, to improve pronunciation, and to develop the habit of attending to details of language. Based on these self-reports, Ding concludes that such practice enhances noticing and rehearsal, and hence facilitates second language acquisition. In addition, it affords the learners psychological satisfaction built on their sense of achievement and confidence.

Results of speech turns during repeating after the teacher versus responding to the teacher in the present study appeared to reflect the teacher's practice in balancing the western and eastern teaching pedagogies in language education. Hong Laoshi seemed to recognize the role of imitation in learning a second language, as well as the significance of retrieval practice where the learner is responsible in adjusting oral output to achieve the desired outcome.

In Table 18, speech turn findings on language use situations also provided other information in terms of teaching and learning in this Mandarin immersion

classroom. When I use a balanced literacy framework proposed by Tompkins (2010) to examine these findings, it became apparent that Mandarin immersion teachers were impacted by their own pedagogical background and a lack of instructional resources. Tompkins (2010) described how effective teachers scaffold students' reading and writing experiences through five levels of support, moving from the greatest amount to the least as children assume more and more responsibility for themselves. These five levels include modeled, shared, interactive, guided, and independent reading and writing. Modeled reading and writing refers to teacher modeling how good readers read and how good writers write. Shared reading and writing is when teacher and students read books together or create the text together, but the teacher does the actual reading or writing. Interactive reading and writing is similar to shared, but teacher and students take turns doing the actual reading and writing. During guided reading and writing, teacher plans and teaches reading and writing to small homogeneous groups using instructional-level materials. Independent reading and writing refers to students reading self-selected books independently and writing stories, informational books, and other compositions on their own.

Target language education in the researched classroom differed from English education in terms of the allocation of each level of instructional support illustrated in Tompkins' (2010). Hong Laoshi used more modeled literacy instruction, because in this one-way immersion program very few or none of the students were native speakers of the target language, students relied more on her input. The role of teacher's language modeling was highlighted in this setting. The frequency of the

teacher's input and the opportunities for the students' output needs to be explored

further, especially at the lower grade levels when students just begin learning the

target language.

It is important to note that due to a lack of instructional materials and

experience in differentiated instruction, Hong Laoshi omitted guided reading and

writing suggested in Tompkins' (2010) framework. Small group activities did exist,

but the role of the teacher was not the same as in guided small group literacy

instruction. During small group time in the Mandarin immersion classroom, the

teacher assigned the task and students worked on it in groups. In a way, these small

group activities were equivalent to independent work stations.

During whole group instruction, Hong Laoshi modeled language use and asked

probing questions to facilitate student's understanding of the learning content.

Students repeated after the teacher and responded to the teacher as a group. Data

showed most speech turns occurred when students responded to the teacher in group

situations. The majority of these turns were in Mandarin. When students responded

to the teacher individually, speech turns were not disaggregated into those used during

whole group instruction and those used during one on one conferencing. However,

findings implied that at least 48% of the time, students received whole group

instruction. This percentage increased to more than 74% when looking at Mandarin

speech turns only, which indicated that students spoke more target language during

whole group instruction time. The reason for more target language use during whole

group time could be due to the teacher monitoring student language use more

frequently than during small group activities. In addition, during whole group instruction, the teacher also explicitly communicated language use expectations whereas these expectations were not reinforced during small group activities.

When students used Mandarin, the percentage of speech turns used to respond to another peer decreased as indicated in Table 18. This is consistent with the vocabulary findings that students used more English for conversational or social language use. It also parallels with the finding in linguistic functions. Students did not use much Mandarin for interactional functions.

Looking at the Mandarin speech turns, 524 out of 540 total turns, equivalent to 97%, occurred when students repeated in Mandarin after the teacher. According to the data, in rare situations did Hong Laoshi use blended sentences for students to repeat such as "这是 quarters." (*This is quarters.*). Based on my observation notes, she rarely used English during instruction. During special situations such as a student coming back from the nurse's office, she would converse quietly one on one in English with the person. Though the percentage of Mandarin use during the repeat after the teacher situation may not have reflected the exact ratio of Mandarin use during Hong Laoshi's instruction, it can serve as a good indicator of her target language use in general, which is above the expectations for language educators proposed by ACTFL (2010) that teachers need to use the target language for at least 90% of the time. Further investigation on how she successfully managed to use such a high percentage of target language with students, as young as first-grade, would be valuable to the field of immersion education.

When students repeated after the teacher, most of those speech turns were fragments of a sentence or new vocabulary, sometimes they were transitional songs or rhymes. The teacher provided one word at a time, as she attempted to model segmentation of semantic units in Mandarin. Chunking or segmentation is a foundational reading skill that relates to reading fluency. However, segmentation alone does not necessarily lead to comprehension. A common misconception is that less input reduces the cognitive load in the brain, which makes it easier to comprehend by the learner. On the contrary, isolated input impedes information retrieval due to lack of neural connections (Kang, Gollan, & Pashler, 2013).

Many times students repeated after the teacher together in a group. Only a few times did a focal student repeat after the teacher in a one on one situation. Occasionally, a focal student repeated after the teacher and then elaborated on the repeated content such as in Example 12.

Example 12. [1102LA] (Abelina could not pull up the projector screen because it was stuck. Hong Laoshi pulled it up.)

Abelina: You have magic. How did you do that? She goes like choo-ka-choo-ka-choo.

Abelina: That's why I said I don't want to do it. She has magic.

Hong Laoshi: 你怎么做到？洪老师是哇！洪老师是魔手。 (*How did you do that? Hong Laoshi goes wow! Hong Laoshi is magic hands*.)

Abelina: 魔手。 (*magic hands*)

Abelina: She has magic hands. She turns hands. Ribbit, ur ribbit! (Hopping)

Dustin: 魔手，Magic, magic, turn you into a frog. Freeze.

Abelina: Ribbit. Okay. I'm a human.

Unknown student: Okay. Turn a human to a horse.

Mackay: Magic, magic, turn it into a shark.

In Example 12, Hong Laoshi provided the recast in Mandarin. Abelina repeated the word 魔手. Dustin repeated the word 魔手 and initiated a sentence which demonstrated his comprehension of the new word Hong Laoshi just introduced. Then several students played with the concept of magic. It would be ideal if they used the Chinese word for magic each time when they discussed the concept. This paralleled the findings in immersion classrooms that, instead of acquiring the linguistic form in the target language, students moved on to the next task after they understood the meaning of the form (Cammarata & Tedick, 2012). Cammarata and Tedick (2012) proposed a content-language balanced instructional model in which the immersion lesson flows from a focus on meaning to a focus on form and back to a focus on meaning through language use. According to this model, the teacher would intervene or embed the form-focused mini-lessons in the content-based immersion education. In this model, students would achieve better grammatical accuracy and produce more native-like speech (Cammarata & Tedick, 2012).

This is a very important message to all language educators, not just to immersion educators. The content-language balanced instructional model relates to

the balanced-literacy framework (Tompkins, 2010). In English language education, educators face the same dilemma in balancing semantics and conventions or forms. In reading, some students who can decode do not understand what they read. Some students understand the meaning, but cannot spell. This suggests that the phenomena displayed in the speech sample around 魔手 (*magic hands*) could be a manifestation of linguistic transfer (Cummins, 1979): what students struggled with in the native language became a challenge in the target language as well. The common thread here is the underpinning concept of the relation between thought and language. Linguistic transfer is a double-edged sword. It could positively or negatively influence a learner.

In Table 18, out of the total speech turns, 558 were directed at a peer. Only 56 out of 558 were in Mandarin. That suggested that when the interlocutor was another student, students used mostly English to converse. According to my observational notes, students often conversed with their peers in the native language when the learning activities were less structured. For example, when Hong Laoshi assisted an individual without giving directions to the rest of the class, the class would take it as a signal of social time. When students worked on a collaborative task in small groups and Hong Laoshi was not nearby to reinforce language use expectations, they also socialized in English.

When students socialized with peers, they often used vernaculars like slang, popular children language, and so forth. Tarone and Swain (1995) argued that students socialize with peers in their native language, because they do not know vernaculars in the target language. It is questionable whether teachers should teach

vernaculars in the target language. Tarone and Swain took the position that we should accept that diglossia is inevitable and it is impossible for teachers to teach vernaculars in the target language. Some language educators expressed that it is unrealistic to expect teachers or adults to talk like a student. Besides, it is not possible to decide which vernaculars from which region should be included in the curriculum. I take the sociolinguistic perspective and believe that social structure in society impacts curriculum in terms of whose perspectives are included. If students have voices and a culture of their own, the curriculum should address it. Then it would be meaningful and relevant to the learner. It does not mean the adult has to talk like a child or the curriculum has to cover things that describe every culture in the world. It means that the educator, as the facilitator of learning, provides opportunities for students to construct meaning out of the social context where they are the constituents. For first-graders, it could be simply the Chinese word for Pokémon or a slang word 坏了 (*messed up*) for when a child made a mistake during a game. These words empower learners and add fun to learning. 坏 also means bad. The complexity of a word with multiple semantics increases the learner's linguistic analysis ability. In addition, observational data in the present study evidenced that Hong Laoshi taught some social vernaculars, such as 乐高 (*Lego*), 屁股 (*butt*), but they were not systematically taught or provided in the district curriculum. However, it showed that it is possible to teach vernaculars in the second language. Therefore, the debate should not be whether teachers should teach vernaculars, but rather which vernaculars to include into the curriculum and how they should be embedded and aligned with immersion content.

Facing the challenge that students speak English with peers for socialization, some immersion educators take a structured approach. I observed some classrooms where the teacher increased the teacher-fronted activities and teacher-structured learning opportunities to minimize their students' socializing. If the student was constantly required to complete a Mandarin task they would have limited time to socialize. However, this is based on two assumptions. First, all students follow directions in verbatim. Second, the teacher knows what students need. The former assumption is not realistic. The latter undermines the learner as an agent. Given this, using an instructional structure to control students' socializing is simply a technical solution and a behavioral approach.

In the speech corpus collected in the present study, about 6% of speech turns were classified as private speech. Vygotsky (1987) divided speech into two types – speech directed at other people and speech directed at oneself, known as private speech. At times, private speech is egocentric and the speaker does not take into account the needs of the listener, but more often this speech is for the purpose of self-direction, such as in Example 13:

Example 13.

1. Abelina [1019MA]: I'm just looking for if I have one two three four, oh, there you are. Here.

2. Abelina [1019MA]: Five plus two. Seven. Eight. Six seven eight. This one is eight. There.

3. Abelina [1019MA]: Oh, I already used blue. Why am I using blue again?

4. Abelina [1019MA]: I'm looking for orange. Oh. There it is. 我的 ears.

5. Abelina [1019LA]: 我有上学。 (*I have go to school.*)

6. Mackay [1026MA]: He's not smart. That's right he's not. I am very smart. He doesn't even know how to get past a little kid.

7. Mackay [1026MA]: 一二三四五六七八九，一二三四五六七八九 (*one two three four five six seven eight nine, one two three four five six seven eight nine*)

8. Dustin [1102MA]: Twenty five plus twenty five is forty. (Whispering)

9. Dustin [1102LA]: 猫，谁的，谁的，谁的 (*cat, whose, whose, whose*)

10. Dustin [1109MA]: 偶数，偶数，偶数，偶数 (*even number, even number, even number, even number*)

11. Yan [1109LA]: Oh, I messed up. Let me …

Data suggested that private speech plays a specific role in first-graders' learning. In language development, speech directed at other people continues to be communicative, but private speech becomes increasingly silent. This speech becomes internalized eventually as silent speech and then as thought. Private speech does not end in early childhood. When confronted with a difficult task, older children, even adults talk to themselves at times. As stated in Vygotsky's (1987) investigations, "besides being a means of expression and of release of tension, it [private speech]

soon becomes an instrument of thought in the proper sense – in seeking and planning the solution of a problem" (p. 31).

Self-talk or private speech is a window to a speaker's thought process. Example 13 showed that students used private speech for various purposes, such as calculation, memorization, making an argument, or processing a task at hand.

Sometimes, speakers are unaware of the flaws in their logic. In Example 13, Turn 5 Abelina's sentence contained a grammatical error of which she was likely unaware. Turn 8 indicated that Dustin thought twenty-five plus twenty-five is forty. He did not double check his answer or use strategies to verify his solution. However, the private speech turns revealed the learners' thinking, which provided valuable information, indicating that the classroom teacher needs to adjust her instruction to provide learners the support that is needed.

Private speech turns also help educators to further understand how people learn and how to scaffold learners' concept formation. Several of Dustin's self-talk speech turns involved rote memorization. In Example 13, Turns 9 and 10, he repeated the same Mandarin word in attempt to remember it. This may indicate that memorization is his basic learning strategy. In that case, the implication of this finding is for educators to provide a variety of learning strategies for students to apply in language learning.

Furthermore, the content of private speech also revealed the learner's self-identity. It is important to Mackay that people respect him as a smart child, as shown in Example 13, Turn 6. In addition, it is exciting to notice that in Table 18 four focal

students initiated 570 speech turns during transcribed lessons. Out of those, 202

speech turns were generated in Mandarin. It is important to highlight the quantity of

student-initiated Mandarin turns, because the primary focus of this research is student

Mandarin use. When a student initiated a speech turn, the speaker was in control of

the intentionality and selection of the language form. This language use situation

empowered the speaker.

Due to the uniqueness of student-initiated speech turns, further analyses were

conducted. Table 19 summarized these turns.

Table 19

Four Focal Students' Initiated Speech Turns

Language Type	Number of Turns	Percentage
English	334	59
Mandarin	202	35
Blended	34	6
Total Turns	570	100

Table 19 revealed that first-graders who participated in this research spoke

spontaneously in Mandarin 35% of the time, which is a much greater than the findings

in Ballinger and Lyster's (2011) study. In their cross-sectional study, the first-grade

Native English-speaking students were never observed speaking spontaneously in

Spanish to their teachers. Ballinger and Lyster researched a 50:50 two-way Spanish

immersion program with a one-teacher model. The first-grade teacher in their study teaches both Spanish and English and she changed the language of instruction on a weekly basis. Findings in the present study showed that students in first-grade are capable of initiating a conversation in the target language with their teacher. Further investigation is needed to find out why native English-speaking students in Ballinger and Lyster's first-grade class did not do so even with the presence of many native Spanish-speaking students in class and how this silence impacts their progression of Spanish language use as they move to upper grades.

Type of Vocabulary

The primary finding in regards to type of vocabulary during language use was that focal students spoke more speech turns that contained academic vocabulary (63%) than those of conversational (32%). Further investigations are needed to explore the relationship between the quantity of academic language, the on-task behavior, and the amount of English used during Mandarin instructional time. Table 20 depicts students' vocabulary use in speech turns.

Table 20

Four Focal Students' Vocabulary in Speech Turns

Vocabulary	Number of Turns	Percentage
Academic	1,944	63
Conversational	997	32
*Blended	149	5
Total turns	3,090	100

*Blended Academic and Conversational vocabulary in the same speech turn

When vocabulary types and language types intersect, it provides us information on when English was spoken and when Mandarin was spoken. Table 21 presents details regarding this intersection.

Table 21

Intersect Four Focal Students' Vocabulary Type and Language Type

Vocabulary Type	English		Mandarin		**Blended	
	Turns	%	Turns	%	Turns	%
Academic	170	16	1,672	89	102	68
Conversational	761	72	204	11	32	21
*Blended	129	12	4	0	16	11
Total turns	1,060	100	1,880	100	150	100

*Blended Academic and Conversational vocabulary in the same speech turn

**Blended English and Mandarin language in the same speech turn

Focal students produced 89% of Mandarin speech turns which contained academic vocabulary. This helps predict on-task behavior in the researched classroom. When students used academic language, it was likely that they were on-task.

Data indicated that 72% of English speech turns consisted of conversational, interactional, and social language. This result supported findings from related research that diglossia is reflected in the specialized use of native language and target language, the native language is used for one situation while the target language is reserved primarily for a different situation (Broner, 2000; Parker et al., 1994; Potowski, 2004; Tarone & Swain, 1995).

I was surprised to find out that in comparison to Broner's (2000) and Potowski's (2004) research, the first-grade one-way Mandarin immersion classroom in the present study is more diglossic than the fifth grade Spanish immersion classrooms in their studies. In Broner's investigation, 88% of the total Spanish corpus was for academic use, whereas in this study 89% of the Mandarin was spoken for academic purposes. In Potowski's study, students used English 32% of the time for academic reasons, while in the present study only about 9% of the time academic language was in English using Potowski's formula:

$$\text{Percentage of English use for academics} = \frac{\text{English turns}}{\text{Mandarin turns} + \text{English turns}}$$

Even when I added up English and blended turns used for academic purposes, the proportion is only 15%, which is much lower than findings in Potowski's.

Tarone and Swain (1995) claimed that immersion students would use more English in peer-peer interaction as they move into higher primary grade levels as speech communities become increasingly diglossic. I think it would be interesting to find out what the language use phenomenon looks like in this Mandarin immersion group over time because of its current high level of diglossia.

I consider both linguistic mastery and social identity factors as playing a role in affecting student language use in the first-grade immersion classroom. Tarone and Swain (1995) claimed that students used English for socializing because they do not have the conversational vocabulary in the target language. Potowski (2000) argued that fifth graders in her study were capable to socialize in Spanish, but chose to use English and seemed to use English as a reaffirmation of their 'identity.' Most students in this one-way immersion program have not mastered social language in Mandarin to the point they could carry on a conversation freely with peers. In addition, social identity factors also affect a student's choice of language use.

