



MONASH University

**Chinese Grammar Acquisition by Second Language Learners in an
Australian Primary School Chinese Immersion Setting: The Potential
of the Form Focused Instruction Pedagogical Approach**

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ABSTRACT

It is assumed that the pedagogy of second language/foreign language immersion programs is primarily focused on content, whereby language acquisition is accelerated through comprehensible second language input and an incidental focus on form. However despite the second language benefits, the incidental nature of the form focus (where grammatical errors are drawn to learners' attention spontaneously when they occur and without prior planning), typically leaves immersion students with a significant deficit in some features of their grammar skills relative to other areas of second language proficiency. This case-study research (primarily qualitative with some quantitative analysis) examines the potential to enhance language acquisition in an Australian primary-level Chinese immersion program through the pedagogical practice of form-focused instruction (FFI). It explores the practical aspects of implementing FFI in this immersion program, noting its specific contextual characteristics including the structure of the program, students' language and cultural backgrounds and the classroom teaching pedagogy.

Drawing on cognitive theory, the research employed the form-focused instruction (FFI) framework (e.g., Lyster, 2004, 2006, 2007; Ellis, 2001, 2006) to study how noticing, awareness-raising and production practice with feedback (Lyster, 2004; 2007) can be operationalised into a content-focused mathematics learning environment to support acquisition of the Chinese 'measure word 量词' form. This research involved 17 Year 5 and Year 6 Chinese immersion students and one immersion teacher. Data collection entailed stage-by-stage classroom observation over 10 weeks (primarily during regular immersion mathematics sessions), combined with a series of pre- to post-intervention assessments. Additional data were also obtained from a questionnaire and semi-guided interviews. These multiple data

sources served a validation function, assisting in data analysis to inform research findings.

Findings indicate that structured FFI intervention during content-focused lessons, combined with three Chinese language lessons in the target form, enabled acquisition of the target form ‘measure word 量词’ by student participants, with the majority progressing from declarative knowledge to procedural knowledge.

Furthermore, the findings suggest that in order to improve Chinese grammar acquisition for second language learners, such FFI approaches can be systematically planned and integrated into a meaning-based communicative Chinese immersion curricula and teaching practice.

Key words: Learning Chinese as a second/foreign language; immersion; pedagogy; form-focused instruction; cognitive theory; cognitive load theory; case study research.

Declaration

This thesis contains no material which has been accepted for the award of any other degree or diploma at any university or equivalent institution and that, to the best of my knowledge and belief, this thesis contains no material previously published or written by another person, except where due reference is made in the text of the thesis.

Signature:



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CHAPTER ONE – INTRODUCTION

1.1 Context and Rationale

The context of, and motivation for, investigating a form-focused instruction (FFI) framework in its practice stems from the apparent and pressing need to improve grammar acquisition for second language (L2) students learning Chinese in immersion settings. This deficiency has been clearly evident at Mawson Primary school; a primary-level immersion setting located in Canberra, Australia comprising students from non-Chinese speaking backgrounds. As an immersion Chinese teacher working at the research site, I have consistently observed this issue of grammatical inaccuracy arising in immersion students' speaking and writing productions. This section provides an outline of immersion pedagogy and FFI developments and demonstrates the context and rationale for applying the FFI framework in the Mawson Chinese immersion program. It also sets out the research objectives and research questions. Other aspects of the Chinese immersion program are also explained to illustrate the specific contextual aspects within which this research took place. First, however, this section briefly discusses the context and rationale for L2 Chinese education in Australia.

Today's world entails rapid growth in the political and economic significance of China, particularly in the Asia Pacific region. In Australia, this means increasing contact with, and movement of people between, China and Australia for purposes of study, employment, trade, investment and international diplomacy. As language skills are the key to effective communication between Chinese and Australian cultures, effective Chinese language learning has become increasingly important in Australian schools (further discussion on L2 teaching in Australia is provided in Chapter Four). Chinese has been taught in Australian schools since the 1950s, and experienced rapid

growth in the 1980s as China implemented its open door and economic reform policies (2014, ACARA). However, according to analyses by Orton (2008, 2015) and Lo Bianco and Slaughter (2009), LOTE (languages other than English) Chinese programs are beset by low retention rates, and for various reasons have failed to achieve an adequate level of success in developing learner's communicative proficiency.

It is important to clarify the term 'LOTE' referred to in this research. The approach currently employed in the majority of Australian school programs for L2 teaching was termed 'Languages other than English (LOTE)' prior 2013; it is now termed simply 'languages'. LOTE refers to sessional language lessons (one to a few lessons per week depending on Year/Grade levels) aimed at building speaking, listening, reading and writing skills in the target language. As such, teaching LOTE includes a focus on vocabulary, grammar and some cultural aspects. By and large LOTE follows 'Universal Grammar' principles, based on the perception that language is acquired universally in a same manner, where language structure and levels of development are deeply common to all languages (as explained by Brown, 1994). The LOTE approach is the standard L2 program operating in Australia schools and has been for many years (as discussed further in the Chapter Two). Here the term LOTE is used for the purposes of comparing the content-focussed immersion approach employed at Mawson Primary School with the language-focussed (Chinese) language education that is much more widely used elsewhere in Australia.

The Chinese via LOTE model has been widely taught in Australian schools through primary and secondary levels, and in university and adult education for many years. However, despite its popularity and the early enthusiasm shown by Chinese students, Chinese learning groups typically become smaller and smaller over time,

sometimes quite rapidly. Perceptions that learning Chinese through LOTE is ‘too hard!’ are commonplace. Indeed many schools begin a Chinese program, only to find that student numbers quickly fall away to unsustainable levels. In Australia, most schools require all students to undertake one of a range of L2 subjects until mid-secondary level. By the time that schools’ compulsory language bands lift, which is generally by Year 10, 95 percent of students who start in primary or secondary level LOTE Chinese have dropped-out (Orton, 2013, 2015). The need to reform and improve Chinese teaching is therefore self-evident.

It is arguable that immersion approaches can make a significant contribution to improving learners’ L2 communicative fluency through content-focused approaches. Yet, as summarised in Chapter Two, while it seems that the immersion approach benefits the development of students’ L2 fluency through communicative activities, various researchers (e.g., Swain, 1985; Genesee, 1994a; Cummins, 1998, 2011 & Lyster, 2004) have argued that the immersion approach continues to fall short in developing learners’ language accuracy, especially with grammatical forms.

In response, the addition of a grammar emphasis to the content-focused immersion pedagogy was proposed by Long in 1988 as a means of improving grammar acquisition. Long’s work sparked over 20 years of research and classroom practice on immersion grammar teaching pedagogy. Lyster (2006) further described the consequences of learning grammar through subject learning incidentally as follows:

This incidental approach also resulted in persistent shortcomings in grammatical accuracy in immersion students’ interlanguage even after years of immersion education. This levelling-off effect has been explained by the fact that many language features, such as certain verb tenses, occur only minimally

in class-room discourse, whereas other features occur frequently but lack saliency in classroom discourse. (pp. 39–40)

Long's original Focus on Form (FonF) proposal has since been developed and extended to form-focused instruction (FFI) which incorporates a range of grammar-focused instructions that target L2 grammatical errors, including implicit, explicit, incidental and planned methods of instruction. As such, it is maintained that FFI can potentially remedy learners' linguistic acquisition and overcome the shortcomings of the content-focused approach, thereby further improving immersion students' L2 acquisition.

To date, however, FFI has mostly been applied and researched in immersion contexts where European language-speaking students study another European language, or where non-English-speaking students study English. In either case, FFI is applied during content lessons taught in the target language. While research in non-European contexts is now emerging, to date much of the FFI literature concerns French as the target language in English-speaking Canada. In contrast, I was able to find only very few examples of published research into form-focused pedagogy in Chinese immersion programs, none of which concerned English-speaking Chinese learners in primary-level partial immersion programs. Hence the significant knowledge gap in grammar teaching and learning in Chinese immersion programs, particularly through subject teaching instruction (whether through FFI or any other framework), is the primary rationale for this research. The research undertaken for this thesis was conducted in an Australian primary school immersion setting, as described in section 1.4. Given the potential of FFI to benefit Chinese immersion education, there is a clear need to study its application in a Chinese immersion program.

The following section (section 1.2) discusses both the Chinese measure word grammatical form (量词) that was the target form used for this research and the rationale for its use. The subsequent section (1.3) discusses the overall aims of this research.

1.2 The Linguistic Focus of this Research—Measure Word 量词

The Chinese measure word (量词), also known as a classifier or counting word, is used with numbers to define the quantity of a given object or objects. As there is no exact equivalent for the Chinese measure word form in the English language, it is necessary to provide some insights into the definition and function of measure words in the Chinese language, and to demonstrate when a measure word is a necessary part of grammatically correct sentence structure. The rationale for targeting measure words in this research is discussed below.

Teng (2011) clarifies measure words as follows: “a measure word appears after a number or 这, 那, 哪, 几, 每 (this, that, where, how many and each) and before a noun. 半 and 多少 (half and how much/many) can precede a measure word as well” (p. 225). Teng (2011) further explains that different measure words are used in accordance with (for example) the nature of a physical object, or the function or form of a thing or an entity that is being referred to in a sentence.

To further elaborate, measure words (sometimes referred to as ‘classifier’ words), are used after a number to fully describe the quantity of the noun (i.e., the object or objects). In English, a parallel example is to say ‘four pairs of pants’, where the word ‘pair’ or ‘pairs’ is required between the number and the noun ‘pants’. Measure words must also be used when a noun needs to be specified in a similar way that words such as ‘this’, ‘that’, ‘the’ or ‘every’ are used in English. Furthermore

measure words are required when a sentence includes questioning words such as ‘which’ and ‘how many’ (Teng, 2011).

There are over 100 measure words in the Chinese language. Some examples are provided below:

English: 3 dogs. **Chinese:** 三 只 狗。 [three – **measure word** – dog.]

English: 12 students **Chinese:** 十二 个 学生。 [twelve – **measure word** – students.]

English: that car **Chinese:** 那 辆 车。 [that – **measure word** – car.]

To reiterate, the function of measure words can be categorised into three groups:

Group 1 measure words are the measure words exclusively used in Chinese, such as: measure words for nouns: 500 sheep – 五 百 只 羊 and measure word for actions: push it once – 推 一 下. These measure words do not in themselves have specific meanings, such as: 个, however they do possess a grammatical function as a classifier between the number and noun.