The individual focal student vocabulary use in speech turns are presented in Table 22-25.

Table 22

Abelina's Vocabulary Use and Language Type

Subject	Vocabulary Type	English	Mandarin	**Blended	Total turns
Mathematics	Academic	49	165	27	241
	Conversational	166	21	5	192
	*Blended	26	0	1	27
	Total turns	241	186	33	460
Language Arts	Academic	35	277	14	326
	Conversational	155	22	8	185
	*Blended	41	1	9	51
	Total turns	231	300	31	562

*Blended Academic and Conversational vocabulary in the same speech turn

**Blended English and Mandarin language in the same speech turn

Table 23

Mackay's Vocabulary Use and Language Type

Subject	Vocabulary Type	English	Mandarin	**Blended	Total turns
Mathematics	Academic	21	76	9	106
	Conversational	96	27	6	129
	*Blended	8	0	1	9
	Total turns	125	103	16	244
Language Arts	Academic	14	107	11	132
	Conversational	101	23	1	125
	*Blended	15	0	0	15
	Total turns	130	130	12	272

*Blended Academic and Conversational vocabulary in the same speech turn

**Blended English and Mandarin language in the same speech turn

Table 24

Dustin's Vocabulary Use and Language Type

Subject	Vocabulary Type	English	Mandarin	**Blended	Total turns
Mathematics	Academic	24	193	12	229
	Conversational	46	18	1	65
	*Blended	14	0	3	17
	Total turns	84	211	16	311
Language Arts	Academic	9	203	12	224
	Conversational	143	18	10	171
	*Blended	14	0	2	16
	Total turns	166	221	24	411

*Blended Academic and Conversational vocabulary in the same speech turn

**Blended English and Mandarin language in the same speech turn

Table 25

Yan's Vocabulary Use and Language Type

Subject	Vocabulary Type	English	Mandarin	**Blended	Total turns
Mathematics	Academic	17	268	17	302
	Conversational	30	40	1	71
	*Blended	1	1	0	2
	Total turns	48	309	18	375
Language Arts	Academic	1	383	0	384
	Conversational	24	35	0	59
	*Blended	10	2	0	12
	Total turns	35	420	0	455

*Blended Academic and Conversational vocabulary in the same speech turn

**Blended English and Mandarin language in the same speech turn

Abelina, Dustin, and Mackay all spoke more Mandarin for academic activities and more English for social conversations. This finding is consistent with other research related to language use (Broner, 2000; Potowski, 2004). Abelina had the highest number of speech turns that contained conversational vocabulary during both mathematics and Language Arts instructional time. Her data supported a typical diglossic speech pattern in which most of her English turns contained conversational vocabulary and an overwhelming majority of her Mandarin turns had academic vocabulary.

Mackay spoke less than other focal students, but during mathematics; he spoke more during social situations than during teacher-fronted academic activities. Mackay's total speech turns that contained academic vocabulary are almost equal to ones that had conversational vocabulary, irrespective of subject areas. Considering that all other students used significantly more academic than conversational language during instructional time, this suggested that it is possible that he was off-task more, because conversational language was often spoken during social situations. When I transcribed the video recorded files, I noticed that Mackay rarely responded to the teacher when students were expected to respond to the teacher with the group. For example, when the teacher said 树干 (*tree trunk*) and expected the students to repeat after her, Mackay did not repeat. When the teacher asked 这是什么？ (*What is this?*) and expected the students to answer in unison, Mackay did not answer, either. However, he did respond when the teacher asked him to share with another student next to him or when the teacher asked him individually. There is a need to further explore the role of culture in the way students respond to aforementioned learning situations.

Dustin's usage of speech turns that blended academic and conversational vocabulary are about the same between mathematics and Language Arts. This indicates that his oral language use is not as biased by the subject areas. His speech turns in each category seemed close to the mean average when I compare four focal students' vocabulary use intersecting language type and subject areas.

Yan is the only exception who spoke more Mandarin for both academic activities and social situations. Her conversational language use was more balanced in language types than other participants in this study. Yan was capable of using either language to carry out the linguistic functions in social settings. It might suggest that using Mandarin at home increased Yan's ability to use it socially at school. Her balance in English and Mandarin might also indicate that her identity was less influenced by the larger context and peer pressure as fifth graders in Broner's (2000) study. This was also supported by the interview data where Yan expressed her pride in being a biracial student and her ability in navigating in two cultures, Chinese and American.

Furthermore, individual focal student's data seemed to support Broner's (2000) results in that not all students exhibited diglossic behaviors that were put forth by Tarone and Swain (1995). In Broner's study, Marvin spoke more Spanish than English in class during both on-task and off-task situations. In the current study, Yan spoke primarily Mandarin for both academic and social situations. This most likely relates to the fact she is half-Chinese half-Caucasian and her mother is a native Mandarin-speaker from mainland China.

Another interesting finding in terms of vocabulary was the words that hinted some aspects of student life at this school. I conducted some word searches in student language use data and the results are worth sharing. When I searched on thank, 谢 (*thank*), 对不起 (*sorry*), 没关系 (*It's ok.*), sorry, 不客气 (*you're welcome*), I found a total of 42 speech turns. When I searched the word 喜欢 (*like*), 爱 (*love*), fun,

cool, like, love, happy, the result was 83. When I search hunger related words, the result was four. When I searched for "don't like", the result was five. For words like tired, stretching, 休息 (*rest*), I received 24 hits. When I searched 疼 (*pain*), 痛 (*pain*), ache, hurt, pain, threw up, nurse, the result was 54. It would be interesting to find out what the norm is in American schools for students to use these vocabularies and the psychology behind them.

In terms of children's social vernaculars, I search for the word like. There were 14 likes used as in "I like everyone's.", five likes as in "I said I don't like it.", and 28 likes as in "Like you say." Results on hiatuses such as "oh", "uh", "um", were 75 items. There were 61 speech turns that were spoken when students were singing or humming.

Through vocabulary searches, the data illustrated 324 minutes of four six-year-old's lives in school. As an educator, it is rewarding to hear students were polite at least 42 times, happy 83 times, and singing 61 times. It is disturbing to know they did not feel well for about 87 times however. From a sociolinguistic perspective, there could be multiple factors relating to these vocabulary search findings, such as nutrition, fall season allergies, social relations with peers, language learning anxiety, sleeping patterns, psychological factors, and so forth.

Grammatical Accuracy

Table 26 summarizes four focal students' language use by grammatical units.

Table 26

Language Use by Grammatical Unit Type

Grammatical Unit Type	Quantity
Word (speech turn)	1,728
Phrases (speech turn)	401
Sentence (complete)	1,299
Sentence (incomplete)	204

In Table 26, I noticed that number of word and phrase speech turns is greater than the number of sentences. According to the Common Core English Language Arts Speaking standards, first-graders are expected to produce complete sentences when appropriate to task and situation (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010). The fact that 2,129 speech turns do not contain a sentence and 204 sentences are incomplete suggested a need to further explore whether using sentences presents challenges for students in immersion classrooms. If it does, I need to investigate what strategies should be implemented in the classroom to mitigate and to support students' learning. The participants in this study only had eleven months of half-day Mandarin instruction. Naturally it is difficult to conceive that students can be expected to meet the same standards for the native language speakers in the target language. However, it is important to find out whether it is reasonable to expect first-graders to speak Mandarin in complete sentences. Therefore, I intersected grammatical data with language type data. Table

27 illustrates findings from such intersections. Quantities for word and phrases are in speech turns. Sentences are extracted from original speech turns and reported.

Table 27

Language Use: Grammatical Unit Type by Language Type

Grammatical Unit Type	English	Mandarin	Blended
Word (speech turn)	208	1500	20
Phrases (speech turn)	135	245	21
Sentence (complete)	893	340	66
Sentence (incomplete)	113	68	23

Note. Blended sentences refer to Mandarin and English.

Table 27 shows more complete sentences were used in English and more word and phrase speech turns were spoken in Mandarin. This phenomenon is predictable considering students have stronger grammatical skills in their native language than in their target language. A large number of English speech turns reflected that students did not always use complete sentences in class. I consider three factors as playing a role in this finding. First, in natural human rhetoric discourse, the goal for linguistic efficiency leads to the reduction of redundancy as shown in Example 14.

Example 14. [1019MA] (Abelina and Yan were coloring.)

Abelina: What color do you think I should make the face?

Yan: Brown.

In Example 14, it made sense that Yan responded with a single word instead of a complete sentence. The complete sentence in this case would be not only redundant but also lacks emphasis on the key word. By using a single word, the word brown was highlighted.

Another reason that students did not use a complete sentence in class could be that sometimes students were interrupted by others and they aborted their original commitment, especially when English was not allowed during Mandarin instructional time.

Furthermore, the data were collected in the fall. These students just started first-grade. They were still working on using complete sentences in their speech. It would be interesting to collect data at the end of the year to compare their progress. The comparison may shed light on how language instruction interfaces with natural language use in the realm of applied linguistics. The underlying assumption for this comparison is that it is important to emphasize that students need to use complete sentences, even though they are learning language to communicate and natural language does not lend itself to always using complete sentences. Here I will attempt to explain why it is important to teach young children complete sentences. Both English and Chinese as language systems have sets of rules that are commonly accepted by the speakers of these languages. For example, a complete sentence contains a set of words with grammatical functions and expresses a complete idea. The difference between an incomplete sentence used by a linguistically proficient adult and a young child is rather distinct. The adult knows the complete sentence and

has selected a sufficient segment to meet the linguistic purpose, whereas a child might have simply mimicked a language use situation without the awareness of what the complete sentence should be. Vygotsky (1987) contended that words may serve as means of communication long before they reach the level of concepts of fully developed thought. It is ill advised for a language educator to assume a young child has the equivalent mastery of language as an adult because they used the same language pattern in the same linguistic situation. It is equally injudicious for an educator to assume the child has the equivalent conceptual understanding as the adult because they solved a problem in the same way.

Before further examining sentence use, I explore the relationship between the grammatical aspects of language use and subject areas. Table 28 summarized the results.

Table 28

Language Use: Grammatical Types and Subject Areas

Grammatical Unit Type	Mathematics	Language Arts
Word (speech turn)	883	845
Phrases (speech turn)	170	231
Sentence (complete)	574	725
Sentence (incomplete)	92	112

Data showed that participants spoke 14% more complete sentences during Language Arts instruction than during mathematics, considering the time ratio between mathematics and Language Arts, 156 minutes to 168 minutes. I then disaggregated these data by each individual focal student, so I could see how language types and subject areas are related to grammatical aspects of the language use. Table 29-32 illustrates the findings.

Table 29

Abelina's Language Use by Grammatical Unit Type

Subject	Grammatical Unit Type	English	Mandarin	Blended	Total
Mathematics	Word (speech turn)	42	176	5	223
	Phrases (speech turn)	37	19	10	66
	Sentence (complete)	271	25	10	306
	Sentence (incomplete)	21	11	1	33
Language Arts	Word (speech turn)	46	213	2	261
	Phrases (speech turn)	31	67	2	100
	Sentence (complete)	199	76	18	293
	Sentence (incomplete)	31	4	4	39

Table 30

Mackay's Language Use by Grammatical Unit Type

Subject	Grammatical Unit Type	English	Mandarin	Blended	Total
Mathematics	Word (speech turn)	38	94	4	136
	Phrases (speech turn)	25	17	1	43
	Sentence (complete)	72	11	8	91
	Sentence (incomplete)	7	4	3	14
Language Arts	Word (speech turn)	20	96	1	117
	Phrases (speech turn)	15	11	0	26
	Sentence (complete)	91	22	2	115
	Sentence (incomplete)	21	11	4	36

Table 31

Dustin's Language Use by Grammatical Unit Type

Subject	Grammatical Unit Type	English	Mandarin	Blended	Total
Mathematics	Word (speech turn)	21	216	1	238
	Phrases (speech turn)	6	19	1	26
	Sentence (complete)	64	25	8	97
	Sentence (incomplete)	13	14	4	31
Language Arts	Word (speech turn)	16	165	3	184
	Phrases (speech turn)	17	28	3	48
	Sentence (complete)	148	41	12	201
	Sentence (incomplete)	16	6	5	27

Table 32

Yan's Language Use by Grammatical Unit Type

Subject	Grammatical Unit Type	English	Mandarin	Blended	Total
Mathematics	Word (speech turn)	23	259	4	286
	Phrases (speech turn)	4	27	4	35
	Sentence (complete)	19	53	8	80
	Sentence (incomplete)	2	10	2	14
Language Arts	Word (speech turn)	2	281	0	283
	Phrases (speech turn)	0	57	0	57
	Sentence (complete)	29	87	0	116
	Sentence (incomplete)	2	8	0	10

Examining Table 29-32, I found Abelina spoke the highest quantity of complete sentences and second to the highest number of complete Mandarin sentences. Yan spoke the highest amount of complete Mandarin sentences, but overall she generated the least amount of complete sentences compared to the other three focal students.

From the ratio of Yan's complete sentences to incomplete sentences, it appeared that she was not a risk-taker with language output. She produced the lowest number of incomplete sentences among all focal students. Yan also produced the highest number of single Mandarin word speech turns (540 turns), such as 可以 (*Okay*.), 下面 (below), and 盒子 (box). This high number of single word speech turns

also relates to the fact that Yan always followed the teacher's directions and repeated after the teacher as expected. The teacher often introduced a word at a time to be repeated.

Abelina and Yan spoke more Mandarin than Dustin and Mackay during Language Arts. During mathematics, Dustin spoke more Mandarin than Abelina. Due to a small sample size, it is important to take caution as one makes a generalization that gender could be a factor here. If it is, it has not been investigated how it impacts students' language output. Mackay spoke the least amount of Mandarin in relation to other focal students.

As to the single phrase speech turns, Abelina produced the greatest number of phrases (166 turns) and the greatest number of Mandarin phrases (86 turns). Example 15 illustrates some sample phrases that Abelina generated.

Example 15.

1. Abelina [1019MA]: 不一样的小朋友 (*different little children*)

2. Abelina [1019MA]: 我的 ears (*my ears*)

3. Abelina [1019LA]: 开了窗 (*opened the window*)

4. Abelina [1026MA]: 加一 (*plus one*)

5. Abelina [1026LA]: 大家好 (*Hello, everyone*)

The phenomenon exhibited in Example 15 could mean two different things pertaining to a beginner in language learning. It is possible that Abelina experimented

with composing words together to make phrases. In Example 15, Phrase 1, she may

have tried to put 不一样的 (*different*) and 小朋友 (*little children*) together because

she predicted that the phrase would make sense. It happened that her prediction was

right and the phrase was grammatically correct. The usage of the phrase in this case

was based on a trial-and-error approach. It is also possible that Abelina remembered

each phrase as a multisyllabic word and was unable to segment the phrases into words.

Using the same example, she could have memorized the phrase 不一样的小朋友

(*different little children*) as a multisyllabic word sounding like

buyiyangdexiaopengyou. She may know the meaning of the phrase, but is totally

unaware of the grammatical function of each component. The usage of the phrase in

this case was similar to a fixed expression or a borrowed phrase. Each *Hanzi* is a

single syllable. Only when a speaker knows the meaning of a Chinese word, can he or

she separate one word from another in language use. Without knowing Abelina's

thought on the composition of this phrase, it remain unknown which explanation

describes her situation.

Looking at all the above grammatical analysis data results, it is fascinating to

see 1,299 complete sentences were produced by first-graders. By default, all 204

incomplete sentences are considered grammatically inaccurate in this present study.

The information on the target language sentence accuracy and actual use situations

helps explain if it is realistic to expect first-graders to use complete sentences in the

target language. The content of language usage helps guide instructional

improvements in helping students achieve a higher level of target language oral

proficiency. Out of 1,299 complete sentences, four focal students spoke 340 in

Mandarin.

Table 33 describes the accuracy of Mandarin sentences and blended sentences

spoken by four focal students during 324 minutes of instruction in Mandarin.

Table 33

Accuracy of Mandarin and Blended Sentences by Four Focal Students

Accuracy	Mandarin Sentences	Blended Sentences
Accurate	295	60
Inaccurate	45	6
Total	340	66

Note. Blended sentences refer to Mandarin and English.

In Table 33, first-graders spoke 87% of Mandarin sentences correctly and 91%

of blended sentences correctly. It would be interesting to find out which type of

sentences was mastered by the learners and which type of sentences was challenging

to first-graders. In addition, observational notes indicated that Hong Laoshi

intentionally prepared students to use complete sentences in expressing ideas. Data

showed focal students initiated 295 complete sentences in Mandarin correctly. This

supports first-graders in meeting Common Core English Language Arts Speaking

standards by producing complete sentences when appropriate to task and situation.

Table 34 displays findings of language use situations relating to accurate

Mandarin or Mandarin and English blended sentences.

Table 34

Language Use Situations for Mandarin or Blended Sentences

Language Use Situations	Mandarin Sentences	Blended Sentences
Repeat/Imitation	152	8
Student-Initiated	143	52
Total	295	60

Data showed 152 out of 295 Mandarin sentences were spoken when focal students repeated after the teacher or chorused with the group. About a similar amount, 143 out of 295 Mandarin sentences were generated by the focal students on their own either when responding to the teacher individually or initiating a conversation with a peer. The length of these sentences ranged from two to 13 *Hanzi*. There were two sentences longer than the ten *Hanzi* as in Example 16. They both were generated during the Language Arts sessions.

Example 16.

Yan [1019LA]: 我的鼻子上面有一个瓢虫。 (*There is a ladybug on my nose*.)

Yan [1026LA]: 你看，我喜欢那个颜色，你喜欢吗？ (*Look, I like that color, do you like it*?)

Some student-initiated Mandarin sentences were used more frequently than others such as summarized in Example 17.

Example 17.

1. 这是什么？(*What is this*?)

2. 我肚子疼。(*My tummy hurt*.)

3. 你喜欢什么动物？(*What animal do you like*?)

4. 谁的鼻子长？(*Whose nose is long*?)

5. 蝴蝶在树干的右边。(*The butterfly is on the right side of the tree trunk*.).

In a teacher-fronted Language Arts activity, Example 17, Sentence 1 was initiated by all four focal students. The frequency of this sentence was the highest, 32 times. When a student could not recognize a Chinese word, he or she was instructed to use this sentence and ask the teacher for pronunciation. Sentence 2 was initiated seven times, because students in this class often used this sentence in requests to use the bathroom. Sentences 3-5 were initiated between four to six times. These sentences were required to be used in a partner share activity. Therefore, they were initiated by each focal student more than once, which indicated that students were on task and that the teacher prepared the learners beforehand so they were able to perform the task.

Some of these Mandarin sentences are grammatically correct, but students mispronounced a word, as in Example 18.

Example 18.

Mackay [1109LA]: 你喜先（欢）什么动物？ (*What animal do you like*?)

Yan [1102MA]: 这是甩（色）子。 (*This is a die*.)

In Example 18, Sentence 1, the word *like* is *Xihuan* in Mandarin, but was mispronounced as *Xixian*, which does not affect the semantics of the utterance. In Sentence 2, the word *die* is *Shaizi* in mainland China, but *Shuaizi* in Taiwan. Hong Laoshi grew up in Taiwan, so her culture influenced the Mandarin used in this immersion classroom. Rather than considering it as a mispronunciation, I refer to it as a cultural enrichment. As learners encounter more Chinese from various cultural backgrounds they will delineate Mandarin through a more cultured lens.

Sometimes when a student mispronounced a word, it became a learning opportunity for the entire learning community such as described in Example 19.

Example 19. [1019LA]

(The teacher asked students to use 上 to make a sentence. 上 means *on top of*.)

Dustin: 身（山）上有一 … 一只羊。 (*There is a ... a goat on top of the hill*.

(The teacher wrote on the whiteboard 身上有一只羊。 *There is a goat on a body*.)

Teacher: 身上有一只羊。 (*There is a goat on a body*.)

Students: 身上有一只羊。 (*There is a goat on a body*.)

Dustin: 洪老师，不是身。 (*Hong Laoshi, it is not Shen*.)

In Example 19, students' output served as an indicator of a learning outcome and an elicitor of interlocutor's input, as well as a main ingredient for interaction. Swain (2000) contended that output puts the learner in control of language use. It enables a collaborative dialogue. Through collaborative dialogue, knowledge can be socially constructed. Language used to articulate the knowledge is acquired during this process. Dustin mispronounced the word *hill*. Hill in Chinese is *shan*, not *shen* that means body. When the teacher wrote an inaccurate word, Dustin requested it to be fixed. This problem-solving collaborative dialogue raised Dustin's awareness of his own language use and puts him in control of his language learning.

Disfluency also occurred in spontaneous Mandarin-speaking in this present study. Some students stuttered and fixed their sentences. I considered these self-corrected sentences as grammatically accurate, such as in Example 20.

Example 20.

Yan [1026MA]: 蝴蝶在，蝴蝶在，树干的左边…N 右边。 (*Butterfly is, butterfly is, at the left side, um, the right side of the tree trunk*.)

Dustin [1109LA]: 你，你喜欢什么动物？ (*You, what animal do you like*?)

Table 35 presented the number of complete Mandarin sentences initiated by each focal student during the observed mathematics and Language Arts instructional time.

Table 35

Mandarin Sentences Initiated by Each Focal Student

Subject	Abelina	Mackay	Dustin	Yan
Mathematics	9	6	5	20
Language Arts	39	13	28	23

Data indicate focal students generated more Mandarin sentences during Language Arts activities. This probably relates to the participant structure and interlocutor as found in Potowski's (2004) study. During Language Arts instructional time, Hong Laoshi structured more teacher-fronted activities than during mathematics. Teacher-fronted lessons tended to result in more student target language use because the teacher was an interlocutor more frequently during teacher fronted lessons (Potowski, 2004).

Yan generated the greatest quantity of Mandarin sentences overall. Her sentences are longer in length with more complexity. However, during Language Arts, Abelina produced a higher number of Mandarin sentences than the other three focal students. That suggests that the more active the student is in speaking, the more opportunities the student has in practicing using Mandarin. Even though Mackay spoke the least amount of Mandarin sentences, he did speak and he spoke one more Mandarin sentence than Dustin during mathematics. There are multiple interpretations of what impacted his language use results. Here I will list three.

First, it is possible that he does not follow teacher-fronted activities as verbatim as other the focal students. During mathematics, when activities are less teacher-fronted, he spoke just about the same amount of Mandarin sentences as the other native English-speaking students, Abelina and Dustin.

Second, Mackay's oral language use results relate to his overall academic performance in the Mandarin class. Though speaking performance does not represent the student's overall language competence, it is related to other skills such as reading, writing, and listening. In L1 acquisition, listening and speaking are acquired prior to reading and writing. However, in second language acquisition, listening and reading, the receptive skills, precede speaking and writing, the productive skills. If a student performs low in speaking, it is possible that the student also struggles in reading. If a student has strength in a particular skill, the teacher could also use his or her strengths and help make connections between skills in improving other skill areas.

Third, the timing of data collection could bias the results. Maybe Mackay did not retain as much Mandarin after the summer vacation. It was challenging for students who do not have access to Chinese resources at home to remember what they learned in kindergarten after more than two months without instruction. Data for the present research was collected in October which is the second month into the new school year. With new teachers on both the English side and Chinese side, maybe he had not transitioned fully into the first-grade. This could have also attributed to his lesser Mandarin oral output in class.

There were four sentence types reflected in the four focal students' Mandarin sentences, statements, commands, exclamations, and questions. Table 36 represents the distribution of student-initiated Mandarin sentences by sentence type. The percentages refer to the proportion of the sentences in that sentence type in relation to the total student-initiated Mandarin sentences.

Table 36

Student-Initiated Mandarin Sentences by Sentence Type

Sentence Type	Number of Sentences	Percentage
Statement	54	38
Command	6	4
Question	81	57
Exclamation	2	1
Total Initiated Mandarin Sentences	143	100

In Table 36, students initiated 57% of Mandarin sentences as interrogative sentences, also known as questions. The most frequently used question was the 什么 (*what*) questions. This word appeared 56 times as in Example 21. Most of them were used during the Language Arts class.

Example 21.

      Mackay [1026LA]: 这是什么？ (*What is this*?)

      Yan [1026LA]: 他们在做什么？ (*What are they doing*?)

      Abelina [1102LA]: 什么圆圆？ (*What is round*?)

      Abelina [1116LA]: 你喜欢什么颜色？ (*What color do you like*?).

Questions with a 吗 at the end are common yes-no questions in Mandarin. They appeared 12 times as in Example 22.

Example 22.

      Yan [1026LA]: 我们可以看书吗？ (*May we read books*?)

      Abelina [1102LA]: 这个是你吗？ (*Is this yours*?)

      Mackay [1102LA]: 我可以休息吗? (*May I take a rest*?).

Example 23 shows other types of questions. Questions with 谁的 (*whose*) appeared seven times. Questions with 在哪里 (*where*) appeared three times. Both *whose* and *where* questions were only initiated during teacher-fronted partner share activities. Questions with 怎么写 (*How to write*) appeared three times.

Example 23.

1. 谁的耳朵小？(*Whose ears are small*?).

2. 瓢虫在哪里？(Where is the ladybug?)

3. 你怎么写朋友？(*How do you write the word 'friend'*?)

4. 怎么写学？(*How to write 'study'*?) .

Not all the interrogative sentence types were used by focal students in the present study. *When* and *which* questions, alternative choice questions, and tag questions were not found in the Mandarin data I collected. They occurred in English, but not in Mandarin. An overall pattern found in the language use data was that students initiated more questions in Mandarin during Language Arts instructional time than mathematics.

In Table 36, students initiated 38% of Mandarin sentences as declarative sentences, also known as statements. I counted the *Hanzi* in each statement. They ranged from three *Hanzi* to 11 *Hanzi* in length. The average length was about five words per sentence. This indicated first-graders in this classroom were comfortable in initiating simple short Mandarin sentences such as in Example 24.

Example 24.

Abelina [1102LA]: 我学过耳朵。 (*I have learned the word 'ear'.*)

Mackay [1102LA]: 我很累。 (*I am very tired.*)

Dustin [1109MA]: 我要休息。 (*I want to take a rest.*)

Dustin [1109LA]: 我也喜欢狗。 (*I also like dogs*.)

Abelina [1116LA]: 我喜欢粉色和白色。 (*I like pink and white*.)

Only 4% of the total student-initiated Mandarin sentences are imperative sentences, also known as commands such as in Example 25.

Example 25.

Abelina [1026LA]: 排队，小朋友。 (*Line up, kids*.)

Abelina [1102LA]: 请你过去一点。 (*Would you please move over a little bit*?).

Abelina [1116MA]: 写少。 (*Write the word 'less'*.)

The remaining one percent of student-initiated Mandarin sentences was exclamations used to express strong feelings, such as in Example 26.

Example 26.

Yan [1019LA]: 太快了！ (*Too fast*!)

Yan [1019LA]: 下雨了！ (*It is raining*!).

According to Table 36, both commands and exclamations were utilized much less than statements or questions. Usually, language educators use commands in great quantity during instruction and immersion students are exposed to high volume of

commands in the target language. It is natural to hypothesize that they would produce commands more easily because they had heard them often. However, findings in this study indicated that only a few commands were generated by focal students. I suspect there are two possible explanations. First, the curriculum in kindergarten and the early first-grade Mandarin program did not address sentence types in a balanced fashion. One way to resolve this issue is to monitor sentence types through the reciprocal process of reading and writing. The first-grade writing curriculum contained informational writing, such as how-to papers. A how-to article explains how something is done. It often presents the information in steps. How-to process writing could be a natural vehicle to teach commands. Second, observed learning activities did not lend themselves well with functions that required such sentence types. Data suggested that exposure to target language alone without explicit teaching may not be sufficient to ensure a desired learning outcome, namely, use of commands. In addition, more oral output opportunities are needed for students to explain a process of doing something or to provide directions for their peers in Mandarin.

Yan learned some Chinese at home and her mother is a native Mandarin-speaker. This helped explain why Yan was the only one who used exclamations in Mandarin. Abelina apparently initiated more commands than other focal students. The choice of sentence structures may relate to a student's personality, verbal interactional context, and their language proficiency level.

Furthermore, I found 66 blended sentences that contained both English and Mandarin among which 60 sentences were grammatically accurate. Out of those 60

accurate sentences, eight were spoken in situations when students repeat after the

teacher or chorus in a group. I was surprised that students would repeat blended

sentences after the teacher. Hong Laoshi used Mandarin 100% of the time according

to my observation field notes. When I double-checked the video and audio record,

Hong Laoshi did say "Nickels 五分钱" (*Nickels are five cents*.). Due to the fact that

Hong Laoshi spoke Mandarin nearly 100% of the time, most of the blended sentences

were initiated by students. This left 52 student-initiated blended sentences to be

analyzed further.

I found that 49 student-initiated blended sentences were English-based

sentences that involved a single word or a borrowed phrase in Mandarin, such as in

Example 27.

Example 27.

Abelina [1019LA]: How do you write 要？？ (*How do you write 'want'*?)

Dustin [1019LA]: You only get to 写字？ (*You only get to write*?)

Yan [1026MA]: 洪老师，he barged in without saying 你可以过去一点吗？

(*Hong Laoshi, he barged in without saying "Would you please move over a*

little?".)

Abelina [1102LA]: I knew her phone number, 一九零四一。 (*I knew her*

phone number, one nine zero four one.)

Dustin [1109LA]: You mean 你喜欢什么动物？ (*You mean what animals do*

you like?)

It is interesting that in Example 27, Yan chose to report or complain to the teacher in English. In Krashen's (1989) theory, Yan's affective filter was high, she was emotional, and she spoke English. It indicated that English was Yan's L1. She could have invested in the identity as a native English-speaking student. It is unknown if this is caused by her linguistic proficiency or the fact that she lives in an English-speaking country.

I found that only three student-initiated blended sentences were Mandarin-based sentences that contained a word or a phrase in English as in Example 28.

Example 28.

Abelina [1019MA]: 这是 nickels. (*This is nickels*.)

Yan [1109MA]: 那个是，是 quarters, quarter. (*That is quarters*.)

Mackay [1102MA]: 我可以休息 after Silvia? (*I can rest after Silvia?*)

Blended sentences are unique sentences. Myers-Scotton (1993) considers the use of a single lexeme from another language as a type of code-switching; other researchers use the term 'borrowing.' In this present study, I consider all sentences with borrowed words or phrases from another language as code-switching. The relation between code-switching and disfluency in spontaneous speech is explored further in the discussion section.

Errors found in code-switching sentences provide classroom teachers valuable information in assessing student learning needs. In the present study, a few types of

errors took place. I conducted an error analysis to examine patterns in Mandarin. During the analysis, I also utilized linguistic theories and an educational lens in exploring the challenges of learning grade level subject-related content in the target language. This error analysis is illustrated in Example 29-34.

Example 29.

Abelina [1116MA]: I'm writing thirty 十三。 (*I'm writing thirty, thirteen.*)

In Example 29 Abelina's sentence, she said she was writing thirty, but the Mandarin word she said was thirteen. In Mandarin, 三十 (*thirty*) and 十三 (*thirteen*) are very similar in forms. They look like the reverse of two Hanzi 三 (*three*) and 十 (*ten*). It is possible that Abelina encountered difficulty in distinguishing between a pair of mirrored images because it is typical for some six-year-olds to confuse the letter *b* with *d* and vice versa. The way to distinguish 三十 (*thirty*) and 十三 (*thirteen*) is by comprehending the semantics of each word. 三十 (*thirty*) is three groups of tens or three tens, so it was arranged as three in the front and ten at the end. 十三 (*thirteen*) means ten and three more, so the arrangement has ten in the front and three afterwards. Abelina's blended sentence does not have grammatical errors, but the content revealed that she needs support in understanding place value and the semantics of Chinese linguistic forms.

Example 30. [1109LA]

Dustin: 我可以擦掉 um and this would be 日。 (*I can erase um … and this would be "sun".*)

Hong Laoshi: 好。 谢谢你。你说擦掉每，擦掉小结，就是一个日。好。谢谢你。(*Right, thank you. You say 'erase the word each, erase the word summary, there will be a day. Okay, thank you.*)

In Example 30, Dustin omitted three words and continued with his sentence. He went up to the front and used his hands to cover up the words he meant to erase. This student used body language in assisting his Mandarin expression. Hong Laoshi responded to the meaning of his speech first by confirming his comment with "Right, thank you." Then she dealt with the linguistic forms and provided the corrective feedback with a recast by filling in the words Dustin omitted 每 (*each*) and 小结 (*summary*). Dustin's blended sentence revealed that he did not know how to say some of the Mandarin words he saw.

Example 31.

Dustin [1109LA]: No. 你，你，你 No, no, first, I say it, and then, he says and then he writes his name. (*No. You, you, you, no, no, first, I say it, and then, he says and then he writes his name.*)

In Example 31, Dustin experienced spontaneous speech disfluency. He originally committed and then he changed his mind. He corrected himself to express the procedure. It appeared that he originally was talking to Student A and changed in the middle of his sentence to direct the comment to Student B.

Example 32.

Mackay [1026MA]: 蝴天 （蝶） on a stem. (*Budderfly <butterfly> on a stem.*)

Mackay [1026MA]: 蝴天 （蝶） on a stick. (*Budderfly <butterfly> on a stick.*)

In Example 32, Mackay mispronounced 蝴蝶. He said蝴天 . The blended sentence is grammatically correct in Mandarin, but incorrect in English. 蝴蝶在树枝上。In Chinese, the subject is directly followed by the prepositional phrase. The verb "is" is not needed. However, in English, the sentence *the butterfly on a stem* is considered as incomplete. Without knowing which language's grammatical rule Mackay intended to follow, I cannot determine the grammatical accuracy of this blended sentence.

Example 33.

Mackay [1102MA]: 我可以休息 after Silvia? (*May I rest after Silvia*?)

Example 33 is another situation where ambiguity existed in a blended sentence. Mackay's sentence appeared to follow the English word order. However, in Chinese, the temporal prepositional phrase needs to be in the front of action verbs. That means the correct grammar is 茜娃完后，我可以休息吗？ (*After Silvia, may I rest*?) in Chinese. 我可以休息吗，茜娃完后？ (*May I rest after Silvia*?) is grammatically incorrect. Maybe Mackay did not know how to say "after Silvia" in Mandarin. Maybe he tried to translate his English into Chinese and the attempt failed at the end. Nevertheless, this example suggested that a student's first language influences second language acquisition.