Group 2 measure words indicate certain type of measurements which work in a way that is not dissimilar to certain phrases in English, for example: a bottle of wine – 一 瓶 酒 or five sheets of paper – 五 张 纸. In each case the English words, ‘bottle of’ and ‘sheets’, and the measure words ‘瓶’ and ‘张’ in Chinese, help to describe the object. For example: ‘条’ means something long and slim, like ‘a strip of something’, and can be used to help describe things such as a scarf. In a similar way, a pair of trousers in Chinese is expressed as – 一 条 裤子 – (one + measure word ‘条’ + trousers).

Group 3 measure words are used for standard measurements: 12 metres – 十二米, 5 kilograms – 五公斤. These words work the same way as they do in English.

Additionally, 半 and 多少 (half and how much/many) can precede a measure word.

As Teng (2011) mentioned, the choice of the measure word can be made through correlation with the shape, function or form of the noun. It is important to know that measure words are not optional in the Chinese language, except for some nouns where the measure word is already built-in. For example, ‘a year’, expressed in Chinese as ‘一年’, does not require a measure word between ‘one’ and ‘year’. It is also important to note that, in some cases, (depending on people’s preferences and/or dialect) some specific measure words can be used in different ways.

Hence, the concept and application of measure words are notoriously difficult for English-speaking (and more generally for non-Chinese or non-Japanese speaking students) to learn, as there is no equivalent grammatical structure in English. Furthermore, many measure words do not themselves possess meaning, (in a similar way that the gender of nouns in French or Spanish do not possess meaning) which further increases the likelihood that students will omit the measure word component from a sentence.

As is typical for English-speaking students of Chinese, the Mandarin Immersion Program (MIP) students at Mawson Primary School found it very difficult to learn the measure word form. The persistent errors observed amongst MIP students in this regard was a key reason for selecting measure words as the target form for this research.

1.3 Research Objectives and Questions

The overall objective of the research is to investigate ways to enhance L2 grammar accuracy in Chinese immersion settings in Australia, noting that, as is typical for immersion students of other languages, grammatical skill deficits are clearly evident among Chinese immersion students. As FFI had been demonstrated to be effective in addressing such grammatical skills deficits in other languages, FFI was selected for use in this study involving primary-level Chinese immersion students. The research seeks to investigate how the FFI framework can be operationalised in L2 Chinese immersion pedagogy to facilitate acquisition of the target ‘measure word—量词’ form. The research also examines whether FFI has a positive/negative effect on L2 grammar acquisition by Chinese immersion students. In pursuing these objectives, this research is intended to support improved grammar accuracy in speaking and writing by Chinese immersion students. Hence, the study explores the pedagogical and methodological aspects of effectively integrating FFI methods of noticing, awareness-raising and controlled practice with feedback (Lyster, 2004, 2007) into Chinese immersion pedagogy and applying them through classroom practice (for detailed discussion of FFI methods refer to Chapter Two). In doing so, the particular characteristics of the study context at Mawson Primary School are taken into account. Thus, in a broader context, the research aims to improve understanding of Chinese language teaching and learning for L2 students, thereby helping to inform pedagogical approaches toward the development of students’ grammatical accuracy and production skills especially (but not exclusively) in immersion settings.

The research proceeded as a primarily qualitative case study via classroom observation, augmented by a series of assessments from pre- to post- FFI intervention, the results of which are intended both to measure progress and to cross-reference with

findings from observational data. Semi-guided individual interviews (with the immersion teacher) and group interview (with students) were also conducted in order to generate knowledge from both the teacher's and students' reflections and perceptions on the FFI implementation process, as well as on the nature and context of the Chinese immersion program.

The FFI intervention exercise ran over the 10-week school term, with the intention of examining, and reflecting on, the FFI interventions applied to the Chinese measure word form. The research proceeded systematically in trialling and modifying FFI methods with the aim of maximising the dual immersion learning outcomes in both content and language. Guided by cognitive theory, the research questions were built on the motivation of improving Chinese grammatical acquisition for immersion students. The research was driven by three research questions:

1. What are the characteristics of the Chinese partial immersion program at Mawson Primary School?
2. How can the FFI framework be operationalised in this Chinese immersion program in order to facilitate students' grammar acquisition?
3. What effect does the integration of FFI into Chinese mathematics primary immersion pedagogy have on students' grammatical accuracy?

1.4 Research Setting

Mawson Primary School is a typical Australia Capital Territory (ACT) government primary school located in south Canberra. Chinese is the only second language offered at the school. An immersion program was first introduced to Mawson Primary School in 2000 to replace a pre-existing Chinese LOTE program, and has been adapted over time since then. The term ‘partial immersion’ is a more accurate descriptor of the program, which entails one day per week Chinese immersion learning in kindergarten (or prep outside ACT) , Year 1 and Year 2, and two days per week in Years 3 to 6.

Chinese was first introduced as a LOTE program (two 45-minute lessons per week) at Mawson Primary School in 1988. This decision was partly motivated by providing continuity for children who had learnt Chinese at the local bilingual childcare centre, so that those students’ language skills could be maintained and further developed in their primary schooling years. However, due to its inherent limitations, the model of two 45-minute lessons in Chinese Pu Tong Hua 普通话 (Standard Chinese or Mandarin) per week was insufficient to achieve its objectives in building students’ communicative skills in Chinese by the end of Year 6 (Scott & McEwin, 2002). For this reason, the Chinese Australian Schools Association proposed an immersion option to the school. The proposal was supported by the principal and parents. With the assistance of a National Asian Languages and Studies in Australian Schools (NALSAS) grant, the Mandarin Immersion Program (MIP) was finally established in 2000 at Mawson Primary School after many administrative applications and approvals. It is the only Chinese immersion model in Australian Capital Territory (Scott & McEwin, 2002).

MIP began by offering students from Years 1, 2 and 3 in a combined class with two school days per week in 2000. Kindergarten and Year 4 Chinese were offered the following year and while Years 5 and 6 Chinese were also offered by 2003, total coverage across all school years proved difficult to arrange. In 2013, at the time of this research, low MIP enrolments in some years meant that MIP was available to all age groups except Year 2. In 2014 MIP was provided across all school years for the first time.

With a majority of English-speaking students, primarily from Anglo-European backgrounds (but including a diverse mix of other ethnic backgrounds), Mawson Primary School is fairly typical of the ethnic mix across most other Australian Capital Territory government primary schools. Despite some diversity in cultural backgrounds in the school community, English is the first language of the vast majority of students. Most of the students enrolled in the school live in the local area, but occasionally one or two diplomat or embassy families send their children to the school either to maintain their Chinese language skills (if they have previously spent time in China), or to learn Chinese in anticipation of possible future diplomatic postings.

In summary, the particular immersion program (Year 5 and Year 6 combined MIP class) studied in this research comprises English-speaking students aged between 10 to 11 who study some subject content (e.g., part of the mathematics, science, social studies curricula) through Chinese for 40 percent of their schooling time (two of every five school days). In the immersion days subject content is taught in students' second language Chinese. English is kept to a minimum to increase the amount of Chinese language input, thereby increasing both the time spent communicating in, and

exposure to, the target language. Additionally, a couple of hours of language arts lessons per week are provided to focus exclusively on Chinese language education.

1.5 The Researcher

Qualitative researchers involve themselves in every aspect of their work.

Through their eyes, data are developed and interpreted. Through their eyes, meaning is brought from an amalgam of words, images, and interpretations.

Through their eyes, a creative work comes into fruition. (Lichtman, 2010, p. 121)

The crucial role of the researcher is emphasised by Lichtman's explanation, above. I begin this section with a self-reflection: I was born into an academic Chinese family in Tian Jing, China. My father was a professor lecturing in Theatrical Design at the Shanghai Theatre Academy 上海戏剧学院. My mother studied Early Childhood Education and worked initially in an early childhood centre. I started my second language learning English in a Chinese primary school. At the time, English grammar was taught away from its communicative context, where individual lexical, grammatical and functional components were taught analytically and discretely. In this way, nouns, verbs, adjectives and adverbs, tense, declarative, interrogative and passive forms were taught by a 'repeating-after-the-teacher' method, and by memorising hundreds of sentences by rote. In learning and practising English in ways that were largely divorced from their communicative context, by the end of 12 years English learning, most of my fellow students and I were struggling to use English in real life situations.

After studying my B.A degree majoring in Chinese linguistics and literature in Tian Jing Teachers' University, I migrated from China to Australia, where I subsequently completed my Post Graduate Diploma and Master of Education. Since

the late 1990s I have taught Chinese as first and second languages to primary and secondary students.

My own experiences in studying Chinese as my native tongue and English as a second language, combined with my L2 teaching experience in Australia, led to my interest in the theories of L2 acquisition and to seeking more effective approaches to L2 teaching. My five years of teaching in the Chinese immersion program at the research school has been a remarkable experience for me, and has led me to realise the crucial need for a grammar focus in a meaning-focused language teaching program, and to consider Chinese L2 education in a new light. The levels of fluency and competency achieved by the Mawson MIP students are high, but nevertheless I have also observed weaknesses in students' language proficiency, particularly in some grammatical areas.

Hence a key challenge that Chinese immersion programs face is to support language acquisition, while at the same time addressing students' grammatical errors through communicative content learning. Lyster's research on FFI, which builds on the application of cognitive theory (e.g., Skehan, 1998), offers findings that assist in supporting language proficiency development in immersion settings. The centre-point of cognitive theory in the field of language teaching is the process of transition from declarative knowledge to procedural knowledge; in other words, the progression from language concepts to language skills. The problem for immersion Chinese is that the grammatical knowledge that students learn in the classroom does not get fully transferred into language ability in its application. Lyster's research findings demonstrate that noticing, awareness-raising and practice activities are effective in stimulating and prompting language knowledge transition from declarative knowledge to procedural knowledge. This has motivated the research.

1.6 Research Significance

In considering the importance of this research, an obvious question concerns the potential value of its findings as a contribution to the field of L2 education.

Firstly, the research explores ways to improve Chinese grammar accuracy for immersion students through the integration and operationalisation of the FFI framework. In the process it investigates how to overcome the significant shortcomings of immersion education relating to L2 grammar accuracy in their speaking and writing skills. The results of this research can play a role in informing pedagogical design in immersion and other content-focused L2 teaching contexts in ways that overcome the common obstacles to effectively teaching language form. By contributing to the understanding and practise of FFI, the research assesses its feasibility and effectiveness in supporting grammar acquisition without compromising content learning objectives. In doing so the research hopes to identify ways that grammar acquisition can be enhanced, via the systematic integration of FFI, in a content-focused immersion Chinese setting.

As a second objective, this research seeks to contribute to the knowledge and practice of Chinese immersion education in terms of the effective integration of FFI to classroom pedagogy, curriculum planning and activity design. This offers pragmatic methods in operationalising FFI in order to facilitate grammar acquisition.

Additionally, this research seeks to broaden knowledge about how primary-level school students become proficient in L2 grammatical forms from declarative knowledge to procedural knowledge. The fact that I was an immersion teacher at the research school, as well as being the researcher, enabled me to benefit from a more comprehensive knowledge of the program than would otherwise be the case. Also, as the research entailed observation and data collection over a whole 10-week school

term, it provided adequate time to obtain the thorough information necessary to explore the process of the development of grammatical skills from declarative knowledge to procedural knowledge.

Finally, as mentioned above, most previous FFI research relates to immersion French or other European language programs for English or European language-speaking students (plus a small number of Japanese and Chinese examples). This includes research published by Lyster (2004, 2006, 2007 & 2015), Lyster and Tedick (2014), Ellis (2001, 2006), Harley (1989), Harley and Swain (1984) and Day and Shapson (1991). In this research, Lyster's FFI approach is studied in the new context of English-speaking L2 Chinese students, applied during the content learning process and adapted to their specific grammar needs. Therefore, this case study research seeks to add to the emerging body of knowledge in grammar teaching available for Chinese language teaching professionals in ways that assist in their professional development and add new and effective tools to their teaching toolkit. As such this study breaks new ground in Chinese grammar teaching and FFI research, and provides a precedent for other researchers to follow.

1.7 Definition of Some Important Terminology, Acronyms and Abbreviations Adopted in this Research

Second Language Immersion Education: Language immersion basically refers to the way of teaching and learning a language through using the target language in content learning. Baker (2006) believes the immersion language model goes back to the Second World War. However, contemporary adaptation of the term has its origins in the 1960s Canadian ‘French Immersion’ model. ‘Early Total Immersion’ is the most common model on which the majority of research about immersion education is based.

Content and Language Integrated Learning (CLIL) and Immersion: CLIL has captured the essential nature of the immersion L2 approach, although by and large it has extended the Canadian immersion emphasis from content to both content and the target language. According to Beardsmore (2006), the modification of dual focus came from the pedagogical adaptation of the success of immersion in Europe; in 2002, the European Commission recognised, “What has clearly been hugely successful and popular in Canada however does not necessarily transpose easily into European context” (2006, p. 209). Coyle, Hood, and March (2010) defined CLIL as “a dual-focused educational approach in which an additional language is used for the learning and teaching of both content and language” (p. 1). Accordingly, the concepts of ‘immersion’ and ‘CLIL’ both come under the umbrella of ‘bilingual education’.

To be precise, the immersion program at Mawson Primary School where this research took place is a ‘Middle Partial Immersion’ setting according to Baker’s definition (2006, p. 246), as the immersion time allotment is 40 percent of a weekly schooling time (two days per week), and the age of the student participants in this research lies in the 10-year-old to 11-year-old range. Prior to this research the

principal pedagogical immersion approach at Mawson had been content-focussed. It emphasises the content learning under the ultimate objective of promoting both multiculturalism and bilingualism in an increasingly globalised world. It is important to clarify that in this study, I use ‘immersion education’ in a broad context, representing one category of ‘bilingual education’.

Second Language Acquisition (SLA): I have adopted Ortega’s (2009) definition on SLA, First Language Acquisition (FLA), First Language (L1) and Second Language (L2) in this research. Ortega (2009) defines SLA as “the scholarly field of inquiry that investigates the human capacity to learn languages other than the first, during late childhood, adolescence or adulthood, and once the first language or languages have been acquired” (p. 10). She further explains that SLA seeks to adapt its approach to take into account for effects of a broad range of factors (e.g., social, cultural and individual differences) and differences in teaching and learning methodology, and their impacts on learning outcomes. SLA covers the learning of second, foreign and heritage languages in natural or formal language-learning environments (Ortega, 2009).

First Language Acquisition (FLA): The investigation of the acquisition of the language/languages into which children are born and grow up with, learned from their family members or carers (Ortega, 2009).

First Language: L1, Mother Tongue: In this study, ‘L1’, ‘mother tongue’ and ‘first language’ are used to describe the language that a child learns first in her/his life from their parents/carers. Ortega puts a time frame on this period: “from the womb up to about four years of age” (Ortega, 2009, p. 5).

First language learner: According to Australian Curriculum, Assessment and Reporting Authority (ACARA), this term is used to define students who are “first

language users of the target language who have undertaken at least primary schooling in the target language; they have had their primary socialisation as well as initial literacy development in that language” (p. 22).

Second Language (SL/L2), Foreign Language (FL) or Additional Language (AL): These terms define students who learn the language only at school. It is the language(s) learnt other than one’s first language(s) in either natural or formal language-learning environments (Ortega, 2009).

Second language learners: These are people who are introduced to learning the target language as an additional, new language for them. As such the term covers learners’ second, third, etc. languages as long as they are not the language of their birth or used at home. ‘Foreign language’ and ‘additional language’ are also terms used to describe ‘second language’.

Home user: This term covers all students “who use the target language at home (not necessarily exclusively) and have knowledge of the target language to varying degrees (for example, vocabulary, phonological accuracy, fluency and readiness to use the language) and have a base ready for literacy development in that language” Australian Curriculum, Assessment and Reporting Authority (ACARA, p. 22).

Form: The term ‘form’ in this study, refers to ‘grammar’ within a broad range of linguistic features, including phonological and lexical aspects in an L2 acquisition context (this covers students’ ability to use standard language structure, grammar, pronunciation, etc.).

Form-Focused Instruction (FFI): The Focus on Form (FonF) approach was first introduced by Long in 1988. Long further elaborated his definition of FonF in 1991 and again in 1998 with Robinson. Fundamentally, FonF entails a shift in

emphasis from meaning to grammar during a communicative language process. Long stresses the ‘incidental’ and ‘implicit’ factors in his FonF theory (Long, 1991, Long & Robinson, 1998). Since first proposed, FonF has been subject to over 20 years of study and development by many researchers (for further details see the Literature Review chapter). Form-focused instruction (FFI), (e.g., Ellis, 2001, Lyster, 2004, 2006, 2007) extends the original Focus on Form approach to cover “any planned or incidental instructional activity that is intended to induce language learners to pay attention to linguistic form” (Ellis, pp. 1–2). It covers a broader context of grammar teaching in a meaning-focused setting. Hence, FFI in this thesis entails the grammar focus explicitly and implicitly, planned (mainly) and incidental in the communicative context.

Languages other than English (LOTE): ‘Languages other than English’ or ‘LOTE’ is a term used in Australia for second/foreign language programs prior 2013, mostly in primary and secondary schools. It refers to sessional language programs for students to study a language that is not the native tongue of the majority of students. In this research, the term (LOTE) is used to describe the way language is taught through weekly sessions, with the number of sessions differing considerably from school to school. (Note that the Australian Curriculum of Languages is designed on an indicative 350 hours of learning undertaken across Foundation to Year 6, 160 hours for Year 7 and 8, 160 hours for Year 9 and 10, and a further 200 to 240 hours for Year 11 and 12). In LOTE Chinese programs focus on language acquisition: grammar is typically taught through exercise drills, concepts, vocabulary and the formation of Chinese sentences. By and large, it follows the Universal Grammar teaching principles.

1.8 Thesis Structure and Chapter Outline

The thesis is arranged in seven chapters. Subsequent chapters are summarised below.

Chapter Two: Literature Review

An extensive review of the literature on L2 teaching and learning, and more specifically on grammar acquisition in a communicative language education context, is provided in this chapter. The literature review begins with an historical review of L2 grammar teaching ranging from the Universal Grammar approach to more content-focused approaches. This is followed by a discussion and critical analysis of the theoretical foundations of FFI in cognitive theory (cognitive process theory and cognitive load theory) and its operationalisation to facilitate grammar acquisition. Additionally, the basis for analysing and assessing data on students' progress in grammar acquisition is discussed, as well as the relevance of contextual information on Mandarin Immersion Program (MIP) and the student participants in this research.

The chapter then sets out the theoretical framework of FFI, considers the literature on its effectiveness in supporting L2 grammar learning, and reviews FFI pedagogical methods and their practical application. The theory behind FFI practical design and its limitations are also discussed.

Overall, the literature discussed in this chapter comprises the theoretical basis for this study, from which the research topic, research questions, hypothesis, design, method and approach to data analysis were all derived.

Key chapter sub-topics include: theoretical and pedagogical approaches to L2 teaching (the shift in focus from learning grammar rules exclusively to content and the motivation for the immersion approach; the immersion approach and pedagogy; and its strengths and limitations); rationale and development of FFI (the development

of the FFI framework; definition of FFI for this research); theoretical foundations of the FFI framework (cognitive theory; cognitive load theory and schemas; the significance of contextual information); FFI framework (comparative study of FFI research; FFI definition and framework); learning Chinese as a L2; theoretical underpinnings of the process of FFI implementation (the appropriate form and the level of linguistic difficulty to FFI; Proactive and reactive FFI); and assessing and analysing L2 acquisition.

Chapter Three: Research Methodology and Methods

Chapter three sets out the methodology and methods of this research. Drawing on the theoretical foundations of this research (cognitive theory and cognitive load theory), the motivation for adopting a reflective practitioner case study and the research design are discussed. The methodological foundation for data generation and analysis is addressed and the research credibility, limitations and ethics are discussed.

Key chapter sub-topics include: research theoretical foundation; research design (combining qualitative enquiry with supporting quantitative data; case study methodology; reflective practitioner case study); research questions; data collection (research setting and participants; classroom observation; data collection instruments; data collection procedure; classroom instructional task design); data analysis (categorising and coding qualitative data in relation to research question two; assessment and analysis in relation to research question three and quantitative analysis in assessing students' accuracy in the use of measure words and data interpretation); limitations and credibility of the research and research ethics.

Chapter Four: The Characteristics and Context of the Chinese Immersion Program (Research Question One) and Preparation for the FFI Intervention

This chapter deals with the context of the research and the characteristics of the Mawson Primary School immersion program (research question one). It discusses the contextual background for the research, including the significance of the participating students' cultural backgrounds and learning environment for this research. The contextual factors behind this research are highly relevant to the way FFI was implemented.

This chapter also demonstrates the Chinese immersion program teaching process, and specifically how students learn mathematics through their second language. Subsequently, the rationale for an FFI intervention is discussed and the FFI intervention procedure is introduced.

In terms of contextual data, key chapter sub-topics cover:

- the Mawson Mandarin Immersion Program (MIP) context;
- connections between background and FFI intervention and background;
- research site;
- student population;
- MIP time allotment and numbers of student in 2013;
- classroom setting; MIP teachers; curriculum design prior to this research;
- a typical MIP day schedule and activities;
- whole-school and community approach;
- MIP resources

In relation to designing the FFI intervention, sub-topics cover:

- curriculum planning with FFI component;
- the immersion mathematics teaching pedagogy for this research.