Example 34.

> Mackay [1026MA]: Okay. 蝴天（蝶）在哪 n. 蝴天（蝶）。 (*Okay. Where is budderfly <butterfly>, budderfly <butterfly>*?)

Example 34 further revealed that Mackay struggled with word order in Mandarin, because it does not always follow English grammatical rules. Linguistic transfer has often been referred to as a positive feature in language immersion education. This is the situation where it presents challenges and causes fossilized errors, incorrect language that becomes a habit and cannot be easily corrected. Long (2003) listed a series of causes for fossilization in the field of Second Language Acquisition discussed by various researchers. Among all the causes, the L1 transfer relates to internal factors.

Linguistic Functions

Four focal students initiated 897 English sentences, 173 Mandarin sentences, and 52 blended sentences. Table 37 presents the number of Mandarin sentences generated by four focal students for each linguistic function. Because I included some grammatically inaccurate sentences, 173 sentences are included in this analysis, out of which 143 are grammatically correct.

Table 37

Linguistic Function in Student-Initiated Mandarin Sentences

Linguistic Function	Number of Sentences	Sample Sentences
Heuristic	45	这是什么？(*What's this?*) 蝴蝶在哪里？(*Where is the butterfly*?)
Informative	32	老鼠的耳朵小。(*The mouse's ears are small.*) 瓢虫在叶子的下面。(*The ladybug is below the leaf.*)
Instrumental	29	我要帮忙，洪老师。(*I need help, Hong Laoshi.*) 我要拿卫生纸。(*I want to get some tissue paper.*)
Interactional	11	丁丁，你还好吗？(*Dustin, are you alright*?) 我喜欢你的鞋子，杰伦。(*I like your shoes, Jaylon.*)
Personal	49	我也喜欢狗。(*I also like dogs.*) 我的肚子疼。(*My tummy hurt.*)
Regulatory	7	请你过去一点。(*Please move over a little.*) 排队，小朋友。(*Line up, children.*)

The role of these sentences serving in a collaborative dialogue (Swain, 2000) was not captured in Table 37. However, it is an important piece of qualitative data to

be reported. For example, when Abelina initiated the sentence 小兔子的耳朵是小。 (*The little rabbits' ears are small*.), her intended function was informative, but Hong Laoshi provided corrective feedback immediately. Abelina then responded to the teacher with a thinking pause. The teacher's input thus became comprehensible. The input and output interconnection helped facilitate thinking and an acquisition of the linguistic concept of 是 (*is*).

In Table 37, the focal students expressed personal and heuristic functions more often in the target language. This means in the present study first-graders generated more Mandarin sentences to give information about themselves and ask for information about things. This finding is different from the results reported by Garcia (2007). She found that the informative function and regulatory function were used much more frequently than other functions in the target language. It indicates that students in her study used more second language to inform about external things and demand actions.

Data also showed that the quantity of Mandarin sentences initiated in four function categories were clustered between 31 and 49. They encompass personal, heuristic, informative, and instrumental functions. Interactional and regulatory functional language use was found to be substantially less than other functions. It suggests that students did not use much Mandarin to interact socially with others or demand actions. This is consistent with the findings represented in Table 20 that most social languages used by the focal students were spoken in English. It also supports

the sentence type findings in Table 36 that only four percent of student-initiated Mandarin sentences were commands.

The balance among linguistic functions found in the present study appears to reflect the balanced approach Hong Laoshi took in her instruction. During mathematics and Language Arts, Hong Laoshi facilitated whole group instruction, student pair share, and student independent seat work. She gradually released responsibility to the students. Sometimes, students who finished their learning tasks earlier were given opportunities to work on a collaborative project with peers in small groups. Because the language expectation in the classroom is 100% Mandarin, students had ample opportunities to use a variety of linguistic functions in Mandarin. The relationship between student language use and the teacher's instructions has been explored in Garcia's (2007) investigation of functional use of the target language. In her study, the teacher for the experimental group implemented specific and well-planned activities to encourage a variety of function use in the immersion classroom. Findings indicated that the number of functions of initiation in the experimental group after the implementation is significantly higher than in the control group. Garcia concluded that classroom activities and the teacher's pedagogical approach affect students' functional language use. This theory helps me explain findings from the current study regarding the relationship between the functional use in Mandarin and Hong Laoshi's instruction.

In Example 35, additional examples are provided to further describe the functional use in Mandarin.

Example 35:

1. Abelina: 谁的鼻子长？（*Whose nose is long*?)

2. Yan: 这个是长方形。（*This one is a rectangle*.)

3. Yan: 洪老师，孙老师可以读一个书给我听吗？（*Hong Laoshi, can Sun Laoshi read a book to me?*)

4. Yan: 洪老师，我要写我。（*Hong Laoshi, I want to write the word I.*)

5. Mackay: 我要喝水。（*I want to drink water.*)

6. Yan: 我要谢谢你。（*I want to thank you*.)

7. Abelina: 我学过耳朵。（I *have learned the word 'ear'.*)

8. Mackay: 我很累。（*I am very tired*.)

9. Abelina: 请你停，卡尔。（*Please stop, Carl*.)

10. Abelina: 写少。（*Write the word LESS*.)

In Example 35, Sentence 1 represents the heuristic function. Sentence 2 is an example of an informative function. Sentences 3-5 are instrumental functions. Sentence 6 is interactional. Sentence 7 and 8 are personal functions. Sentence 9 and 10 are regulatory functions.

It is important to note that these focal students were capable of using multiple forms of Mandarin sentences to express the same function, which demonstrates their flexibility of language use. Acquisition of nuances and the complexity of a language are often the most challenging in foreign language learning. Findings from this

present study suggested that such complexity can be socially acquired at a young age.

Examples from the speech corpus are listed in Example 36.

Example 36.

1) Asking for a turn to take a rest.

Mackay: 我要休息。 (*I want to take a rest*.)

Dustin: 洪老师，我要休息。 (*Hong Laoshi, I want to take a rest*.)

Mackay: 我可以休息吗? (*May I take a rest*?)

Yan: 茜娃完，我可以休息吗？ (*After Silvia, may I take a rest*?)

2) Asking people to move.

Yan: 你可以过去一点吗？ (*Could you move over a little*?)

Yan: 请你，你可以过去一点点吗？ (*Please, could you move over a little bit*?)

Abelina: 请你过去一点。 谢谢你。(*Please move over a little. Thank you*.)

3) Asking to use the bathroom.

Abelina: 上厕所。 (*Use bathroom*.)

Dustin: 我去上厕所。 (*I am going to the bathroom*.)

Dustin: 我要去上厕所。 (*I want to go to the bathroom*.)

Mackay: 我要上厕所。 (*I want to use the bathroom*.)

4) Expressing a tummy ache.

Dustin: 肚子疼。 (*Tummy ache*.)

Yan: 洪老师，我肚子痛。 (*Hong Laoshi, I have a tummy ache*.)

Abelina: 我肚子疼。 (*My tummy hurt*.)

Dustin: 我的肚子疼。 (*My tummy hurt*.)

Yan: 我肚子痛。 (*I have a tummy ache*.)

5) Expressing gratitude.

Mackay: 谢谢。 (*Thanks*.)

Abelina: 谢谢洪老师！ (*Thanks to Hong Laoshi*!)

Abelina: 谢谢你。 (*Thank you*.)

Yan: 我要谢谢你。 (*I want to thank you*.)

In Example 36, functional use Item 3 was asking to use the bathroom. Students used various forms of Mandarin expressions to ask. Based on my experience in mainstream American classrooms, students are often expected to request permission to use the bathroom by asking *May I use the bathroom, please?* However, in the Mandarin classroom I observed, students used statements to express such a need. Culturally, maybe in a Chinese classroom, a biological need to use the bathroom becomes superordinate over linguistic formality, such as social etiquette. However, the use of formal language is expected, such as using the term bathroom.

Table 38 represents the number of Mandarin and English blended sentences generated by four focal students for each linguistic function.

Table 38

Linguistic Functions in Student-Initiated Blended Sentences

Linguistic Function	Number of Sentences	Sample Sentences
Heuristic	5	Why is it all turning to 毛毛虫? (*caterpillars*) That's 洪老师？ (*Hong Laoshi*)
Informative	20	It says 两个洪老师。 (*two Hong Laoshi*) 那个是，是 quarters, quarter. (*That is, is*)
Instrumental	12	He barged in without saying 你可以过去一点吗？ (*Would you move over a little?*) 我可以休息 after Silvia? (*May I take a rest…?*)
Interactional	0	
Personal	12	I changed my 有。 (*have*) I would like 红色. (*red*)
Regulatory	3	Say 猴。 (*monkey*) It's not just you, Mackay. 轮流! (*Take turns*.)

In Table 38, the informative function occurred most frequently. It suggested that in the present study most student-initiated Mandarin and English blended sentences were used to inform about external things.

In order to further understand linguistic functions in student language use, English sentences are also analyzed and the results are represented in Table 39.

Table 39

Linguistic Functions in Student-Initiated English Sentences

Linguistic Function	Number of Sentences	Sample Sentences
Heuristic	95	- What color is the rainbow color?
Informative	220	- My mom said Chinese if Chinese people mess up on a character, they have to erase the whole word. - Also cats don't really have hands, because they really have claws in front of their hand, in front of their feet.
Instrumental	40	- Hey! Give me my spot back.
Interactional	270	- What are you gonna be for Halloween? - Happy Monday! I'm going to one of mine, uh, two of my friends' house.
Personal	228	- I was done way before everybody, but I was showing the teacher. - I showed the nurse that everything hurt in my head.
Regulatory	44	- After you put all the cards in the bag, and then don't forget if you see one on the floor by your chair, just pick it up and put it in your bag.

In Table 39, the interactional, personal, and informative functions were expressed more frequently by the focal students in the native language. This means a substantial amount of English sentences were used by students to interact socially with others, inform about themselves, and inform about external things. Findings from the functional use of Mandarin sentences showed that students used lesser amounts of Mandarin for social interaction purposes. Linking the results, data support diglossia in that students used English for social conversations with others rather than Mandarin during Chinese instructional time in the immersion classroom. Table 40 compares linguistic functions across languages.

Table 40

Linguistic Functions Comparison in All Student-Initiated Sentences

Functions	English		Mandarin		Blended	
	Sentences	%	Sentences	%	Sentences	%
Heuristic	95	11	45	26	5	10
Informative	220	25	32	19	20	38
Instrumental	40	4	29	17	12	23
Interactional	270	30	11	6	0	0
Personal	228	25	49	28	12	23
Regulatory	44	5	7	4	3	6
Total	897	100	173	100	52	100

In Table 40, proportionally speaking, the difference between Mandarin use and English use of the interactional function is the greatest, which suggests diglossia. It supports earlier findings in regards to students' social language use in immersion classrooms. The gap of the heuristic function between Mandarin use and English use, though not as high, is still substantial. Students initiated 25% of Mandarin sentences to ask for information about things whereas only 11% of English sentences were generated for the same purpose.

A very interesting finding was that there seemed to be little difference in the percentages among student-initiated sentences in various language type regarding personal or regulatory functions. With a purpose of investigating this further, I summed the totals of student-initiated sentences under each function in Table 41. The total sentences refer to the sum of English, Mandarin and blended sentences under their specific linguistic function. The percentage was calculated by using the total sentences under a function divided by the total sentences under all functions.

Table 41

Linguistic Functions Summary in All Student-Initiated Sentences

Functions	Total Sentences	Percentage
Heuristic	143	13
Informative	272	24
Instrumental	83	7
Interactional	281	25
Personal	289	26
Regulatory	54	5
Total Functions	1,122	100

In Table 41, I found four functions were used a majority of the time. They encompassed personal, interactional, informative, and heuristic functions. Focal students consistently spoke more for the purpose of informing about themselves or external things, irrespective of language type, because the quantity of sentences under personal and informative functions is higher than other functional use across all language types. It is important to note that the difference between English and Mandarin use for interactional and heuristic functions. Data indicated that focal students initiated more sentences in English for the interactional function whereas they initiated more sentences in Mandarin for the heuristic function. That means students socialize with others in English more than Mandarin and proportionally speaking they used a significant amount of Mandarin in asking for information about things.

It is exciting to see that the quantity of sentences under personal and informative functions is higher than other functional use across all language types. This result suggests that first-graders produced more language about themselves or things around them. Personal and informative functions were also found more common than other functions in both the control and experimental groups in Garcia's (2007) study. However, in her study, after the treatment of intentional teacher-fronted activities in encouraging functional use of language, use of the target language increased in the personal function and even more in the informative function.

Linking the results relating to personal and informative functional use of language from the present study and Garcia's (2007) study, if one considers early childhood development, it is predictable and understandable that first-graders use more language for personal purposes. It is natural for young children at age of six to exhibit egocentric behaviors and perspectives. Piaget (1973) described egocentrism as the inability to differentiate between self and other, whereas Borke (1975) argued that young children were capable of understanding another person's perspective and egocentrism relates to the appropriateness of task difficulty for the age, rather than inability to differentiate between self and other. I think people at all ages are in a continuum of acquiring skills to see multiple perspectives.

Focus Group Interview

On Tuesday, December 1, 2015, at 11:10 a.m. to 11:26 a.m., a focus group interview took place in my office down the hall from the four focal students' classrooms. I interviewed Abelina, Mackay, Dustin, and Yan with questions from the

interview guide adapted from Potowski's (2004) study. This focus group interview focused on four aspects, home language environment, learners' Mandarin learning experience, their perception of their own language learning and language use, and their awareness of language expectations in the classroom.

A total of eight questions were asked in both Mandarin and English. Dustin was the last one to answer the questions, so I repeated the question to him. He did not understand, so I asked in Mandarin 洪老师做什么 (*What did Hong Laoshi do*)？ This seemed to help him visualize Hong Laoshi and relate the question to his personal experience in the Mandarin classroom. The last question was on classroom language expectations, but the four focal students quickly generalized it to classroom expectations and then became very excited about it. They were proud of themselves for knowing all the rules and having the ability to navigate school successfully.

Results revealed consistency within each individual participant's data. They support some of the earlier findings in other categories including overall speech turns, vocabulary, grammatical accuracy, and linguistic functions. However, they also display certain discrepancies that require further discussion in understanding the factors involved.

Table 42 summarized overall turns and word counts in student interview responses.

Table 42

Focal Students' Language Use during Interview Responses

Student Name	Speech Turns	Total Word Count
Abelina	18	372
Mackay	16	173
Dustin	21	194
Yan	14	248

In Table 42, interview response language use data showed that Abelina and Yan used more words in replying to the eight interview questions. Dustin used more sentences, but fewer words than Yan. Data showed that Yan used longer sentences with more complex grammatical structures, such as those containing a subordinate clause(s). It is interesting to recognize that the results in Table 42 parallel actual classroom language use by each focal student in Table 11.

In addition, Yan and Mackay answered all questions in English. Both Abelina and Dustin used Mandarin words at times. For example, Dustin said, "I know 花，羊，um, 龙。 " (*I know flower, sheep, um, dragon.*)

Home language environment and Mandarin learning experience. I analyzed interview data relating to the home language environment and learners' Mandarin learning experience prior to their attendance in the immersion program at the research site. Data revealed that exposure to Mandarin outside the program varied among students. Yan, a half-Chinese and half-Caucasian girl, speaks both English and

Chinese at home. Example 37 illustrates that she has had the most exposure to Mandarin because her mother is a native Mandarin-speaker.

Example 37. [1201Interview]

Interviewer: 你在家里说什么？是说中文还是说英文？ (*What do you speak at home? Chinese or English?*) What language do you speak at home?

Yan: I speak Chinese and English to my family.

Interviewer: Who do you speak Chinese to?

Yan: My mom mostly and sometimes my dad.

Interviewer: Who do you speak English to?

Yan: My brother, cause he doesn't understand Chinese. (Her younger brother is about 4.)

(Later) Interviewer: Is there anyone else with whom you speak Mandarin? 还有谁你跟他说中文？ (*Who else do you speak Chinese with*?)

Yan: I speak Chinese when I'm in China to my grandparents and cousins.

The student with the next highest amount of exposure to Mandarin is Mackay who attended a preschool that offered systematic Chinese enrichment classes. Mackay, an African-American boy, speaks English at home, but he claimed that he sometimes spoke Mandarin to his younger brother who was also learning Mandarin at preschool as mentioned in Example 39.

Example 39. [1201Interview]

Interviewer: How about Mackay? 你说中文吗？(*Do you speak Chinese*?)

Mackay: I speak Chinese to my brother, because he knows Chinese, too.

… …

(A few minutes later)

Interviewer: Did you know any Mandarin before you came to this school?

How did you learn it? 来这里之前，你会不会中文？你在哪里学到的中

文？(*Before you came to this school, did you know any Mandarin? Where*

did you learn it?)

Mackay: I knew Chinese since I was in pre-k, because we used to have, every

Tuesday, we used to have a, a Chinese teacher come teach us Chinese.

Dustin did not start Chinese until he entered Kindergarten, but he was exposed

to Chinese culture during preschool art activities. Dustin, a Caucasian boy, spoke only

English outside the Mandarin classroom. He said he sometimes sang songs in Chinese

at home and he read Chinese on iPads.

Finally, Abelina had the least amount of exposure to Mandarin outside the

immersion program at the research site. Abelina, an African-American girl, spoke

both Creole and English at home. During the interview, she said, "I didn't know any

Chinese before I came to this school and this classroom. When I came to this school, I

went to kindergarten. That's how I knew Chinese." Just recently, she began to

participate in a newly implemented Mandarin Homework Club after school at the

research site. This service was requested by families who lack Mandarin resources at home. Confucius Trainee Xiao Laoshi provided homework support for 30 minutes a day, four days a week.

As a part of the exposure to Mandarin outside the program, data relating to home environment also indicated that the four focal students lacked Chinese materials at home. When I asked them if they read Chinese books at home, Abelina and Yan seemed confused. Mackay simply said he did not have any. Dustin mentioned using technology. Technology in language education plays a unique role in twenty-first century schools. Students who do not have access to hard copy books in foreign languages can sometimes access information through iPads and other digital devices. However, these modern tools cannot replace all Chinese books or other printed literacy materials at home. A survey of 2,986 Americans ages 16 and older was conducted in assessing reader attitudes towards print books and e-books. Findings indicated that people prefer e-books to printed books when they want speedy access and portability, but print wins out when people are reading to children and sharing books with others (Pew Research Center, 2012). In the case of second language materials, lack of resources made digital resources even more appealing to immersion families. However, while digital resources and print resources both hold values in our modern society, it is important as the consumer to have knowledge on how they impact brain and the reader.

Comparing four focal students, Yan has the longest Chinese learning history. Mackay received formal Mandarin instruction at the ages of three and four for 30

minutes a day, four days a week. Dustin did not receive Mandarin instruction, but was

exposed to Chinese culture. Abelina started her Mandarin in kindergarten. She has

the shortest Chinese language learning history. Exposure to Mandarin outside the

immersion program played an important role in students' Mandarin use inside the

classroom. It was expected that Yan produced the most Mandarin among all

participants (729 speech turns). However, the speech corpus collected in the present

research showed that Abelina spoke more Mandarin (486 speech turns) than Dustin

(432 speech turns) and Mackay (233 speech turns). This supports the conclusion that

Genesee and Lindholm-Leary made in their review of two immersion cases (2013)

that time alone cannot account for the target language outcomes. Mackay, in the

present study, had the longest history of learning Mandarin in a school setting, yet he

spoke less in Mandarin than other focal students. On the contrary, Abelina, with the

least exposure to Mandarin prior to enrollment at the researched school, outperformed

her native English-speaking peers. It is important to explore what factors affected her

Mandarin use. Aside from curriculum and instruction, there could be a number of

factors that are associated with students' target language use, encompassing

comprehensible input, collaborative dialogue, social identity, the learners' motivation,

perception, and affect.

       Student perception of their own language use. The learners' motivation and

social identity are related. When a student invests in the identity of being a second

language speaker, the student is more motivated to learn the target language (Norton,

2006). In exploring this concept, I asked the four focal students how important it is to know Mandarin. Example 40 presents their responses.

Example 40. [1201Interview]

Abelina: Really important for me, because I think it's okay for me to learn Chinese. Because when I learn Chinese, I learn more languages.

Mackay: I don't think it's important to learn Chinese, because I would really want to speak Spanish.

Dustin: Well, um, I think it's not important, because I really want to speak Japanese.

Yan: I think it's important to learn Chinese, because if I go to China, if I live in China one day, then, then, and I can't speak Chinese, then the people won't understand me.

In Example 40, Abelina and Yan both expressed positive attitudes toward learning Mandarin. They considered learning Mandarin important. This indicated that when a learner is motivated and perceives the significance of the target language use, he or she is more likely to use the target language. Mackay and Dustin did not think speaking Mandarin was important. Mackay mentioned Spanish. Dustin was in the same room, so his response could be biased by Mackay's reply. They both mentioned another language, Spanish and Japanese. These were not random answers. Spanish is the most spoken second language in the United States. Most dual language immersion

programs in the researched school district are Spanish. In the researched school,

nearly a quarter of the student population is Hispanic. It is reasonable for Mackay to

consider Spanish as a more popular and practical foreign language to learn than

Mandarin. In the same school district, Japanese immersion programs have a longer

history than Mandarin immersion and serve a more affluent community with mostly

Caucasian and Asian ethnic groups. It is unknown why Dustin considered Japanese

more important than Mandarin, maybe it is because his favorite game, Pokémon,

originated from Japan. Nevertheless, Mackay and Dustin appeared less motivated and

did not consider Mandarin important, which may negatively impact their language use

performance in the classroom.

An interesting finding is that girls were more motivated than the boys

according to the interview responses. Due to the limitation of a small sample size,

further investigation is needed to explore the impact of gender on student motivation,

perception, and language use.

During the focus group interview, I also investigated students' perception of

their own language learning experience and language use. Data showed that these

first-graders generally perceived Chinese learning as word study. This learners'

feedback is critical for language educators. The teacher may intend to teach all

aspects of language, but the learner may perceive only a reduced version, the technical

drilling of linguistic structures. It is challenging for the teacher to facilitate concept

development, scaffold the learner's thinking, and provide an experience where

learners can perceive the richness in language learning.

Example 41 is samples of student responses.

Example 41. [1201Interview]

Interviewer: 你的老师中文都教你些什么？ (*What does your Chinese teacher teach you*?)

Abelina: Mostly, mostly we learn how to do, mostly every single word, like if we forget, like 大声, because if she, and now she stapled all the words we know on the wall. So when we forget, we could just look up there and look at the word we forget, because we got play dough, and then we make the word with play dough.

Mackay: We learn say fire in Chinese. We learned, um, I learned two fifty million Chinese.

Dustin: I know 花，羊，um, 龙。 (*flower, goat, dragon*)

Yan: We learn how to write the characters. We learn how to say the characters' name. We learn, um, we learn what it means. And then we can speak Chinese. We know all the words.

In Example 41, the four focal students described what they learned in the Mandarin immersion classroom as examples of Chinese words, the quantity of words, reading, writing, speaking of the words, meaning of the words, word resources, and word study activities.

In Table 43, I compare the four focal students' perceptions to the findings of their Mandarin use in Mandarin classes during the observed sessions.

Table 43

Perception and Actual Findings of Mandarin Use

Categories	Abelina	Mackay	Dustin	Yan
Perception	A lot; always	A little	A lot, but sometimes I forget.	30-40%
Actual Turns	486 (48%)	233(45%)	432 (60%)	729 (88%)

Students' perceptions do not necessarily match the actual findings recorded in the database. According to the percentages, Abelina and Mackay were close, but Abelina felt she always spoke Mandarin, whereas Mackay felt he spoke only a little. According to the actual number of speech turns, Abelina did speak more in Mandarin than Mackay. Yan spoke the most in Mandarin, 88% of the time, but she said, "I think 30%, maybe 40%." Maybe Yan, as a six year old first-grader, does not know percentages well enough to express it accurately. Maybe she has higher expectations for herself. This is consistent with her learner's characteristics exhibited in the video-taped data. Yan always followed directions and stayed on task. She often thought before she spoke. As a learner, she seemed to avoid risk-taking. Speech sample data showed that she spoke less incomplete or inaccurate sentences than other focal

students, her overall total sentence output was the lowest, though the quantity of her

Mandarin sentences and the sentence quality were the highest of four.

Student awareness of language expectations. The last category in the focus

group interview refers to the students' awareness of language expectations in the

classroom. All of the focal students concluded that students sometimes do not know

the words in Chinese, so they speak English during Mandarin class. The awareness of

language expectations is unanimous. They all commented that they felt sad and

frustrated when they could not meet the language expectations. They know Hong

Laoshi expects them to speak Mandarin and she implements a classroom management

system to reinforce such expectations, as described by a participant in Example 42.

Example 42. [1201Interview]

> Abelina: When you speak English, she doesn't even talk or say something, she
>
> just moves, like she grabs your name [a magnet on a whiteboard] and then
>
> she moves it. You talk again, she moves it. And then the X one, that's the
>
> yellow. Again, you don't get King buck. If she moves it again to the pink
>
> paper, she got to call your mom.

Two out of four focal students developed strategies to cope with language

expectations in the Mandarin immersion classroom, such as asking for help or

speaking English quietly, shown in Example 43.

Example 43. [1201Interview]

> Abelina: If you don't know, like the word or something, that you need to see
>
> that's important, you just ask the teacher, or you say that in English,
>
> because usually if we don't know something how to say it, we ask the
>
> teacher, the teacher helps us how to say it in Chinese.
>
> Mackay: Oh. Try to speak it quietly.

Overall, the language expectations and the management system may have impacted student language use positively. The actual relationship and how much impact it is making are to be further investigated.

Mackay's case is unique. He is aware of his language learning history. When explaining why some students speak English in class, Mackay exhibited greater confidence than the other focal students. Yet, he spoke less Mandarin than the other three. When he measured his language use, his descriptor was 'a little' (45%). His coping strategy matches the video-recorded data. He did speak English quietly and skipped repeating after the teacher or when responding with the group. In a way, he played as the invisible boy. The Mandarin immersion curriculum is aligned to the English side in terms of mathematics. In terms of Language Arts, the lesson delivery structure is also aligned with the English side. Further alignment is also in progress. If the current curriculum, instruction, and assessment are biased, culturally, more research is needed in order to develop a learning environment to better meet the needs of African American learners.

Furthermore, Abelina had a different attitude towards Mandarin learning, a different approach to learning in class, and a different strategy in dealing with struggling situations. She and Mackay both are African-American learners, but she spoke much more Mandarin than Mackay who had a longer history of learning Mandarin. Not all African-American learners are the same, but it is valid and urgent for educators to find ways to support this historically underserved population. If schools do not keep up with the demand, a wonderful young student like Mackay will eventually lose the confidence he has expressed in Example 44.

Example 44. [1201Interview]

> Mackay: Um, I think some kids don't know as much Chinese as me, because I've been learning since pre-k and kindergarten and first-grade. Might be 100, but a lot of people they don't know Chinese.
>
> Interviewer: Is that why those people speak English in your class?
>
> Mackay: Yeah.

I emailed the participating teacher a short version of this research study and included the sections that were related to data collection, results, and conclusions. She was given two weeks to read them and provide me feedback on whether the data results "ring-true." I also asked her if my interpretation of the data and conclusions seemed accurate.

Her reply was "it looks good. Nothing needs to be changed". She expressed gratitude for being a part of this research and said, "I learned a lot from your research and findings."

In terms of language use, she did question whether all English concepts should be translated into Chinese during Mandarin instructional time. For example, U.S. coins are not circulated in China, so what reason is there to teach the Chinese word for them? Her input was valuable because it indicated that she was aware of her language use and rationale for her language choice. This also has implications for immersion teacher professional development. Teachers need opportunities to discuss with colleagues what language to use and why, as well as techniques to make the input comprehensible. At the school district department level, in-service teachers need support on ways to increase target language use without being detrimental to students' conceptual understanding (LeLoup, Ponterio, & Warford, 2013).

Chapter Five: Discussion and Conclusions

In this chapter, I will first summarize the whole research study. Then I will interpret each individual focal student's language use with multiple theories. Next I will discuss major themes that interconnect findings presented in the previous chapter. Finally I will present some limitations and implications of the study.

One of the greatest challenges for immersion teachers today is to keep their students using the target language (Fortune, 2012). Broner (2000) and Potowski (2004) both conducted systematic language use research in fifth-grade Spanish immersion classrooms. No such research as theirs has taken place in a Mandarin immersion setting. This research gap inspired me to investigate how four first-grade students in a one-way fifty-fifty Mandarin immersion classroom in an urban public school in the Northwest United States orally use Mandarin when learning mathematics and Language Arts.

Methodologically, I employed a combination of interaction analysis and constitutive ethnography that is qualitative in design. I video- and audio- recorded one mathematics lesson and one Language Arts lesson per week for a month. Four focal students were fitted with lapel microphones and taped. Afterwards I conducted a semi-structured focus group interview to collect additional data in relation to student language use.

The speech corpus included a total of 3,090 speech turns during 156 minutes in mathematics and 168 minutes in Language Arts. Phase One analysis focused on the number of speech turns, vocabulary, grammar, and linguistic functions. Phase Two

analysis focused on interview findings and additional information that emerged from observations. Results showed that students used Mandarin 61% of the time. Participants used more Mandarin during Language Arts (63%) than during mathematics (58%). Out of the total language use, 1,880 speech turns were in Mandarin. They were spoken during various situations. Students generated more Mandarin turns during whole group instructional activities. They spoke more in the native language when the interlocutor was a peer and more in the target language when the interlocutor was the teacher.

As to vocabulary, students produced more academic than conversational speech turns that indicate that they were mostly on-task. Eighty-six percent of the academic speech turns were in Mandarin while seventy-six percent of the conversational speech turns were in English.

Regarding grammar, 1,728 speech turns were single word turns. Among 1,296 complete sentences, 295 were in Mandarin. Students initiated 143 accurate Mandarin sentences and 52 grammatically correct blended sentences. More Mandarin or blended sentences were produced during Language Arts. These sentences varied in length, but were grade-level appropriate. They covered all sentence types including statements, commands, exclamations, and questions, though not all categories under each type were addressed. Error analysis and blended sentences revealed nuances in Mandarin learning and the challenges students encountered.

When looking at linguistic functions, students consistently spoke more for the purpose of informing about themselves or external things irrespective of language type.

They initiated more sentences in English for the purpose of social interaction with others whereas they initiated more sentences in Mandarin to ask for information about things.

The individual focal student data supported the general pattern in the main speech corpus, with only a few variations due to learner differences. Abelina spoke the most overall, but Yan spoke the most in Mandarin. Yan was the only student who used more Mandarin than English during social conversations. Mackay spoke the least overall and also the least in Mandarin. All focal students initiated Mandarin sentences and used them appropriately in a real-life context. Yan's sentences were longer and of better quality in comparison to the other three focal students.

Interview data provided additional information on home language environment, learners' Mandarin learning experience, their perception of language use, and their awareness of language expectations. Yan is half Chinese. She traveled to China and talked to relatives in Chinese. Mackay had the longest Mandarin learning experience, but he was not as motivated as Yan with her Chinese heritage. Abelina had no Chinese access at home, but she did have a positive attitude, a Creole cultural background, and effective learning strategies. Dustin was totally dependent on Mandarin instruction at school.

By examining findings from different categories, vocabulary, grammar, and linguistic functions, results were shown to be interrelated. Conversational vocabulary was related to interactional and regulatory functions. Linguistic functions were often used when students initiated sentences. Student target language use data reflected

student motivation, the teacher's target language use, and language use expectations. Findings were consistent and cohesive.

Compared to other language use research, the percentage of student Mandarin use in the present study, 61%, is higher than Potowski's (2004) 56% and slightly lower than Broner's (2000) 63%. Results from the present study supported the diglossic phenomena in immersion classrooms also found in Broner's, Potowski's, and Tarone and Swain's (1995). They were consistent with findings in Broner's and Potowski's such as the following: 1) Overall, students used more target language during L2 instruction in the immersion classrooms; 2) Students spoke more English during social interactions with peers; 3) Students spoke more in the L2 when the interlocutor was the teacher; 4) Students spoke more in the L2 during instruction of a language-related subject (Broner); 5) Students spoke more in the L2 during instruction with teacher-fronted language activities (Potowski); 6) Girls spoke more in the L2 than boys (Potowski).

When contrasting findings from the present research to other related language use research, a few differences are worth noting: 1) Four first-graders in the Mandarin immersion classroom generated more spontaneous speech than first-graders in Ballinger and Lyster's (2011) study; 2) Students in the current study used more personal and heuristic functions in Mandarin whereas Garcia (2007) found that informative and regulatory functions were used more in the target language. 3) Broner's (2000) three participants were all from Caucasian middle-class native

English-speaking families. The four focal students in the present study are much more heterogeneous in terms of cultural, linguistic, social, and racial backgrounds.

Potowski's (2004) participants reflected a similar diversity as focal students in the present study. She used a sociocultural perspective to examine the relationship between language use and social identity. I built upon her ideas, examined each individual focal student's language use through an educator's lens, and also incorporated several linguistic theories such as Krashen's (1982) input hypothesis, Swain's (2000) collaborative dialogue, and Cummins' (1979) linguistic transfer theories.

Abelina is an African-American girl who also speaks Creole at home. She is proud of her heritage and occasionally speaks Creole in class. Abelina thinks learning Mandarin is important, because it is good to learn multiple languages. In class, she is an active thinker and participant. When she spoke Creole, she was aware that the Mandarin teacher might not understand, so she paraphrased it for the listeners. Abelina focused on the semantics of language, rather than rote memorization of the linguistic form. She knew the language use and behavioral expectations in the Mandarin classroom. When she faced challenges, she knew how to access resources. Data showed that she used strategies such as using a wall chart, posing questions, and asking for assistance from the teacher or peers. Abelina took pride in the fact she could speak 'a lot' of Mandarin. As a student with only eleven months of Mandarin instruction and no access to Chinese resources at home, she blossomed in this language immersion setting.