Chapter Five: Data Collection and Analysis – Research Question Two

The chapter demonstrates in detail the process of the FFI intervention as it relates to the target measure-word form and associated data collection. It examines the operationalisation of the FFI intervention and discusses the processes of collecting and analysing the relevant data. The second research question relates to the FFI implementation procedure and entails an examination of the ways that the FFI framework can be integrated into Chinese immersion settings. The detailed pedagogical approaches employed and the associated data and data collection process are all critical to answering this question. The data collection process, which entailed a stage-by-stage procedure of collecting FFI implementation data during immersion mathematics sessions and in a small number of Chinese language sessions, combined with data from a series of assessments (designed to measure changes over time in students' proficiency in the target form), is also covered.

Over 10 hours of classroom observations and interviews were recorded during the FFI intervention, with transcribed data coded into units and then organised into predetermined categories according to the recurring patterns of FFI. Parts of the data transcript that are representative of classroom FFI interactions are provided to demonstrate both the classroom FFI in action and the evidentiary basis for data analysis and subsequent research findings.

Throughout, the credibility and trustworthiness of preliminary findings were tested by cross-checking for discrepancies and review against relevant theoretical frameworks. Observation and reflection procedures were applied at each stage of the intervention.

Key chapter sub-topics include: the FFI classroom intervention/data collection process (create opportunities for students to notice the target form; balanced noticing,

awareness-raising and production practice FFI with corrective feedback and focused exercises and controlled practice to improve grammar acquisition); the second research question: In order to facilitate immersion students' grammar acquisition, how can the FFI framework be operationalised in this Chinese immersion program? (comparing Chinese language and immersion mathematics pedagogy pre and post FFI intervention; FFI methods employed in the research classroom; FFI Chinese immersion classroom implementation from the planning, first stage, second stage to the final stage of FFI intervention and the use of metaphor as a prompting method); and the chapter summary.

Chapter Six: Data Analysis – Research Question Three

This chapter examines the impact of the FFI intervention on students' grammatical accuracy and the ways in which the intervention extended and developed their proficiency in the target measure word form. Most of the data used to inform this analysis was qualitative in nature, with quantitative data (student participants' assessment results) also examined to help in confirming changes over time in students' grammatical accuracy. The post-intervention group interview with the student participants, and the interview with the immersion teacher Ellie, are also briefly discussed in this section.

Research question three investigates the impact of the FFI intervention in assisting immersion students' grammar acquisition. Acquisition was observed and assessed progressively drawing on both Lyster's (2006) summary of cognitive theory and the 'three evaluation approaches' established by Ellis, (2006, p. 37), which discusses the staged acquisition process of attaining conceptual knowledge; gaining skill in target form application; and reaching a competent level of applying target form frequently and extensively in different situations.

Key chapter sub-topics include: examining students' acquisition of the measure-word form (the third question): analysis of classroom observation data; analysis of students' pre, during and post-assessments results in Chinese measure-word production and assessment of potential detrimental effects on mathematics learning.

Chapter Seven: Research Findings Discussion, Recommendations and Conclusion

This chapter discusses the research findings on FFI operationalisation and its impact on grammar acquisition. It summarises the positive contribution of the FFI intervention to measure word acquisition by participating students, the key findings as relates to the operationalisation of FFI, and the challenges associated with the objective of adapting and integrating FFI more comprehensively into Chinese immersion settings.

The factors that have contributed to the success of FFI implementation are analysed and a series of recommendations are made on the most appropriate and effective ways to design and implement FFI in Chinese immersion language lessons, some of which may also be applicable to other language programs with a communicative emphasis on both content and language. The chapter also includes a discussion of the limitations of this research, factors that contributed to its success, areas for future improvement and areas for further research.

Key chapter sub-topics include: discussion of research findings; research success factors and recommendations for FFI integration in the Chinese immersion classroom:

- the importance of complementing the theoretical foundation for the FFI intervention with contextual specifics;

- the importance of incorporating FFI at the curriculum planning stage;
- the importance of containing FFI interventions to one or two forms that closely relate to subject content;
- effective FFI methods to this research;
- reducing cognitive load through familiar teaching tools;
- the compatibility of FFI with content-focused models of language education;
- the importance of language production practice in enhancing grammar learning;
- the Importance of teaching skills to the effective application of FFI; and research limitations and areas for further improvement.

1.9 Research Design

The design of this research project is summarised at table 1.1, below:

Table 1.1 Summary of Research Design

Research Questions and hypothesis	Research site and Participants	Instructional Treatment	Grammar Target	Methodology and Methods	Testing Instruments
<p><u>Research questions:</u></p> <ol style="list-style-type: none"> 1. What are the characteristics of the Chinese partial immersion program at Mawson Primary School? 2. How can the FFI framework be operationalised in this Chinese immersion program in order to facilitate students' grammar acquisition? 3. What effect does the integration of FFI into Chinese mathematics primary immersion pedagogy have on students' grammatical accuracy? <p><u>Hypothesis:</u> According to Lyster (2006), based on cognitive theory: A balanced FFI integration – systematically designed noticing, language awareness and production activities with feedback can be effective in improving immersion students' linguistic proficiency.</p>	<p>Mawson Primary School, ACT Australia.</p> <p>N:17 Grade 5 and 6 (10 to 11 years old) MIP (Mandarin Immersion Program) students.</p> <p>N:1 MIP mathematics teacher.</p>	<p>Form-Focused Instructional treatment in mathematics lessons through</p> <ul style="list-style-type: none"> • input enhancement and corrective feedback, followed by • controlled practice and • production exercises. 	<p>Chinese measure word (mw):</p> <p>The conceptual understanding of the measure word (mw) and the application of the mw in a communicative context.</p>	<p><u>Data collection period:</u> 10 weeks of 1 hour per week in total of approximately 10 hours of FFI treatment within a school term in 2013.</p> <p><u>Qualitative research with quantitative analysis</u> via classroom observation in a Chinese immersion classroom environment</p> <ul style="list-style-type: none"> • <u>Audio-recorded observations:</u> focus on FFI interventions on Chinese grammar during mathematics teaching process. Interactions between teacher and students and students with students. • <u>Field notes:</u> focus on the techniques of FFI employed by the teacher and students mw learning progress • <u>Audio-recorded individual and group interviews:</u> focus on the teacher and learners reflection on the most effective method from their experiences. • <u>Questionnaire:</u> background data collection on students' Chinese study history and their family backgrounds. • <u>Assessment results:</u> assessment results from pre and post FFI intervention are compared to measure students' grammar acquisition. <p><u>Data analysis:</u> Qualitative analysis: category coded data transcript in order to examine classroom pedagogical patterns, in order to draw pedagogical recommendations Data coded by: 1. Noticing activities. 2. Awareness-raising and 3. Production exercises with feedback. Quantitative analysis: assessment data were examined and analysed for grammatical accuracy gains in mw application.</p> <p><u>Theoretical framework:</u> Lyster's application of cognitive theory in FFI: Noticing, awareness raising and practice can move declarative knowledge toward procedural knowledge by moving knowledge from short-term to long-term memories. Cognitive load theory informs the pedagogical design of the FFI intervention.</p>	<p>Formative and summative assessments:</p> <ul style="list-style-type: none"> • Pre and post assessments on Chinese mw usage, including grammar judgement test, preference task in both oral and written productions. • Translations between English and Chinese phrases with target the grammar as essential part. • Classroom interactions and response to teacher's questions. • Sentence operation: phrase making: number and nouns phrases. • Production task: mathematics presentation. • Production task: creating mathematics questions. • Production task: My aunt's suitcase oral task. • Oral production: singing 1001 wishes. • Oral production: performance in "Mawson's got Talent". • Metalinguistic test: state the mw rules and application.

1.10 Chapter Summary

This is an introductory chapter that sets the context for the research. It introduces the rationale, significance and the background to the research. It also outlines the research objectives and the research questions. The next chapter discusses the literature and theories that are fundamental to this research.

CHAPTER TWO – LITERATURE REVIEW

2.1 Introduction

This chapter provides an extensive review of the literature on L2 teaching and learning on grammar acquisition and classroom pedagogy in a communicative language education context. The literature review also discusses the theoretical foundations of form-focused instruction (FFI) in cognitive theory and its operationalisation to facilitate grammar acquisition. Noting its role as one of the major theoretical underpinnings of content-based L2 approaches, cognitive theory assists in understanding the developmental process of L2 acquisition. In addition, and as part of building an in-depth and comprehensive theoretical foundation, Cognitive Load theory is also briefly discussed, as it provides further theoretical foundation for the design of effective language instruction. The theoretical explanations of how and why the FFI framework has been proven effective in supporting L2 grammar learning are provided, along with a theoretical review of FFI pedagogical methods and their practical application. Furthermore, the significance of the considerable linguistic differences between Chinese and European languages is also discussed. Subsequently, the theoretical framework used to assess and analyse data is discussed towards the end of this chapter. In summary, this chapter discusses the literature that provides the theoretical underpinning for this study; its research hypothesis and questions; as well as the research method and approach to data analysis employed in its design and implementation.

The following chart summarises the sequential development of the literature review.