Linguistically speaking, Abelina had a long history of navigating a multilingual environment and she has developed skills such as paraphrasing, communicative competence (Celce-Murcia, Dornyei, & Thurrell, 1995), and acculturation. These skills are transferrable from Creole to English to Mandarin (Cummins, 1979). Socially, she took pride in her heritage and African-American culture. At the same time, she was open to other cultures and languages. Therefore, she had a low affective filter and was more receptive to comprehensible input (Krashen, 1982). The linguistic skills she gained through growing up in a multicultural environment brought her success at school, which boosted her confidence in learning. Consequently she invested in the identity of being a Mandarin-speaker, a multi-cultural multilingual first-grader, and a know-how girl. In corollary, her Mandarin output was the highest among the three native English-speaking focal students.

Mackay is also an African-American student. He attended a federally-funded preschool that mainly serves low-income African-American families. At that preschool, he received some Mandarin instruction from a certified teacher from China. Later, he enrolled in the immersion program and received eleven months of systematic Mandarin instruction at the research site. Mackay's little brother also learns Mandarin. According to the interview data, Mackay spoke the target language at home to him. Mackay had confidence in himself, but was also aware that he did not speak much Mandarin in class. He had no access to Chinese resources at home, but he was proud of himself being smart and more experienced in Mandarin learning than other children

in class. Mackay spoke more Mandarin percentage-wise during mathematics than the other three focal students. Mackay often sang Michael Jackson or other hip-hop songs in class. He said he did not think Mandarin was as important as Spanish and he really wanted to learn Spanish. This made sense because the school where the research took place has a large Spanish-speaking student population and a small Asian population. Many families did request a Spanish immersion program, but due to feasibility, the school district decided to implement a Mandarin program on site. Mackay was aware that more people spoke Spanish than Mandarin in his community. He was also aware of school rules and teacher's expectations. Mackay was strategic. He knew the teacher expected him to speak Mandarin, so he mentioned in the interview that he would, "try to speak it [English] quietly." He did sing Michael Jackson quietly and avoided being caught speaking English. Mackay rarely repeated Chinese words the teacher expected him to repeat with a group, nor did he respond to the teacher with the group. Mackay spoke the least overall among the four focal students and he produced the least amount of Mandarin as well.

From the vantage point of Krashen's (1982) comprehensible input, Hong Laoshi used Total Physical Response techniques, visual cartooning, step-by-step guidance, and monitored her language input such as speed, wait time, chunking information, and other techniques. She also carefully planned each lesson to make sure students understood the instruction, expectation, and performance tasks. Mackay did not exhibit any anxiety or a confidence issue. His affect filter should have been low. However, the comprehensible input and affective filter alone are insufficient in

explaining why Mackay spoke the least amount of Mandarin in class. He is a very smart child who was very aware of his surroundings, social context, and linguistic context. Mackay took pride in his African-American culture. He invested in the identity of being popular and being smart. His strategies to navigate school could be a way of being smart. He has not focused on linguistic skills, because the social need trumped the target language learning need. Another factor was the curriculum and instruction. The curriculum had not been designed to be real, rigorous, relevant, and relational to Mackay. The mathematics curriculum was nearly scripted and the Language Arts curriculum was limited by resources. In this Mandarin classroom, nearly all materials did not reflect an African-American culture. The only book available in Mandarin was *the Snowy Day* by Ezra Jack Keats. The story was written in 1962. The reading level of its Chinese translation is well above first-grade, though the interest level is appropriate. Hong Laoshi is a very skilled teacher, but her instruction was limited by the district curriculum. She modified learning activities to allow students' input, but for Mackay, he needed more than that. Further investigations are required to determine what Mackay needs to reach his full potential at school.

Yan is a biracial child. Her mother is a native Mandarin-speaker. Her father is a Caucasian who speaks limited Chinese, but has a great interest in Chinese culture. Yan is very proud of her heritage and cultural identity. She mentioned her visit to China and speaking Chinese to relatives there. Her mother taught her some Chinese at home. At school, she always followed the teacher's directions and participated in all

learning activities. She was also very humble and polite to other peers. When I asked her how much Chinese she spoke, she said 30-40%. Yan always took time to think before she spoke, so she made fewer errors in initiating sentences. She liked all the school activities, such as singing, coloring, learning new words, and reading books. During one observation, she asked me to read her a Chinese book on volcanoes, which might suggest that she considered science important.

I am Chinese myself, so I tried not to over-analyze her data. It is impossible to separate myself from Yan. She reminded me of wanting to follow all the rules in America, wanting to be humble, wanting to avoid making mistakes in public and wanting to be good at mathematics and science. In a way, that is considered to be a good student in China. I often struggled when the image of being proper in one culture is viewed less proper in another, which made me feel socially unfit at times. I examined Yan's behavior. She was living in a multicultural environment. Celebrating her cultural identity was the best way to fit in.

From an educational point of view, the Mandarin immersion program is critical for students like Yan who have a Chinese heritage. The Chinese population, economy, and language should not be neglected in the world. Chinese culture has a long history filled with many celebrated scholars, scientists, and elites in various fields. The descendants of Chinese have the right to access its language and culture. Unfortunately, unlike Yan, many Chinese children did not and still do not have the opportunity to access formal schooling in the Chinese language. Though it is not perfect, the curriculum and instruction in the researched Mandarin immersion

classrooms were relevant to Yan at a personal level. Her effort at being a good student matched the messages in some Chinese materials introduced at school. It is predictable that she produced the most Mandarin among all four focal students and longer sentences as well. I am curious about how she performs in the English classroom in terms of her language output.

Language use data suggested that Yan's language choice might have been affected by multiple factors including diglossia, language proficiency, and language use situations. Tarone and Swain (1995) stated that it is predictable that immersion students would use English in peer-peer interactions as they move into higher primary grade levels if one takes a sociolinguistic perspective on immersion classrooms, viewing them as speech communities that become increasingly diglossic over time. Diglossia already existed in the Mandarin immersion classroom where the present research took place. Students did choose what language to use accordingly. The first-graders I interviewed unanimously thought that language proficiency was the key factor. That is probably the main factor for most first-graders. However, when I interviewed four focal students, though I asked questions in both English and Mandarin, Yan answered all of them in English only. This suggested that Yan judged the situation as an English-only situation.

Tarone and Swain (1995) suggested that the notions of input and output may be too simple. They are not sufficient in explaining the complexity of language choice and language learning in an increasingly diglossic speech community. A sociolinguistic perspective leads us to examine what types of the target language input

and output are involved and to what purposes the target language is used in immersion classrooms. I agree with Tarone and Swain. In my present study, I looked at the vocabulary, the grammar, the types of sentences, the language use situations, the linguistic functions of student-initiated sentences, and the content of their language, such as whose song the focal student was singing quietly that only the lapel microphone could pick-up. It provided me rich information that posed critical questions such as how we might better serve historically underserved populations, specifically, African-American students in immersion classrooms and mainstream classrooms. The fact that Yan chose what language to speak in school at the age of six led me to wonder whether she will still be the one who produces the most Mandarin turns in class when she is in the eighth-grade. It is important to start cultivating their Mandarin-speaking identity and maintain the investment in such an identity.

It is important to notice Dustin's language use, because the quantity of his language use was very close to the average of the four focal students. Dustin is a six-year-old Caucasian boy from a native English-speaking family. He had not taken Chinese classes prior to his enrollment at the current immersion program in September 2014, but he said he was exposed to Chinese culture through art at preschool. Dustin did not speak Chinese outside school or attend the afterschool Mandarin homework club. Neither did he have Chinese books at home. His learning depended on the classroom for second language acquisition. Dustin followed the teacher's directions most of the time. In class, he participated in learning activities. He often noticed things on the whiteboard, either a word the teacher wrote, a pattern, or a recognizable

word. He did rely on memorization at times. Dustin enjoyed songs, toys, games, playing, and used his iPad at home to support his Chinese learning. He was curious about the Japanese language and he liked Pokémon. He did not speak as much Chinese as Abelina and Yan, and he exhibited the most disfluencies in his spontaneous speech. However, he was confident and he spoke 60% of the time in Mandarin. Dustin was aware of the language use expectations and complied with rules.

Dustin responded to instructional techniques that were intended to make the target language comprehensible. Hong Laoshi's approach of providing multi-sensory input helped Dustin understand the tasks in Mandarin. When Dustin produced an incomplete output, the teacher provided a recast, an input, as corrective feedback to facilitate his understanding of the language. In a language classroom, these collaborative dialogues need to be more structured, otherwise, the dialogue could end too early and the concept would be underdeveloped or undeveloped (Swain, 2000). From a linguistic transfer angle, he benefited from curriculum alignment. The same concepts were taught in both Mandarin and English in two different classrooms through two different activities by two different teachers, Hong Laoshi and Ms. Smith. Socially, Dustin's investment in identity seemed to be to simply fit in as a first-grader. Being able to speak another language is cool and a means to fit in the Mandarin immersion classroom. Thus, he worked at it and spoke 60% of the time in Mandarin.

In conclusion, several major themes emerged and interconnected in this research study. They include diglossia, linguistic transfer, developmental stages, curriculum and instruction, as well as culture and identity.

Diglossia in Immersion Classrooms

Language use findings in this research study supported diglossia in the immersion classroom. Tarone and Swain (1995) defined a diglossic situation as "one in which a second language is the superordinate, formal language variety, and the native language is reserved for use in informal social interactions" (p. 166). Diglossia was found in several immersion research studies. Heitzman (1993) and Parker et al. (1994) found that the target language was only used on tasks, but never socially among students. Broner (2000) documented that students tended to use the target language only in structured task-oriented activities. Potowski (2004) also found that students used the target language for fulfilling mostly academic functions and rarely for socializing. In the current study, focal students produced 89% of Mandarin speech turns that contained academic vocabulary. Looking at linguistic functions, 96% of interactional functions were expressed in English.

Tarone and Swain (1995) argued that cognitive difficulty alone could not explain the complexity of diglossia in language immersion classrooms. They contended, in considering the immersion classroom as a speech community, academic style and vernacular style both play a significant role. However, curriculum and instruction have not addressed vernaculars in the target language sufficiently enough for a student to carry out a social conversation. Therefore, students socialized in the native language. This diglossic situation undergoes language change with increasing pressure over time. This pressure originates from social needs that become increasingly important to pre-adolescents and adolescents. Hence, there seems to be a

tendency to use the native language more in the upper grade levels (e.g., fifth grade) than in the lower grade levels (e.g., second grade).

In the present study, first-graders already exhibited diglossic behaviors. Mandarin, as the institutional language, became superordinate and students used it for academic purposes. Even though students were aware of the language expectations, social conversations were mostly carried out in English, their native language. Three factors could have caused this phenomenon.

First, students had not learned enough vernaculars in Mandarin in a peer-peer setting. Hong Laoshi, as an authority figure, interacted most of the time with her students at a formal level in Mandarin which included giving directions, posing questions, and teaching subject area content. Once in a while, she conversed with students on topics related to students' life in Mandarin such as Legos, toys, safety, and health-related topics. However, during these conversations students were bound in this speech community by social constraints for appropriateness. During peer-peer situations, the lack of an authority figure permitted a different level of socializing. Dustin talked about his "fart club," a typical kid behavior. Of course, these were not introduced in the immersion language curriculum.

Second, peer-peer interactions were monitored less in the classroom. Sometimes a small group task could be challenging when it contained multiple steps or demanded management. Some students were off-task due to a lack of task-management skills. If Hong Laoshi stayed with one group, the other groups may or may have not stayed on-task. As a result, off-task conversations were carried out in

English. This does not mean that a teacher should only assign simple tasks to small

groups. Rather, the teacher may scaffold task-management skills and monitor each

small group in a more frequent fashion.

Third, a student's culture played a large role in peer-peer conversations. Even

during small group learning activity time, some students' culture was more relational,

so they focused on peers rather than a task.

Broner (2000) and I found that not all learners exhibited diglossic behaviors.

Yan spoke Mandarin for both academic and social purposes. Potowski (2004) used

Norton's (2000) identity theory to explain students' language use. Yan was highly

invested in the identity of being a Mandarin speaker; therefore, she spoke Mandarin

most of the time during my observations. Culturally she may have regarded

respecting the teacher and meeting language expectations as criteria for being a good

student. She invested in being a good student, so she obeyed rules. It was apparent

that this rule was attached to the setting, because during the focus group interview

outside Hong Laoshi's classroom, she answered all the questions in English.

Diglossia may be a norm in immersion classrooms. From a language

educator's point of view, it is important to extend target language output opportunities

during instructional time. This means limiting social conversations in the native

language. Target language instructional time is already limited. The reduction of

socializing in English would not be a detriment to their social development. One of

the powerful contributions a qualitative study can make is to investigate the outlier

through a purposeful sampling. In this case, Yan was the outlier. Immersion

educators may consider ways to limit social conversations in English. For example, teaching vernaculars in the target language, promoting the identity of being a target language speaker, strengthening peer-peer activities, and learning more about speech community dynamics. In a speech community, participants shared universal constraints including social constraints and linguistic constraints. Constraints refer to assumptions that language learners make that limit the alternative meanings that they attribute to new words (Levine & Munsch, 2010). Social constraints relate to gender, age, and ethnicity. Linguistic constraints relate to word choice, accent, and so forth. The language educator plays a significant role in this community as an authority figure.

Linguistic Transfer

Language use findings in this research study support linguistic transfer theory. Cummins (1980) stated that "to the extent that instruction in Lx is effective in promoting proficiency in Lx, transfer of this proficiency to Ly will occur provided there is adequate exposure to Ly (either in school or environment) and adequate motivation to learn Ly" (p. 90). By proficiency, he meant the common underlying proficiency, the cognitive and academic knowledge and abilities that underlie academic performance in both languages. Thus, linguistic transfer refers to the transfer of the common underlying proficiency from one language to another. Cummins listed five types of possible transfers, depending on the sociolinguistic situation: (a) conceptual elements (e.g., understanding the concept of photosynthesis); (b) metacognitive and metalinguistic strategies (e.g., strategies of visualizing, use of graphic organizers, mnemonic devices, vocabulary acquisition strategies); (c)

pragmatic aspects of language use (e.g., willingness to take risks in communication through L2, ability to use paralinguistic features such as gestures to aid communication); (d) specific linguistic elements (knowledge of the meaning of photo in photosynthesis); and (e) phonological awareness--the knowledge that words are composed of distinct sounds.

However, this transfer can have both favorable and unfavorable consequences. On one hand, it could strengthen conceptual acquisition. On the other hand, it may cause fossilized errors. In the current study, data indicated that both types of transfer occurred. In the case of fossilization, errors only become fossilized if they are not corrected. Llinares and Lyster (2014) compared the frequency and distribution of different types of corrective feedback and learner uptake in three instructional settings: English immersion classrooms in Spain, French immersion classrooms in Canada, and Japanese immersion classrooms in the US. Learner uptake refers to a range of possible responses made by students following corrective feedback. These responses could be utterances with repair or utterances still in need of repair. Findings revealed that teachers used diverse corrective feedback including recasts, prompts and explicit correction. In English immersion classrooms, recasts were much more effective than either prompts or explicit correction at leading to immediate repair. In French immersion classrooms, recasts were the least effective relative to prompts and explicit correction. In Japanese immersion classrooms, recasts, prompts and explicit correction all led to similar proportions of repair. Llinares and Lyster (2014) attributed the success of recasts at leading to repair to the explicit nature of the

teachers' corrective feedback. This suggested that language educators need to provide explicit corrective feedback that requires students to uptake or to restate an utterance with the correct usage in order to avoid fossilization in second language acquisition.

In addition, some researchers believe that linguistic transfer does not happen naturally. Biliteracy requires the strategic use of both languages. Teachers must use "bridging," explicit instruction where the teacher guides the students to make the linguistic transfer (Beeman & Urow, 2012). Beeman and Urow (2012) pointed out that the bridge needs to be pre-planned, making cross-linguistic connections, and focusing on metalinguistic analysis including phonology, morphology, syntax, grammar, and pragmatics or language use. For example, Hong Laoshi may use a graphic organizer such as a T-Chart to compare and contrast a complete English sentence and a complete Chinese sentence.

A very important finding from my research relates to the "sociolinguistic situation" Cummins (2005) mentioned. The African-American girl, Abelina, with the least exposure to Mandarin prior to enrollment at the researched school outperformed her native English-speaking peers. Her motivation, learning strategies, social identity, and Creole background may have contributed to her success. These sociolinguistic factors mediated linguistic transfer. Data from the present research illustrated such a process. According to the interview responses, Abelina said she speaks Creole to her grandma, her mom, her little brother, and herself. This home culture was reflected in the video-recorded data from the observed Mandarin classes, such as in Example 45.

Example 45. [1116MA]

(Hong Laoshi drew a circle on the board.)

      Abelina: Ooh, she maya big, m-m-m.

(Abelina raised her hand and Hong Laoshi called on her.)

      Abelina: You are trying to go it fast, that's why you made it look like a big big

          carpet, a humongous parket, a carpet where I've never seen in my whole

          entire life.

In Example 45, Abelina spoke Creole in class and then she paraphrased it in English for the teacher to understand. Apparently as a Creole-speaker, she naturally acquired the paraphrasing skill to communicate with English-speakers. This linguistic skill that she acquired in the process of learning English was transferred into Mandarin acquisition, which was supported by classroom observation data as in Example 46.

Example 46.

      Hong Laoshi: 请你们写中文名字。 (*Class, please write your Chinese name*.)

      Abelina: That means Chinese name.

In Example 46, Abelina's quick response to the teacher's Mandarin directions went beyond merely an action to follow the instructions. She translated the Chinese to English to help facilitate other students' understanding. It was likely that her experience of navigating between Creole and English, and between various cultures in

her life, primed her in Mandarin learning. Her skills in communicating in a multilingual context were transferred to the Mandarin classroom. This could be the very key to her success in oral language use.

Developmental Stages

Language use findings in this research study illustrated four types of development: concept development (Vygotsky, 1987), psychosocial development (Erikson, 1968), cognitive development (Piaget, 1973), and language development (Levine & Munsch, 2010).

A teacher needs to have knowledge of concept development to be able to scaffold students' learning. Vygotsky (1987) explained that concepts are layered in three phases. First, the meaning of a given artificial word is a manifestation of the trial-and-error stage in the development of thinking. In this phase, the target language to a learner is simply a perception of patterns. Second, many variations of a type of thinking, also known as thinking in complexes, take place when the learner makes connections between individual objects. Third, the concept is developed through the use of language to go beyond concrete and factual to the abstract and logical stage. In language education, students move through stages of concept formation to understand the target language. Language use data collected in the current study described such a process of learning. Hong Laoshi introduced a word through multi-sensory input. When the student used the word, Hong Laoshi provided feedback. The use of the new word was simply a trial-and-error application. After several trial-and-error occurrences, the student gained more information on the word and began making

connections from one situation to another. Metalinguistic abilities supported the learner to acquire the concept of the word. Most first-graders in this class are at the trial-and-error stage of target language use. Some began to make connections. It is critical for teachers to scaffold the learner's concept formation in the target language, as well as encourage the learner to take risks in using the target language and draw connections.

Language use data reflected students' social development. Erikson (1968) was best-known for his famous theory of psychosocial development and the concept of the identity crisis. He proposed that all people go through a series of eight stages through the entire lifespan. They include trust versus mistrust during infancy, autonomy versus shame and doubt at two to three years of age, initiative versus guilt from three to five years of age, industry versus inferiority from six to 11 years of age, identity versus role confusion during adolescence, intimacy versus isolation during young adulthood, generativity versus stagnation during middle adulthood, and ego integrity versus despair at age of 65 and above. At each stage, people face a crisis that needs to be successfully resolved in order to develop the psychological quality central to each stage. According to Erikson's theory, first-graders in the present study are at the transition from the stage of initiative versus guilt to the stage of industry versus inferiority. They are socially experiencing two major events in life, exploration and school. First-graders need to begin asserting control and power over the environment. Success in this stage leads to a sense of purpose. Children who try to exert too much power experience disapproval, resulting in a sense of guilt. The language use data

indicated that first-graders used the least amount of sentences for regulatory functions, which means they rarely demanded actions. This information is important for educators, in that, they need to adjust their instruction to increase student target language use opportunities to empower the learner. For example, the teacher could give students jobs or let students lead an activity.

First-graders also need to cope with new social and academic demands at school. Success leads to a sense of competence, while failure results in feelings of inferiority. Student language use data illustrated these social characteristics among focal students. In Mackay's case, it was even more prominent such as in Example 47.

Example 47.

> Mackay [1026MA]: He's not smart. That's right he's not. I am very smart.
> He doesn't even know how to get past a little kid.
> Mackay [1201Interview]: Um, I think some kids don't know as much Chinese
> as me, because I've been learning since pre-K and kindergarten and first-
> grade. Might be 100, but a lot of people they don't know Chinese.

Thus, I raise two questions. How will schools address the social development of ethnically diverse learners when achievement data marks them less than stellar? How will teachers adjust curriculum, instruction, and assessment to address the social needs of young learners?

Besides social development, language use data revealed students' cognitive development. Piaget (1973) distinguished four stages in the development of intelligence: first, the sensori-motor period that occurs before the appearance of language; second, the period from about two to seven years of age, the pre-operational period that precedes real operations; third, the period from seven to 12 years of age, a period of concrete operations; and finally after 12 years of age, the period of formal operations. Piaget believed that one's childhood plays a vital and active role in a person's development. Language is contingent on knowledge and understanding acquired through cognitive development. According to Piaget, first-graders are at the pre-operational stage. They are able to understand, represent, remember, and picture objects in their mind without having the object in front of them and they want to know everything. However, they do not yet understand concrete logic and cannot mentally manipulate information, even though they could manipulate symbols such as using blocks to build a castle. Thus, children at this age benefit from hands-on activities and opportunities to use concrete objects to construct ideas. In the pre-operational stage, thinking is still egocentric, meaning the child has trouble seeing things from another's viewpoint. Language use data in the present study showed that first-graders used the greatest amount of language in expressing personal functions irrespective of English or Mandarin. The need to give information about themselves was greater than all other linguistic functions. This supports Piaget's analysis of children's cognitive development at this age. In addition, among all student-initiated Mandarin sentences, while personal functions were used the most, heuristic functions were the next highest.

Heuristic functions refer to the use of language to ask for information about things. This may suggest the intuitive aspect of first-graders.

Linguistically, Levine and Munsch (2010) described that first-graders still use private speech for self-direction, especially in problem-solving situations. In terms of literacy, they became emergent readers and writers. It is critical for the teachers to carefully scaffold this delicate learning process and boost their confidence in their literacy experience. The notion of metalinguistic awareness plays an important role at school age. It is the ability to think about and talk about language. However, first-graders just began to think about language. One must understand that language and cognitive development go hand-in-hand. Vygotsky (1987) examined the relation between language and thought and he found the development of cognition and language is interdependent.

Through the investigation of language use, I found the need to highlight interconnectedness among concept development (Vygotsky, 1987), psychosocial development (Erikson, 1968), cognitive development (Piaget, 1973), and language development (Levine & Munsch, 2010).

Curriculum, Instruction, and Assessment

Language use findings in this research study allowed me to examine the effectiveness of curriculum, instruction, and assessment. While a great deal is known about what works in immersion and why, we are still discovering aspects of this kind of education that can be appropriately applied to Chinese instruction and the solutions to common questions such as the following: (a) Which type of program model is best

suited to Chinese immersion? (b) What are the qualifications for teaching in Chinese

immersion? What does high-quality Chinese immersion instruction look like? (c)

What curricula and instructional materials are already available for Chinese immersion?

(d) How might literacy development in Chinese be approached (Met, 2012)?

Data indicated that Hong Laoshi taught language and academic content

concurrently in Mandarin. The curriculum was academic-oriented. Language

education revolved around linguistic functions and forms. Grammar and word study

became the focus of language instruction. It appeared that Hong Laoshi put more

emphasis on listening, speaking, and word recognition, but less emphasis on writing.

She created materials and facilitated activities to enrich the curriculum. Findings

suggested that she introduced some social language that was related to students'

personal needs or school environment.

When I cross-examined the description of the curriculum and student language

use, it became apparent that this Mandarin immersion curriculum needed further

development. Language use data provided an opportunity for curriculum gap analysis.

Suggestions for improvement are four fold.

First, the curriculum needs to balance the teaching of content and language.

Cammarata and Tedick (2012) stressed the significance for immersion teachers to

balance content and language. I found in the current research that it is equally

important for the program to adopt a content-and-language balanced curriculum. It is

more effective when the content and language are integrated. For example, a form-

focused mini-lesson could be embedded in a mathematics session. A form-focused

mini-lesson is a short lesson where teachers bring learners' attention to language forms. This language lesson has to fit with mathematical content seamlessly. It cannot distract students from learning the mathematical concepts. On the contrary, it aids students' comprehension of the mathematical concepts. Taking first-grade counting as an example, instead of pointing at the numbers and let students count 一二三四五 (*one, two, three, four, five*). The teacher may use the opportunity to teach measure words. Chinese use measure words in combination with a numeral to indicate an amount of something represented by some noun. If first-graders already know 人 (*person* or *people*), one may teach them to count with a measure word 一个人 (*one person*)，两个人 (*two people*)，三个人 (*three people*)，四个人 (*four people*)，五个人 (*five people*). When Chinese writing and picture or visuals are matched with numbers, students will gain more concrete understanding of numerals. This embedded language mini-lesson on measure words will enhance the mathematical content lesson by making counting more meaningful.

Second, materials should address the learner needs in immersion programs. Data showed that Hong Laoshi's instruction was constrained by materials. For Mandarin materials, she had one textbook, one student activity book, and assorted trade books for the classroom library. The textbook contained rhymes and short passages. The student activity book contained grammar exercises. Trade books were at various reading levels, and most were above the students' ability. These materials lacked richness in content for reading and writing. Reading strategies, writing crafts,

and many more literacy skills were not systematically introduced or mapped out. In addition, mathematics materials were in English. It demanded a tremendous amount of time and energy for Hong Laoshi to create materials to enrich the curriculum.

Third, the curriculum should include socially appropriate vernaculars to reflect the culture of a six-year-old child. Native English-speaking students were able to use their first language to express the nuances in social conversations that, according to focal students' interview data, was the main reason that first-graders spoke English in a Mandarin immersion classroom. The language immersion curriculum needs balance between formal academic language and social vernaculars in the target language. English speech turns as in Example 48 could be expressed in Mandarin with a modified curriculum.

Example 48.

Dustin [1019MA]: See, I told you.

Mackay [1019MA]: Yeah, yeah. I don't care.

Yan [1019LA]: You got a turn.

Abelina [1026MA]: What is this for?

It is important to include interpersonal communicative skills in the target language curriculum, such as ways to ask for help, language used for making a friend, and strategies for solving conflicts. In addition, there is a need to consider enriching the immersion curriculum with social language that is real, relevant, rigorous, and

relational to students' culture and life. For example, the target language curriculum
might include some holidays in the students' culture.

Fourth, interrelatedness within school curricula needs to be stressed. It is not
only important to align curriculum across subject areas, but also to align target
language curriculum with the native language curriculum. This does not mean
duplication. Rather, it aids the teacher to explicitly assist students to make
connections of their learning content throughout the day, through the reciprocity of
reading and writing and linguistic transferrable proficiency. According to linguistic
transfer theory (Cummins, 2005), the common underlying proficiency acquired in one
language can be transferred into another. The alignment between English and the
target language curriculum bridges and reinforces concepts taught in both languages.
This curriculum alignment should be articulated and systematically planned to
improve the quality of immersion education. The participating school district was in
the process of working on curriculum alignment and materials adoption at the time of
this research. They expressed an interest in my research findings. The continuous
efforts in refining immersion curriculum, instruction, and assessment could be a key
reason that students in this classroom spoke more target language than participants in
Potowski's (2004) and Ballinger and Lyster' (2011) research studies.

Furthermore, curriculum development faces many challenges. Patterson (2007)
reflected upon her experience administering an elementary school Mandarin
immersion program and considered it as the most rewarding and equally challenging
task in her entire professional life. She discussed issues pertaining to building a

cohesive school climate, selecting and supervising school staff, and curriculum and instruction. Particularly, she asserted that the articulation of the curriculum was often strongly influenced by cultural differences, and district and state requirements. Chinese teachers and English teachers have quite distinctly different philosophies about student motivation, discipline and instructional practices. These challenges still exist today. Stakeholders are more equipped and informed than a decade ago, but as the learner population has become more complex, the nuances of these challenges have increased.

Pedagogically speaking, conventional Chinese pedagogy is teacher-centered whereas American pedagogy is learner-centered (Chipman, 2015). These pedagogical differences along with cultural differences present challenges for immersion teachers, especially those who were themselves taught in traditional ways in China (Hall Haley & Ferro, 2011). In addition, Chinese teachers struggle in working with learners with diverse cultural backgrounds and learning styles who are attempting to learn advanced level subject matter in the target language (Fortune, 2012). Hong Laoshi is from Taiwan. Her co-teacher on the English side was from the United States. Her students were culturally, ethnically, linguistically, and racially diverse. This immersion context requires implementation of instruction with careful examination of the learners' and teachers' cultural differences and needs. Data showed that Hong Laoshi became a hybrid educator who in practice merged pedagogical philosophies from the east and the west. She addressed social development in her teaching and adjusted her approach based on the learner's needs. Hong Laoshi used various techniques to increase the

comprehensibility of her Mandarin input. She also structured the learning activities with modeled, guided, shared, and independent practice. The success of this pedagogical mix is intricately linked to the quest and challenge of acculturation in American schools.

In terms of balancing content and language during instruction, immersion teachers in Cammarata and Tedick's (2012) study described their experiences in the following ways: (a) identity transformation – seeing myself as content and language teachers; (b) external challenges – facing time constraints, lack of resources, district pressures, and other factors that are outside of the teachers' control; (c) being on my own – experiencing a growing sense of isolation; (d) awakening – developing an increased awareness of the interdependence of content and language; and (e) a stab in the dark – having difficulty identifying what language to focus on in the context of content instruction. Hong Laoshi's instruction exhibited similar characteristics. For example, she structured collaborative activities during math to encourage student language use. It was an attempt to balance content and language. However, she did not have a specific guideline to follow in terms of what language to focus on during mathematics.

Regarding assessment, data suggested two subjects for discussion. One is the possibility of using language use data for formative assessments. Two is the discrepancy between student word recognition and language use results.

I consider the possibility of using language use data for formative assessments, because they revealed a plethora of aspects in student language learning. First, data

showed the technical structure of student language use, such as type of vocabulary, types of sentences, and grammatical accuracy. It could help the teacher assess students' learning in terms of what they did or did not know. Second, data presented the linguistic applications of student language use, such as language use situations, interlocutors, subject areas, and linguistic functions. The teacher may see connections between student language use situations, classroom activities, and the pedagogical approach. Third, the content of student language use revealed the students' learning process. When analyzing language use errors and code-switching sentences, one will gain a deeper insight to target language acquisition and the linguistic transfer process. It also provides teachers information on how students process information, how people learn, and how to scaffold concept formation. Fourth, the interview data unfolded the learner's perceptions and attitudes towards language use. It offers teachers information beyond the surface level, such as who the learners are and what they value in life. Fifth, when the data were synthesized and connections were made, it profiled a whole child. Using a lapel microphone to follow an individual student captured valuable information that none of the other formative assessment tools have done.

In fact, there are some wonderful assessments that capture students' language use through video-recordings. Namely, Center for Applied Linguistics (CAL) developed Early Language Listening and Oral Proficiency Assessment (ELLOPA) and Student Oral Proficiency Assessment (SOPA) for kindergarten through eighth grade. These assessments include hands-on activities and are conducted entirely in the target language. Students are assessed in pairs by two trained test administrators and, during

the activities or tasks, are encouraged to interact with each other as well as with the interviewers. Then these oral samples are analyzed in detail with scoring rubrics. However, these assessments can be time-consuming. They also miss student interactions in natural settings, such as language use during off-task situations.

Another interesting finding in the present study resides in the disparity between student assessment results and language use data. Table 4 displayed student's test results for *Hanzi* recognition and *Hanzi* dictation. During the time of language use data collection, Hong Laoshi tested her students with 36 *Hanzi* that she formally taught and expected students to master through the first quarter of the first-grade school year. Yan and Dustin scored higher than Abelina and Mackay in both word recognition and dictation. In Yan's case, the result was consistent with her target language use data. However, when examining other focal students' performance, discrepancies surfaced.

Abelina scored the lowest in *Hanzi* dictation and second lowest in *Hanzi* recognition, but her Mandarin oral output was the greatest among three native English-speaking participants. Three possible interpretations include: (a) Word recognition, dictation, and language use involved three different skills: reading, writing, and speaking. Speaking skills do not naturally transfer into reading and writing. (b) Her *Hanzi* recognition score was lower at the beginning of the school year. Her learning rate actually improved in first-grade. This indicated the delay could have occurred in the previous year or was related to summer loss. (c) *Hanzi* writing uses strokes

instead of alphabets. The difference between Chinese and English writing systems can be perceived as a learning challenge.

Mackay scored the lowest in *Hanzi* recognition, but was second to the highest in *Hanzi* dictation. At the beginning of the school year, he only recalled 33 out of 96 *Hanzi* he learned in kindergarten. This could have impacted his low oral production of Mandarin use. His learning rate was slightly higher than last year due to multiple factors such as the teacher's instruction, student's cognitive development, and so forth. However, it was interesting to notice that he wrote more *Hanzi* correctly than he could recognize and say in Mandarin. It is possible that Mackay is a visual learner who benefited from moving his hands or using graphic organizers. Without knowing the testing environment and context, I need to take caution in interpreting the results.

Both Abelina and Mackay were African-American students. Testing results do not reflect all the aspects of their learning. Abelina had a great attitude, motivation, and learning strategies. Mackay had confidence and pride as a long-term Mandarin learner. It is important for educators and researchers to identify ways to improve the immersion curriculum, instruction, and assessment to meet these individual learner's needs while maintaining high expectations.

Culture and Identity

Norton (2006) investigated the relationship between identity and language learning. Her sociocultural theory covered five main characteristics: 1) Identity is dynamic and constantly changing across time and place. 2) Identity is complex, contradictory, and multifaceted. 3) Identity constructs are constructed by language. 4)

Identity is social constructed and marked by relations of power. 5) Identity theory can be linked with classroom practice. Most identity-related classroom investigations were conducted in upper-grades (Norton & Kamal, 2003; Potowski, 2004). Erikson (1968) also proposed that adolescence is the time period when people deal with the conflict of identity versus role confusion. A question remains as to whether I can use the identity theory to analyze student language use in the first-grade classroom.