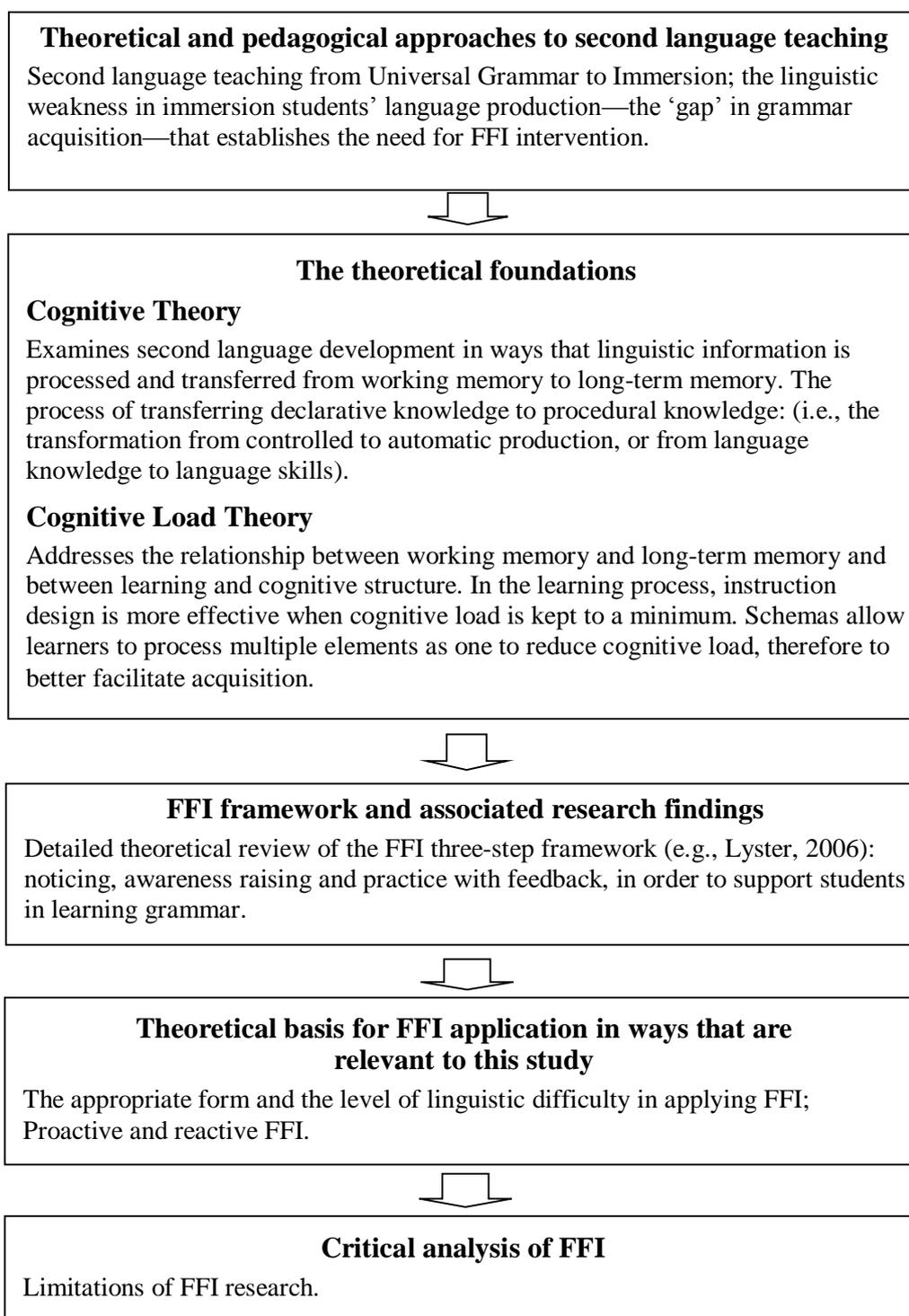


Figure 2.1 The development and structure of the literature review.

2.2 Theoretical and Pedagogical Approaches to Second Language Teaching

In order to gain clearer insights into both the history and rationale for a grammatical emphasis in the content-focused language teaching approach, a brief review of its development over time is warranted. However it is first necessary to explore the motivations behind the immersion model of L2 education and to discuss its benefits and limitations.

Larsen-Freeman (2000) explains that L2/foreign language acquisition studies began in the late 1960s, with further significant growth and development in this field of study through the 1980s and 1990s. As a result, various teaching methods and approaches have since been adopted by teachers and researchers. After over 40 years of research, L2 teaching and learning has become an independent discipline.

The writings of Lightbown (1998, 2000), Ortega (2009), Swain (1988), Mitchell and Myles (2004), Long (1988), Long and Robinson (1998), Larsen-Freeman (2000, 2009, 2014), Lyster (2004, 2006, 2007 & 2015), Ellis (2001, 2006) and Cummins (1998, 2011, 2014) comprise the primary sources used to demonstrate the theoretical and pedagogical development of L2 teaching and progression of the FFI framework. Doughty and Williams' (1998) analysis of the key issues associated with classroom focused research into FFI pedagogy is also relevant. Ellis (2001), Lyster (2006, 2007 & 2015), Paradis (2001, 2009) and Skehan's (1998) literature provide the theoretical foundation and explanations for the effectiveness of FFI framework in support of L2 learning. The development of L2 education is examined and discussed briefly below.

2.2.1 The Shift in Focus from Learning Grammar Rules Exclusively to Content, and the Motivation for the Immersion Approach

This section reviews progress over time in the discipline of L2 teaching ranging from teaching grammar one element at a time during language teaching through to a pure reliance on comprehension of content. In evaluating the content-focused approach of immersion education, some grammatical weaknesses in immersion students' target language production are identified, the existence of which established the need for FFI.

Historically, L2 teaching has been dominated by two major approaches to teaching grammar, one of which entails teaching grammatical forms analytically and the other through language use (Larsen-Freeman, 2014). A critical point to begin the history of L2 teaching is a brief discussion of the language-focused (i.e., teaching grammar analytically) approach and its theoretical basis, as it has been an influential, yet controversial, approach in L2 teaching for many decades. One of the main characteristics of this approach is that students learn the target language as a subject under approaches that, by and large, relate to either Universal Grammar theory or behaviourism. The Universal Grammar concept was developed by American linguist Chomsky in 1957, who believed that people have an innate knowledge and ability to acquire languages. Adherents of the Universal Grammar approach maintain all human languages are shaped by a common set of principles and parameters that are inherent to all human cultures and, as a result, all human languages share certain linguistic similarities. Furthermore, L2 grammars are controlled by Universal Grammar. It follows that language is encompassed mainly by content words, on the one hand, and grammatical rules on the other (Chomsky, 1981, 1986). Nevertheless, the fact that L2 learners are cognitively mature as they already possess their first language, combined

with the differences in learning approaches between each L2 learner, means that L2 acquisition is a different process compared to learning first language (Mitchell & Myles, 2004). In addition, behaviourism (e.g., Watson, 1924) views language learning as a habit formation process. A number of teaching approaches are aligned with both the behaviourist view and Universal Grammar linguistic theory, such as the more form-focused grammar-translation method, which emphasises reading and writing skills over speaking and listening skills. The purpose of the grammar-translation method is to enable students to learn through memorising grammar rules (Larsen-Freeman, 2000). Lightbown summarised the pedagogical trend in 1960 and 1970s as “preventative pedagogy” (1998, p. 189), where students were expected to acquire oral skills through repetition and by closely following language models and their teacher’s instructions. “... and by the time I began teaching high school French in the late 1960s, ‘everybody knew’ that language was learned through imitation, repetition, and drill, leading to the formation of habits of correct language production” (Lightbown, 2000, p. 434). Lightbown comments: “the principle underlying this approach was the importance of practicing correct forms, which led to the formation of habits and subsequent learning by analogy” (1998, p. 190).

Even though more contemporary classroom language teaching approaches have endeavoured to add cultural and communicative elements into the language-focused teaching practice, they fundamentally limit their focus to just some aspects of a language system, (i.e., syntax, semantics and phonemes, which comprise the vocabulary, grammatical rules and structural features of the language), and thereby ignore the linguistic and cultural dimensions of languages. Long and Robinson explained that a focus on grammar language teaching is one of the ‘synthetic’ (Wilkins, 1976) approaches that have come to dominate L2 teaching, including

methods such as the Grammar Translation method, the Silent Way, the Audio Lingual method and Total Physical Response. Such methods often break language into small parts and take linguistic features out of their context, hence making it difficult for learners to master them systematically. In critiquing the adequacy of ‘synthetic’ approaches, Wilkins observed that by segmenting the teaching of a language into separate steps, synthetic approaches artificially limit a learner’s exposure to small samples of the language (Wilkins, 1976). Long and Robinson contended that advocates of the ‘synthetic’ method “either largely ignore language learning processes or tacitly assume a discredited behaviourist model” (1998, p. 16). As a result, students taught through such methods fail to attain grammatical proficiency and communicative competency, as they “typically pass through stages of non-target-like use of target forms, as well as target-like and non-target-like use of non-target-like forms” (Long & Robinson, 1998, p. 17). Unfortunately those grammar focused approaches that teach the target language as a subject have been demonstrated to be neither effective nor sufficient in developing learners’ target language communicative skills. The contribution of Universal Grammar theory in language analysis nevertheless needs to be recognised, as Mitchell and Myles (2004) affirmed

...despite these criticisms, Universal Grammar has been highly influential as a theory of language, and is probably the most sophisticated tool available for analysing language today, whether native or second languages. (p. 93)

Nevertheless, in acknowledging the shortcomings of Universal Grammar theory, research in the second language field in the 1970s and 1980s advocated a shift away from the exclusively synthetic focus on grammar and towards input and interaction, the theory and practice of more communicative-focused L2 education, and more specifically the immersion approach. “[T]he pendulum has swung, and

communicative language teaching has swept through many FL/SL classes”
(Lightbown, 2000, p. 434).

Subsequently, the communicative nature of language use was emphasised over the rules of the language, and cognitive psychology was influential to this change. In the 1980s, drawing from L2 research findings and the success of French immersion outcomes in Canada, (the French immersion programs established in Canada since 1965), many partial/full immersion programs replaced the traditional grammatically structured ‘memorization and drill’ model. They did this by applying a content-focused and task-based language teaching approach. As noted by Lightbown (1998), the linguistic theories and proposals from Breen and Candlin in 1980 and Brumfit and Johnson in 1979 informed this shift.

The focus on meaning approach has hundreds of years of history (Baker, 2006), where the emphasis is on the importance and benefits of learning a target language through its functions as a medium of communication, rather than as a learning object. It proposes successful L2 acquisition through incidental and implicit exposure to comprehensible target language, in much the same way as children acquire their first language. Immersion is one of these content-based approaches.

Baker (2006) and Johnson and Swain (1997) described the main features of the immersion approach as a form of bilingual education, in which the target language is used as the medium of instruction in teaching and learning several areas of students’ curriculum (for example, German students studying their history in English; Chinese or Japanese students in China or Japan learning science in English; or Australian students learning social studies in Chinese). According to Baker (2006) and Cummins (1998, 2011), immersion has a history back to as early as the Second World War. Here, the term ‘immersion’ was used to describe additional language

training for the US army in preparing soldiers to go to other countries. This preceded the subsequent development of L2 immersion education for school-aged children. The French immersion model first used in Montreal, Canada, in 1965 is one of the driving forces that started the modern immersion movement. Since then, various types of immersion programs (total/ partial immersion, early/middle/late immersion, CLIL) have spread from Canada to many countries in Europe, America and Asia.

Larsen-Freeman (2000) informed the principle of communicative language teaching: “Communicative language teaching aims broadly to apply the theoretical perspective of the Communicative Approach by making communicative competence the goal of language teaching and by acknowledging the interdependence of language and communication” (p. 121). In her observation of a content-focused classroom teaching, she noted that students’ language mistakes were ignored and perceived “as a natural outcome of the development of communication skills” (p. 127).

By this time, ‘everybody knew’ that exposure to comprehensible input and the opportunity to interact in group work would not give students what was necessary for language acquisition to proceed.

(Lightbown, 2000, pp. 434–435)

Subsequently, in the mid-1980s, the levels of language proficiency achieved by immersion students in their speaking and writing skills were questioned by some researchers. “Researchers were raising questions about the adequacy of a purely comprehension – or content-based – approach to language teaching for achieving high levels of proficiency in language production” (Lightbown 2000, p. 437). In this regard, the views of Lightbown were reinforced by Harley and Swain (1984), and Swain (1984, 1985). Long also believed that the sole focus on meaning approaches

are as “equally single minded” (Long & Robinson, 1998, p. 18) as the grammar-centred approach.

Long and Robinson (1998) disagreed with the fundamental basis of the ‘pure natural’ approach to L2 learning that entails an exclusive focus on meaning, and provide four evidential points in support of their arguments. Firstly, older learners do not have the same capacity to learn an additional language as young children do in acquiring the basic functions of their first language, even though older learners have the advantage of higher comprehensive ability. In fact, older learners need more support in order to gain L2 proficiency. Secondly, older L2 learners show “premature stabilization” despite sufficient content-focused input. This is further supported by Swain’s (1991b) finding that, “their productive skills remain far from native-like particularly with respect to grammatical competence” (Long & Robinson, 1998, p. 20). Thirdly, some grammatical features simply cannot be learnt by only positive exposure to the target language. And finally, the limited range and variety of language features (i.e., vocabulary, grammar structure, function) exposed to immersion students in the process of delivering content served to impede progress in their language proficiency (Swain, 1988).

Similarly, a number of studies were able to demonstrate that the process of L2 acquisition is more efficient for learners who receive formal instruction in a language than otherwise (i.e., not receiving language instruction). In this regard, Long concluded that “it is unlikely that more exposure is all the students need. Rather, additional salience for the problematic features seems to be required, achieved either through enhancement of positive evidence or through provision of negative evidence of some kind” (Long & Robinson, 1998, p. 21). This led to further analysis of the advantages and challenges that immersion approach brings on language development.

2.2.2 The Immersion Approach and Pedagogy, and its Strengths and Limitations

The immersion approach provides learners with opportunities for language exposure in its input and production opportunities in a communicative environment. Generally it has proven to be successful in building students' communicative competency, comprehension capacity and L2 production fluency. While there are considerable differences between immersion models and the contexts within which they operate (Lyster, 2007; Baker, 2006), much research suggests that a content-focused immersion approach can make a far more significant contribution to improving learners' L2 communicative fluency than those approaches where the target language is taught only as a discrete subject (e.g., Lyster, 2004, 2006). Findings from Harley et al. (1990), Allen, et al. (1990), Orton (2008a, 2008b), Scarino et al. (2011), Clyne (1986), Baker (2006), Berthold (1995) and Cummins (1998, 2011) are aligned with Lyster's conclusion. While it is clear that immersion students perform better in their language fluency and competency than students of more conventional language programs, the precise factors or reasons (e.g., the extended time spent using the target language; potential cognitive benefit derived from regularly shifting between languages; or both factors; or others), remain unclear. Cummins (1998, 2011) evaluated the achievements of French immersion programs in Canada and associated research findings on their limitations. According to Cummins, in early immersion programs in the Canadian school context, students develop their French language skills without any detrimental impact on their first language (English) academic skills (acknowledging that the assessment tool for measuring students' academic English skills may have its limitations in assessing all areas of the language proficiency). It is also evident that there is a strong correlation between first and L2 academic development (Cummins, 2011). Cummins (1998) claimed that additive bilingual

education has no negative impact on children's academic development. On the contrary, it has significant positive effect on children's metalinguistic, academic and intellectual development. As children learn a second language, the learning process assists in developing their conceptual understanding and cognitive skills, which in turn contributes to learning outcomes in other subjects. Despite significant differences between some language systems (e.g., Chinese and English), learners actually acquire common sets of knowledge and skills required to switch between language codes as "there is an underlying cognitive/academic proficiency that is common across languages" (Cummins, 1998, p. 37). In addition, bilingual children have two ways to describe the world and this gives them more flexible perceptions and interpretations in their views (Vygotsky, 1978). Bilingualism can therefore enhance divergent thinking to the better development of learners' creative thinking. It not only increases their language fluency but also improves flexibility, originality and elaboration in their cognitive process.

In addressing concerns about immersion students' target language acquisition, Cummins' findings (1998, 2011) are significant for this research. Drawing on others' research findings, Cummins reported that immersion education provides students with good receptive skills (listening and reading) in French, but with limitations on linguistic accuracy and vocabulary development in their productive skills. "By the end of elementary school (grade 6) students are close to the level of native speakers in understanding and reading of French but there are significant gaps between them and native speakers in spoken and written French" (Harley et al., 1990). "The gap is particularly evident in grammatical aspects of the language" (Cummins, 1998, p. 35). Moreover, Cummins affirmed that the immersion approach should include language and socio-cultural aspects within its scope as this is "likely to enhance the natural

tendency of bilinguals to become more aware of their linguistic operations” (1998, p. 36). With regard to the linguistic gap mentioned by many researchers, a shift in emphasis from content to teaching language form can sometimes be essential. An immersion program can therefore become more effective through a dual focus on content (or message) and language. This includes provision of opportunities for sufficient comprehensible input and output production in the target language. Immersion teaching should ensure learners’ development both in learning strategies and in using the target language in meaningful communications. Significantly, Cummins extended the emphasis beyond developing students’ linguistic knowledge to deepening students’ multicultural understanding, thus better equipping them to become effective contributors to global society.

In Australia, Clyne arrived at a similar conclusion in his study on Australian German immersion programs (1986), where he found grammar acquisition to be a major weaknesses of the immersion model. As observed by Clyne, immersion can entail an overgeneralisation of grammatical rules, and specific teacher-pupil interactions patterns, each of which can compromise children’s L2 grammatical development, and which demand corrective intervention by the third year of the program. Thus language in use should be complemented by language arts in second language, as is the case in English, and as has been found necessary in the Canadian immersion programs (Clyne, 1986).

2.3 Rationale and Development of FFI

Building on from the discussion at 2.2, this section further explores the grammatical deficiencies evident in immersion models of second language education, (including the gap between immersion students' language fluency and accuracy), and the rationale that this weakness provided for the FFI approach. This 'grammatical gap' that Cummins mentioned in his analysis (1998), along with my own experiences in the Chinese immersion program, were the primary factors in instigating this research, and have reinforced my interest in searching for methods to deal with this weakness in immersion linguistic development.

2.3.1 Rationale for FFI

Concerns on immersion students' linguistic accuracy development as expressed by Cummins and Clyne are well supported by many researchers, many of whom have undertaken detailed analysis of this weakness. Swain (1985) explained that students in immersion settings do not need to be grammatically perfect to understand meaning, as learners can employ strategies to decode meaning in L2 comprehension (e.g., listening for key words, contextualising the message, guessing, interpreting body language, etc.). Hence immersion students are "linguistically truncated, albeit functionally effective" (Genesee, 1994a, p. 5). As a result of the fact that immersion students are well-known for being fluent yet inaccurate (Lyster, 2004), the development of target language accuracy is comparatively weak.

Paradis (2009) observed, from a neurolinguistic perspective, that speakers may be quite fluent in L2 but quite inaccurate at the same time (meaning that they have internalised or automatised a grammar containing some items that are deviant with respect to the L2 norm). The fundamental premise behind the input exclusive language approach is that language is acquired unconsciously through implicit input.

Krashen proposed Monitor Theory (1982, 1985) in which he differentiates between consciously learnt languages with unconscious learning, believing that L2 competency is dependent on unconsciously acquired language knowledge. This ‘non-interface’ proposal is based on the way learners use the L2, where some fluent production “seemingly involves intuitive knowledge, and more deliberate language use, which appears to depend upon expressible linguistic knowledge” (1998, p. 203). However, Doughty and Williams (1998) argued that Krashen’s theory fails to address the possibility (or likelihood) of any connection between conscious and unconscious language usage, and the transformation from one to the other. The contention here is that some FFI could well provide assistance in improving unconscious language usage.

In addition, based on his own immersion program teaching and researching experiences, Lyster (2006) shares the views of Allen, Swain, Harley, and Cummins (1990), Larsen-Freeman (2014) and Swain (1988) that the theoretical basis for early immersion programs in the 1970s and 80s was based on the assumption that learners’ L2 development follows a similar process as their first language acquisition; that is, the development of L2 skills can be attained through acquiring content knowledge without particular attention to the language forms. Moreover, content-based language education, where exposure to grammatical forms is largely incidental to other language aspects, fails to achieve adequate learning outcomes in those forms (Harley, 1994; Swain, 1988; Lyster, 2007).

Furthermore, Skehan (1998) explained the issue from a cognitive position: “...instructional activities that emphasize meaning, whether comprehension-based or production-based, may induce learners to rely on strategies for communication which result in a bypassing of the form of language” (p. 11). The content-focused

methodology "... offered only rudimentary accounts of the mechanisms and processes by which comprehension was supposed to influence underlying interlanguage and generalize to production" (p. 13). In analysing Krashen's 'comprehension-based instruction' (1985) which influenced listening-centred pedagogies in L2 classrooms, Skehan (1998) pointed out the inadequate development of productive skills, in comparison with students' receptive abilities, in which again explains the lack of accuracy in immersion students' speaking and writing production.

In conclusion, with the acknowledgment of the language-focused approach and the early immersion achievements, the history of L2 education practice, particularly grammar teaching, has indicated that neither extreme of a decontextualized approach of teaching grammar rules on the one hand, or a pure communicative approach on the other, can produce satisfactory outcomes on its own. Therefore, neither rigid grammar nor purely natural language learning are effective when either approach is applied in an exclusive fashion (Doughty & Williams, 1998; Larsen-Freeman, 2014)). The integration of grammar and content approaches such as FFI can potentially lead to a more effective L2 acquisition (Lyster, 2007; Lightbown, 1998; Larsen-Freeman, 2014).

The discussion above forms the base of the hypothesis for this research: that FFI could potentially be integrated in the Chinese immersion teaching process to improve students' grammatical proficiency.