Data indicated that students did not explicitly question or discuss the deep structure or conceptual level of identity. However, data did show that first-graders cared about how others perceived them. Yan appeared to be a student who followed directions, met school expectations, and was good at mathematics and science. Maybe these characteristics were important to her. Abelina was proud of herself knowing multiple cultures and languages. Dustin knew how to navigate school by following rules as well as finding moments of socializing with his friends. Mackay was proud of being smart and knew more Mandarin words than some students in class. All of them figured out ways to cope with school. Though identity as a concept was not internalized by first-graders, their attitudes towards Mandarin did impact their language use. Student language use and culture mediate their social life at school, which over time affect their attitudes, behavior, and value of self. In corollary, their experience in primary grades may positively or negatively impact their identity formation in adolescence.

Norton (2006) stated that language learners are constantly organizing and reorganizing a sense of who they are and how they relate to the social world.

Although it is important for language learners to understand the rules to use a target language, it is equally important for them to explore whose interests these rules serve. First graders are too young to mentally operate such concepts, but they begin learning rules for language use. The feedback in this social context will impact student perception of the rules. Yan spoke almost exclusively in Mandarin during target language instructional time. Yet, she spoke in English through the whole interview.

Besides identity, I also explored language status in relation to language use through a sociolinguistic perspective. The status of a language is very often described and measured by different factors, including the length of time it has been in use in a particular territory, the official recognition it has been given by governmental units, and the number and proportion of speakers. Ballinger and Lyster (2011) also pointed out that language status is a major factor of language proficiency in an immersion context. Regarding first graders' Mandarin use, participants were too young to understand language status at a global level, such as how many people in the world speak Mandarin and the economic power Mandarin-speakers hold. However, the status of Mandarin within the community might have had more of an impact on them. In the United States, Spanish is the second most spoken language. Naturally Mackay was more interested in learning Spanish than Mandarin. This may affect his attitude in Mandarin learning and his classroom performance. In order to motivate students and help young learners to be aware of the status of the target language, it is important for the immersion teacher to teach target culture as well. Many times it was assumed that when language is taught, culture is also embedded. However, this subtle implicit

approach is not sufficient to motivate young learners in a context where target culture is lesser known. The teacher needs to integrate this cultural knowledge into instruction, beginning at the early levels. This could have had an impact on Mackay if he had knowledge about the rise of Mandarin and the Chinese presence in the world.

Culture definitely was in every fiber of this entire research. The researcher's culture should be first examined for biases (see page 57). Hong Laoshi and each focal student's culture were described throughout chapters from three to five. Student language use data reflected the interaction of various cultures within the speech community in this Mandarin immersion classroom. Culture is a way of life of a group of people. It is the behaviors, beliefs, values, and symbols that they accept, generally without thinking about them. Culture is passed along by communication and imitation from one generation to the next. It impacts language use, but this impact cannot be judged with any terminology such as good or bad, positive or negative. Lee and Buxto (2013) stated that effective teachers use cultural artifacts and community resources in ways that are academically meaningful and culturally relevant. It is crucial for educators to be aware of their own culture and their students' culture. It is equally crucial for educators to take culture into consideration as they develop curriculum, plan for instruction, and design assessments.

Limitations

Aside from valuable findings I summarized above, this research study contained some limitations. (a) The small sample size is small due to purposeful sampling and the ethnographic nature of the study. Readers or policy-makers should

take caution while generalizing the results from this investigation. (b) Due to my

employment situation, the observation schedule conflicted with the native Spanish-

speaking students' English language development pull-out service time. I missed an

opportunity to collect data on trilingual students in this program. (c) I only observed

sessions on Mondays, so the content was limited, especially in mathematics. (d) This

study was also limited by the number of observations. (e) Garcia (2007) found that six

out of Halliday's (1975) seven linguistic functions promoted students to speak the L2

when the teacher scaffolds. I used her classification because her participants were

five-year-old students in immersion classrooms. After the data analysis, I realized

participants in this study expressed the seventh function in Halliday's original

categorizations, the imaginative. It is to use language to tell stories and jokes, and to

create an imaginary environment. It would be interesting to separate those speech

turns out and analyze their relationship with learners' intuitiveness.

Implications

Implications for educators, stakeholders, and policy makers are four fold.

1. Improvement should be made in language immersion curriculum,

   instruction, and assessment.

Through previous discussions, I mentioned a few ways to increase student

target language use in an immersion classroom, especially when working and talking

among themselves. Teachers may consider teaching some age appropriate vernaculars

in the target language, such as Pokémon in the first grade. It is important to strengthen

student-student interactive activities during instruction. Some strategies include (a)

assigning roles to participants, (b) teaching specific language use expectations for small group time, (c) providing language resources such as a task-related vocabulary dictionary, and (d) implementing a small group monitor system such as a checklist for self-evaluation. Teachers may also consider cultivating students' identity of being a target language speaker by explicitly teaching the target culture. The participating teacher and school district attempted to address this; however, a more intentional explicit and systematic approach is still needed.

One of the findings from this study is that there needs to be more opportunities for the students to use the target language for various linguistic functions in an authentic setting, both academically and socially, through well-planned and structured activities that require the students to use the target language. For example, when a teacher designs a lesson, he or she may examine what linguistic functions are involved in the learning activity. If the teacher uses a given curriculum with scripted lesson plans, it is important to use the linguistic functions lens to identify modification needs.

Furthermore, because linguistic transfer plays a significant role in immersion education, it is important to align the target language curriculum with the English curriculum in a way a teacher can naturally "bridge" two languages. In addition, the balance of content and language within immersion curriculum, instruction, and assessment needs to be experience-based, as well as research-based. I will provide two examples. First, instruction should take the characteristics of a subject area into consideration. Mathematics involves technical terms and grammatical conventions that are peculiar to mathematical discourse. Therefore, it is important to structure

teacher-fronted language activities around mathematics. This is not detrimental to mathematical content delivery, because mathematical concepts are expressed with mathematical language which is also a language. On the contrary, language scaffolding in mathematics may deepen students' understanding of mathematical concepts. Second, the interrelationship among students' reading, writing, listening, and speaking (oral language use) informs us that it is critical to balance curriculum and instruction to address all four skills. Mandarin immersion teachers may consider explicit instruction of the Chinese writing system. Chinese characters are not composed of randomly drawn elements. Young learners, in particular, enjoy learning Chinese characters, because they view the task as in playing games such as sorting, grouping, classifying, and solving puzzles, all of which contribute to cognition and higher order thinking skills (Everson, Chang, & Ross, 2016). Finally, multiple forms of assessments are needed to capture the strengths of students, specifically those who are historically underserved.

2. School and teachers should help cultivate student identity investment through being a second language learner or speaker.

Potowski (2004) proposed that schools or families should involve immersion students in activities outside the classroom with peers who are native speakers of the target language. Ballinger and Lyster (2011) also supported this suggestion. They specifically stressed the importance of culturally relevant teaching activities. In a Mandarin immersion program, teachers may introduce Chinese contributions to the world, not limited in ancient China, but modern Chinese presence, culture, and

significance. Students may communicate with learners at their own age level in China

under adult supervision with aids of modern technology. Immersion parents may take

their children to visit Chinatown, attend Chinese community events such as Chinese

New Year celebrations, and travel to China if possible.

Furthermore, Mackay's community identity conflicts with his individual

identity in the Mandarin immersion classroom. This research finding suggests schools,

community, and stakeholders should help assist the learner by bridging the cultural

gap. For example, the local public library may increase support in providing

information and resources responsive to the needs of the target language learners in

the area.

3. It is important for in-service and pre-service immersion educators to have

knowledge of various linguistic theories and their interactions in practice.

Professional development needs to address linguistic theories, social theories,

and child development theories, as well as their connections in practice. In addition to

professional development related to curriculum design and pedagogical techniques,

both native and non-native teachers report the need for ongoing support of their own

proficiency in the immersion language (Fortune, Tedick, & Walker, 2003). Given

teachers' time constraints, the structure and delivery model of this professional

development can be flexible without diminishing the content. This means the course

needs to be highly integrated. Online courses may be an alternative. In addition,

teachers' input has to be considered and teachers' needs may be prioritized. Beyond

these technical issues, we should understand the essence of this professional

development goes beyond skill sets and comprehension of theories. Immersion teachers are practitioners. This professional development needs to have three key elements encompassing knowledge, application, and reflection. These recommendations apply to both in-service and pre-service educators. Furthermore, emphasis should be placed upon building a professional learning community where immersion teachers invest in the identity of being a life-long learner and a hybrid educator.

4. Alternative perspectives may provide additional information on how people learn.

Tokuhama-Espinosa (2010) grounded Mind, Brain, and Education (MBE) theory in histories, philosophies, and epistemologies. The development of MBE science depends on changing relations across three disciplines, specifically neuroscience, psychology, and education. The development of each of these disciplines depends on the progress in the development of the MBE system. It is critical for educators to understand language learning, brain function and structure, human development, and culture, as well as their interconnectedness and intraconnectedness. Immersion educators equipped with MBE knowledge could become part of a new frontier in education.

Conclusions

This research study investigated student language use in a one-way 50:50 first-grade Mandarin immersion classroom. Findings revealed diglossia in immersion classrooms, the role of linguistic transfer, culture, and identity, the interconnectedness

of language and cognition in childhood development, as well as the need for further

development of immersion curriculum. This information can be useful to classroom

teachers, program administrators, and policy-makers. It is also an addition to our

knowledge of immersion education.

Further research is still needed in investigating what strategies are more

effective in increasing student target language use. As the access to language

immersion from early childhood is expanding, demographics in immersion classrooms

will be more diverse. It will be important to explore trilingual students' target

language use.

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Appendix A

Non-Consent Form for Classroom Videotaping

Dear Parent/Guardian,

My name is Jessica Bucknam, a doctoral candidate in the School of Education,
University of Portland. In my research, I study how students speak Mandarin in an
immersion classroom. As part of my research, I will be videotaping _____'s
math and Language Arts lessons to study Mandarin use of four students in her class.
This video will not be posted publicly. I am the only person with access to the video
content. Your child's identity will be kept confidential. If you have any questions,
please contact me at 503-539-2894 or bucknam16@up.edu.

Thank you,

_____   09-30-2015
Jessica Bucknam   Date

Please complete this form and return it to _____ if you DO NOT wish to
have your child involved in classroom activities in the aforementioned study.

Student Name _____   School/Teacher _____

I am the parent/legal guardian of the child named above. I have received and read your letter regarding the study on Mandarin language use in my child's classroom. I DO NOT give permission for my child to appear on the video recording, and understand that he/she will be seated outside of the recorded activities.

_____   _____

Signature of Parent or Guardian   Date

Appendix B

Parent Informed Consent Form

Your child is invited to participate in a research study conducted by Jessica Bucknam, a doctoral candidate in the School of Education, University of Portland. The research hopes to learn about how students use Mandarin in an immersion classroom when mathematics and Language Arts are taught in Mandarin.

If your child decides to participate, he or she will be observed and tape-recorded (both video and audio). The video recorder will be on a tripod in the corner of the classroom, so it will not disturb your child's learning. Each observation lasts 30-60 minutes, accompanied with video and audio recording. Your child will be observed twice a week for five weeks. After that, all participants will be interviewed as a group for about 10-15 minutes. All interview questions are related to their language use.

Your child's participation in this study will be kept confidential. Any information that is obtained in connection with this study that can be linked to your child will be kept confidential. All data collected from the study will be kept in a locked file cabinet.

Participation is entirely voluntary. Your child's decision to participate or not participate, will not affect his or her relationship with me or with University of Portland in any way. If your child decides to take part in the study, he or she may

choose to withdraw at any time without penalty. Please keep a copy of this letter for your records.

If you have any concerns about your child's participation in this study or his or her rights as a research subject, please contact the Institutional Review Board at UP (irb@up.edu). If you have questions about the study, please contact me at bucknam16@up.edu or my advisor Professor Sally Hood at hood@up.edu.

Your signature means that you have read and understand the above information and agree that your child has permission to take part in this study. Please understand that you may withdraw your consent at any time without penalty, and that, by signing, you are not waving any claims, rights or remedies. The researcher will provide you with a copy of this form for your own records.

Signature of parent   Date

Print the name of the child

Appendix C

Student Assent Form

Student's name: _____

      Your parent (or guardian) has said it is okay for you to take part in a project about Mandarin use. If you choose to do it, you will be observed, video-taped, and asked to wear a tiny microphone and a pocket-size tape recorder. After all the observations, you will join other observed students in a small group for a 10-15 minute interview. If you need to use the bathroom, just tell me, we will unclip the mike. Other than that, you simply act the way you always do in class. If you do not want to be observed or recorded or interviewed, you do not have to. Also, if you have any questions about what you will be doing, just ask me to explain.

      If you want to be observed, video-taped, wear a tiny mike, and interviewed, please sign your name on the line below. Remember, you can stop to rest at any time and if you decide not to take part anymore, let me know.

Signed: _____

Date: _____

Appendix D

Student Interview Guide

1) 你在家里说什么？是说中文还是说英文？跟谁说？什么时候说？

   What language do you speak at home? With whom, when?

2) 还有谁你跟他说中文？你在家里或者在学校，或者在学校外面。

   Is there anyone else with whom you speak Mandarin?

3) 你在家里读不读中文书？要是读的话，多久读一次？

   Do you read Chinese books at home? How often?

4) 来这里之前，你会不会中文？你在哪里学到的中文？Did you know any

   Mandarin before you came to this school? How did you learn it?

5) 会中文有多重要？How important is it to know Mandarin?

6) 比如说，你在学校里学中文。你的老师都教你些什么？而且你说多少中文？

   What kind of things do you learn in Mandarin? How much Mandarin do you

   speak in your class?

7) 你觉得为什么有的学生有时候在中文课上说英文呢？

   Why do you think that students sometimes speak English during Mandarin class?

8) 老师听到小朋友说英文会做什么？你感受如何？

   What does the teacher do if she hears English during Mandarin class? How do you

   feel about that?

Appendix E

XXX DLI Program Expectations for Target Language (TL) Usage

Grade K-2:

Grade	Teacher	Students
K	Speaks TL 100% of the time except for emergencies.	At the beginning of the year – speaking in E is OK, teacher asks to repeat in TL; by the end of the year speaking TL at least 60-70% of the time for non-heritage and 100% for heritage speakers. *Minimum Text Type Expectation:* Word/phrase level moving to sentences with support.
1st	Speaks TL 100% of the time except for emergencies (Transfer Time provides opportunities for cross linguistic explanations)	From the beginning of the year - during TL time we speak in TL only. *Minimum Text Type Expectation:* By the end of the year - speak in complete sentences with support.
2nd	Speaks TL 100% of the time except for emergencies (Transfer Time provides opportunities for cross linguistic explanations)	100% in TL student to teacher and student to student (teacher structures opportunities) *Minimum Text Type Expectation:* Complete sentences

Grade 3-5:

Grade	Teacher	Students
3rd	Speaks TL 100% of the time except for emergencies	100% of the time, except for structured L1 processing with a partner/group
	(Transfer Time provides opportunities for cross linguistic explanations)	*Minimum Text Type Expectation:* Complete sentences with some connected.
4th	Speaks TL 100% of the time except for emergencies	100% of the time, except for structured L1 processing with a partner/group
	(Transfer Time provides opportunities for cross linguistic explanations)	*Minimum Text Type Expectation:* Connected and compound/complex sentences with support.
5th	Speaks TL 100% of the time except for emergencies	100% of the time, except for structured L1 processing with a partner/group
	(Transfer Time provides opportunities for cross linguistic explanations)	*Text Type Expectation:* Connected and compound/complex sentences.

Glossary

Adjacency pair: a unit of conversation that contains an exchange of one turn each by two speakers (Heitzman, 1993).

Communicative competence: a combination of five components including linguistic competence, strategic competence, sociocultural competence, actional competence, and discourse competence (Celce-Murcia, Dornyei, & Thurrell, 1995).

Diglossia: a phenomenon "in which a second language is the superordinate, formal language variety, and the native language is reserved for use in informal social interactions" (Tarone & Swain, 1995, p. 166).

Instance: a unit of language use comprised of at least one adjacency pair (Heitzman, 1993).

Interlocutor: a person who takes part in a dialogue or conversation. In this dissertation, it refers to the person that a focal student speaks to.

Linguistic functions: the purpose of language use that includes asking for information, informing about oneself, demanding actions, interacting socially with others, and so on (Halliday, 1975).

Participant structure: organization of learning activities such as teacher-fronted, whole group, small group, and so forth.

Recast: an implicit reformulation of learners' non-target utterances (Lyster, 2009).

Reciprocal learning: language learning among students via student-student

    communication (Ballinger & Lyster, 2011).

Selected-ness: whether a student's speech turn directed to the teacher is selected or

    unselected (Potowski, 2004).

Speech corpus: a database of speech audio files and text transcriptions.

Target language: an instructional language other than English in the immersion

    context.

Turn: a completion of one interlocutor's speech with no interruption from another

    interlocutor (Broner, 2000).

Utterance: a stretch of language bounded by pauses, under one single intonation

    contour, and generally consisting of a single semantic unit (Broner, 2000).