2.3.2 The Development of the FFI Framework

Based on the strengths and limitations of meaning-focused approaches, (such as the immersion approach), and in light of the ‘Interaction Hypothesis’, Long (1981, 1983, 1988a, 1991) proposed the ‘Focus on Form’ (FonF) approach. He explained the effectiveness of FonF through his Interaction Hypothesis by drawing learners’ attention to certain linguistic forms and the gap between input and output, thereby accelerating understanding and learning by helping learners to internalise the forms in question. Thus, the concept of FonF was first introduced by Long in 1988. In 1991, Long defined FonF as drawing learners’ attention to grammar features during a communicative content-focused L2 learning process. He especially pointed out that it should happen incidentally as the need for grammar attention arises.

Given that the grammar focus in the content learning process theory has been the subject of much research in L2 classrooms for over 20 years, the pertinent question is not whether to focus on grammar, but how to do it most effectively. As many researchers are convinced of the merits of a form-focused approach, the debate now concerns ‘how’, ‘when’ and ‘what’ to make form focus more effective for L2 learners. Furthermore, many researchers have questioned the incidental approach stressed in Long’s FonF and in so doing, have further developed Long’s FonF original framework, drawing on their empirical studies and the specification of their research contexts.

In the application of a grammar emphasis in L2 teaching, the ‘consciousness raising’ approach attempts to raise learners’ linguistic awareness by highlighting the grammar features explicitly in the input process in order to ameliorate the weaknesses associated with the ‘synthetic’ approach (e.g., Ellis, 1991; Sharwood-Smith, 1981). Further, Sharwood-Smith (1991, 1993) developed the ‘input enhancement’ theory that

entails a “more readily verifiable creation of input salience” (Long & Robinson, 1998, p. 17). For example, the teacher uses highlighting, underlining, colouring or italics to draw learners’ attention to the grammar element in order to integrate linguistic acquisition with learners’ L2 learning processes. Hence the overall L2 teaching methods remain as discrete, separate methods. In addition, based on their empirical studies, Norris and Ortega (2000) and Spada (1987) prefer a more explicit approach to FonF, rather than an implicit approach (discussed in Lyster, 2006). In 2001, Ellis recommended the ‘Form Focused Instruction (FFI)’ approach, the FFI approach deleted the ‘no analytical’ and ‘implicit’ emphasises to expand the FonF definition to include “any planned or incidental instructional activity that is intended to induce language learners to pay attention to linguistic form” (2001, pp. 1–2). Based on a series of L2 classroom research projects, Lightbown (1998) and Ellis (2002) both questioned the restrictions of the preceding FonF approach in communicative interaction (Lyster, 2006). Lyster also found Long’s definition of FonF (1991) was too brief and ‘boiled down’, and thus failed to convey the nuances of “certain grammatical subsystems” (2007, p. 27). Furthermore, Lightbown found that learners benefit from the integration of forms and meaning in instructional environments (1998), and argued that “there is a role for ‘grammar instruction’ that is separate from communicative activities and yet is integral to the lesson as a whole” (Lightbown, 1998, p. 194). Lightbown stated that

teachers who focus learners’ attention on specific language features during the interactive, communicative activities of the class are more effective than those who never focus on form or who do so only in isolated grammar lessons.
(Lightbown, 1998, p. 192)

In addition, and as found by VanPatten (1990), he also argued that this joint focus on form is in fact essential to conveying meaning effectively. Moreover, Lyster (2007) contended that Long's incidental FonF, (e.g., recasting) in the immersion settings ignored disappointing findings of many classroom research projects on the connection between extensive recasting with learners' interlanguage development.

Hence a more systematic and proactive language focus integrated into the curriculum is considered by Lyster to be essential for immersion programs, "...because there now exists considerable evidence that a prevalence of implicit and incidental treatment of language in these particular instructional settings does not enable students to engage with language in ways that ensure their continued language growth (Lyster, 2007, p. 99). In relation to grammar instructions, Lyster continues to promote more systematically planned, balanced instructions with grammar and content in communicative content-focused interactions:

In the case of grammar instruction, a more intentional approach is called for, but with less decontextualized analysis of the target language in terms of its structural parts, and more systematic reference to form/meaning mappings in the target language during meaningful interaction and content-based instruction. That is, because much content instruction is lexically oriented, teachers are naturally inclined to focus on vocabulary for the purpose of comprehension more than for drawing explicit attention to the formal and generative properties of words. At the same time, because content instruction and its lexical orientation do not readily bring grammatical issues to the forefront, teachers are more inclined to do so either incidentally or in a decontextualized manner. (Lyster, 2007, p. 58)

In the early 90s, as globalisation drew into focus the increasing need for people to communicate internationally, ‘Content and Language Integrated Learning (CLIL)’ was initiated in Europe according to Mehisto, Marsh, and Frigols (2008).

An increased understanding that content and language needed to be taught and learnt hand in hand was developing. At the same time, it was becoming apparent that standard second-language teaching alone was not achieving adequate results on a widespread scale. (Mehisto et al., p.10)

Hence, the rapid growth of content-focused programs in Europe, Asia and across the world stressed the need for a dual focus on both language and content. This dual approach was designed to provide ample scope for flexibility in all aspects of language programs, including the aspects of time allocation and intensity.

Having discussed the rationale for incorporating a grammatical focus to content-based language approaches, the concept of Form-focused Instruction is defined below.

2.3.3 Definition of FFI for this Research

The FFI framework of this study is intended to be understood in terms of a focus on the development of grammar skills through explicit, implicit, planned and incidental approaches in the classroom communicative process (based on Ellis’ 2001 FFI definition). The communicative factor of grammar use is stressed here to distinguish FFI from teaching grammar in isolation. Additionally, Ellis defined FFI in terms of both its primary focus and the way it is delivered. The focus on forms approach primarily targets grammar through concentrated model drills. In contrast, reactive FFI teaches grammar through content. In this way it covers a broad range of grammar features and deals with them as and when each mistake occurs. In

considering planned FFI, the priority assigned by this research is on grammar taught via systematically designed communicative arrangements while delivering content.

2.4 Theoretical Foundations of the FFI Framework

Cognitive processing theory provides a helpful insight in understanding and explaining the linguistic processes behind language development, especially for immersion students (Lyster, 2007). As the main theoretical foundation for FFI, cognitive theory is discussed in detail in this section. The FFI framework is examined particularly through the concepts of transformation from controlled knowledge to automatic production, and from declarative to procedural knowledge, both of which are foundational to pedagogical design and to measuring grammar acquisition. The section also explores the differences between implicit and explicit knowledge and their relationships to short and long-term memory. Cognitive load theory is also briefly discussed as it relates to the load of working memory. Ultimately, the FFI approach is intended to facilitate the acquisition of L2 grammar from language concept to the skill required to use the language for communication.

2.4.1 Cognitive Theory

Cognitive linguistics is about language, communication, and cognition. They are mutually inextricable. Cognition and language create each other. ...

Cognition, consciousness, experience, embodiment, brain, self, and human interaction, society, culture, and history are all inextricably intertwined in rich, complex, and dynamic ways in language. (N. Ellis & Robinson, 2008, p. 3)

Cognitive theory, which approaches L2 acquisition as a cognitive action, comprises two major views: information processing theory; and construction theory. The process-focused cognitive theory on which this research is based “investigate[s] how L2 learners process linguistic information, and how their ability to process the L2

develops over time” (Mitchell & Myles, 2004, p. 97). This framework perceives L2 learning as acquiring cognitive skills.

The process-focused cognitive theory underscores language learning and use, and deals with L2 competency building and learning strategies. As such it has been significantly influential in shaping many pedagogical approaches to L2 education. McLaughlin described the application of cognitive theory in L2 acquisition as a process of supporting the “automatisation” of language skills through practice and performance, where “[a]s performance improves, there is constant restructuring as learners simplify, unify, and gain increasing control over their internal representations” (McLaughlin et al., 2004, p. 97).

Consequently, many researchers posit a distinction between learning and acquisition. For Paradis, “the term acquire (and its derivatives acquisition, acquirer) will be used to refer only to implicit (non-conscious) items and processes, whereas learn (and its derived forms learning, learner) will refer only to explicit (conscious) items and processes (except in direct quotations)” (2009, p. 1). Therefore, acquisition leads to competence, while learning develops knowledge (Paradis, 2009). In explaining the differences between ‘acquire’ and ‘learn’, it is easy to understand Paradis’ next point: that while noticing may lead to the learning of syntactic rules, it does not equate to acquisition, as grammatical rules need to be internalised in order to a learner to gain linguistic competence. Otherwise, grammatical mistakes will continue to occur (Paradis, 2009). Mitchell and Myles state:

Learners first resort to controlled processing in the L2. This controlled processing involves the temporary activation of a selection of information notes in the memory, in a new configuration. Such processing requires a lot of attentional control on the part of the subject, and is constrained by the

limitations of the short-term memory... Through repeated activation, sequences first produced by controlled processing become automatic. Automatised sequences are stored as units in the long-term memory, which means that they can be made available very rapidly whenever the situation requires it, with minimal attentional control on the part of the subject. As a result, automatic processes can work in parallel, activating clusters of complex cognitive skills simultaneously. (2004, p. 101)

According to this view, learning is a transformation from controlled process to automatic process through repeated practice and activation. Once the knowledge is moved to automatic stage, it can continuously proceed to more complex levels of acquisition. This procedure involves constant modifying, correcting and reforming learners' linguistic knowledge in achieving higher proficiency. This process explains why L2 acquisition is a progressive, accumulative process.

To explain cognitive process theory further in a L2 learning context, the primary elements of cognitive theory when applied to language acquisition are the concepts of 'declarative knowledge' and 'procedural knowledge'. As explained by Lyster, declarative knowledge refers to the process of acquiring language items through a controlled process that relies on short-term memory. Procedural knowledge refers to the automatic process of performance, which is an automatic process of language production that relies largely on long-term memory. Memory function is a key concept in cognitive linguistics. The memory system concept helps to explain how the FFI framework of noticing, linguistic awareness and practice works in order to support the transformation from declarative to procedural knowledge.

To explain this in terms of the memory system, the short-term and long-term are considered the two major memory systems (Skehan, 1998; Cooper, 1998). Of these:

the short-term memory is considered to be limited in capacity, and to require conscious effort and control. It is also likely to be serial in operation. The long-term memory system, in contrast, is very large in capacity, can operate in parallel fashion, and may not be always susceptible to conscious control. (Skehan 1998, p. 44)

This theory has been developed further in recent years, in that short-term memory is now recognised as working memory which possesses certain characteristics, notably a capacity for repetitive phonological and visual rehearsal; a ‘central executive’ capacity to focus attention on subject matter; and an ability to recall more recent and frequently accessed information from long-term memory (Skehan, 1998). Working memory closely connects with input process, and the interface between working and long-term memory is vital to language production. Skehan (1998) examined three key concepts of input, central processing and output, concluded that noticing is fundamental for input, as it affects the quality and focus of the input and also shapes internal factors and task demands. Memory can also be defined in three categories: short-term memory, a declarative long-term memory and procedural long-term memory. In 2004, Lyster articulated a connection between cognitive theory and FFI:

cognitive theory predicts the feasibility of pushing interlanguage development above and beyond the plateau by means of form-focused instructional options that include noticing and language awareness activities designed to effect change towards more target-like declarative representations, and practice

activities designed in tandem with strategic opportunities for feedback to enable learners to proceduralise their knowledge of emerging target forms. (Lyster, 2004, p. 337)

Lyster further affirmed that FFI is the: “instruction that emphasises, on the one hand, noticing and language awareness to enable learners to restructure interlanguage representations, and on the other, opportunities for practice that allow learners to proceduralise more target-like representations” (2004, p. 334).

The transformation from declarative knowledge to procedural knowledge is a developmental process of progressive accumulation. Lyster believes that noticing, awareness-raising and practice FFIs develop L2 growth in an accumulative and continuous way, as indicated in the diagram below (Figure 2.2). “Learners engage primarily in a receptive mode during noticing activities and in a productive mode during practice activities. Activities designed to develop language awareness engage learners either receptively or productively, or both” (Lyster, 2004, p. 334). Receptive skill entails the ability to listen and read in the target language, and hence to receive and understand the language. As such it does not in itself require that students can produce the language. In contrast, productive skill entails capacity for language production – speaking and writing. In language learning, learners often start with building their receptive skills and then gradually transfer their effort and knowledge into productive skills. When content, communication and cognition are combined into one lesson, this provides opportunities for students to improve both receptive and productive knowledge and skills at the same time.

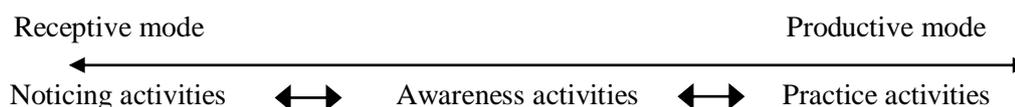


Figure 2.2 An illustration of the role of noticing, awareness raising and practice FFIs in stimulating students' learning responses (Lyster, 2004, p.334).

Furthermore, the premise that central processing is based on rule-based and exemplar systems has generated considerable discussion on the conditions that are conducive to learning, such as the various ways that implicit and explicit approaches impact on L2 acquisition. A conclusion can be drawn that “[t]he rule-based system is generative and flexible, but rather demanding in processing terms, while the exemplar (memory) system may be more rigid in application, but functions much more quickly and effectively in ongoing communication” (Skehan, 1998, p. 62). Most importantly, the two knowledge systems (rule-based and exemplar), have major impacts on language output and, taken together, explain the need for FFI: “one can equally propose that it is not a natural activity to focus attention on form, but that such a focus has to be contrived in some way” (Skehan, 1998, p. 62). At the input stage, strategic processing is of higher priority than noticing. When it comes to processing, a knowledge system based on memory is the easiest to access. In terms of language output, “similarly, unless form-enhancing processing conditions apply, instance-based performance will be more natural” (Skehan, 1998, p. 62). Furthermore, according to Paradis (2009) “implicit linguistic competence is acquired incidentally, stored implicitly, and used automatically” (p. x). It is impossible for us to consciously accelerate this process. Competence refers to learners' language skills, where declarative knowledge is subserved by declarative memory. In this respect, both implicit competence and linguistic knowledge are coexistent and transferable (Paradis, 2009). It follows that:

The transformation of declarative knowledge into procedural knowledge involves a transition from controlled processing to automatic processing. Controlled processing requires a great deal of attention and use of short-term memory, whereas automatic processing operates on automatised procedures stored in long-term memory” (Lyster, 2006, p. 42).

In this way, Lyster affirms the valuable contribution of both practice and feedback in optimising L2 learning outcomes. This view aligns with Skehan (1998) who considers L2 learning to be a complex, gradual cognitive process in which declarative knowledge progresses to procedural knowledge. Lyster emphasises that FFI can be processed either by instruction intervention or through learners’ internal cognitive analytical process. In the case of language learning, practice and feedback can speed up the progress of knowledge from the stage of understanding language concepts to using the language for communication (DeKeyser, 1998, 2001). Hence Lyster asserted that practice and feedback can accelerate the progression from short-term memory-controlled knowledge to a more long-term memory-based automatic production.

Significantly, “counterbalanced instruction” was proposed by Lyster based on the hypothesis that: “instructional intervention” (2007, p. 126) can shift learners’ L2 acquisition in the direction of increased accuracy. This entails the integration of form-focused and content-based instruction through counterbalanced instruction. The counterbalanced instruction promotes continued L2 growth by inciting learners to shift their attentional focus in a way that balances their awareness of getting two for one, that is, learning both language and content together. In contrast, controlled production activities with role plays and games, in tandem with greater emphasis on noticing and awareness tasks

designed to draw attention to the formal properties of target forms, led to more robust change. (Lyster, 2007, pp. 128–129)

Unlike other language theories, (e.g., Universal Grammar approaches, which study people's innate language capabilities), cognitive theory approaches L2 learning from the perspective of understanding the brain's information processing functions. However, while cognitive theory does provide important insights into how a second language is acquired, the value of other theoretical approaches should not be discounted. In particular, it should be noted that cognitive theory does not nullify the relevance of many other aspects and factors critical to language acquisition including (for example), the linguistic system within which learning takes place; and the significance of social interactions and a variety of contextual factors that impact on learners and learning (Mitchell & Myles, 2004). Hence, cognitive theory can be complemented with other theories to improve the understanding on L2 acquisition. This leads to the following discussion.

2.4.2 The Significance of Contextual Information to this Research

As discussed above, cognitive theory supports the study of L2 acquisition through knowledge transformation in memory function. However this should not mean that contextual and individual differences could be perceived as being of only minor relevance. "In attempting to maximize any pedagogical strategy, it is important not to accept blanket edicts, but instead to take into account the differing circumstances under which classroom SLA takes place. ... and these differences may have important consequences for decisions regarding focus on form" (Doughty & Williams, 1998, p. 199). In undertaking this study, it is important to acknowledge the significance of the learning environment, its impact on FFI intervention, and its relevance for classroom pedagogy and curriculum design. While this study seeks to

apply and test the application of cognitive theory through the FFI framework, it nonetheless connects cognitive activities with their contextual variables, as the FFI sequence of noticing, awareness-raising and practice (participation) can readily be considered as environmental support that helps to accommodate grammar learning. Hence some discussion about the contextual information of the Mawson Chinese immersion program is warranted as part of the study. As noted by Van Lier (2000), the application of cognitive theory benefits from analysis that connects social and environmental factors with cognitive activities. Furthermore, contextual information also serves to demonstrate the differences between immersion programs and to stress the relationship between learning environment and learners, and how these factors impact on, or influence, the FFI intervention. This topic is discussed in more detail in Chapter Four.

2.4.3 Cognitive Load Theory and Schemas

Cognitive Load theory (Sweller, 1988, 1999) is also closely related to immersion pedagogy and FFI. While it is not the main theoretical focus of this research, Cognitive Load theory complements cognitive theory (i.e., the process of transferring declarative knowledge to procedural knowledge) in ways that assist in the design of immersion and FFI instructional pedagogy.

Cognitive Load theory developed out of research into information processing, and focuses particularly on how our short and long memory operate. In the process, it established a set of principles in effective instructional design (Sweller, 1988, 1999). Thus, Cognitive Load theory is an instructional theory developed in the field of cognitive science research which studies the mental processes of knowledge, and therefore the ways that instruction design can lighten the load on our working memory (Cooper, 1998). Specifically “cognitive load refers to the total amount of

mental activity imposed on working memory at an instance in time” (Cooper, 1998, p. 11). Furthermore:

It describes learning structures in terms of an information processing system involving long term memory, which effectively stores all of our knowledge and skills on a more-or-less permanent basis and working memory, which performs the intellectual tasks associated with consciousness. Information may only be stored in long term memory after first being attended to, and processed by, working memory. Working memory, however, is extremely limited in both capacity and duration. These limitations will, under some conditions, impede learning. (Cooper, 1998, p. 1)

It confirms that most human cognition is driven by the information stored in the long-term memory. As students’ short-term memory is limited in its capacity at any one time. Cognitive Load theory suggests that the cognitive load placed on students during the learning process should be minimised through instructional methods that best align with human cognitive structure and support effective learning. The term ‘schemas’ is used to describe complex systems of concepts, such as grammatical concepts, within the Cognitive Load theory. Once learnt, these concept systems, or ‘schemas’, become stored in the long-term memory and are retrieved as a whole, making retrieval easy. Therefore, and most importantly, the aim of instruction is to embed these schemas in long-term memory. It is these schemas that allow cognitive processes, such as thinking, problem-solving and comprehension activities to take place, and as such they are the cognitive structures that build our knowledge base (Sweller, 1988). The more schemas that we store in our long-term memories, the easier to access and refer to within our cognitive processes, thereby lightening the cognitive load.

In applying Cognitive Load theory into language teaching and learning, (particularly those principles most relevant to this research), the theory recommends minimising working memory load by reducing the number of visual information sources. For example, to use different diagrams, labels and text in teaching one concept would increase students' cognitive load when compared to an integrated or sequential presentation of the required visual information (i.e., where labels are located within the diagrams, or where students are able to familiarise themselves with relevant text prior to being presented with other pieces of visual information). Furthermore, Cognitive Load theory tells us that working memory capacity can be increased by adding auditory assistance to visual information as our mind processes visual and auditory information separately and they do not compete with each other in the same way that two visual sources of information do. For example, a text and picture would compete with each other for cognitive load, whereas a picture supported by auditory information would not. Moreover, Cognitive Load theory informs us where a schema is highly automated, the cognitive load is required to process it becomes less; therefore, a well-practised schema is effortless for working memory to process. This highlights the importance of designing learning activities that could draw on existing knowledge when seeking to expand the capacity of working memory. As Sweller (1988) noted, an established schema is treated as a single item for working memory.

Accordingly, chunking can lighten the cognitive load on students, thereby assisting their working memories to process new information. According to Cooper (1998) chunking refers to the act of combining some elements into smaller and readily 'digestible' groups as a way of assisting students to process large pieces of information. Each group is termed as a 'chunk'. Cooper uses an example of chunking

information that most of us use when we try to remember a mobile or telephone number, it is helpful when we remember them in groups: if the number is 032178346722, we tend to break up the whole number, so our brains can process it in smaller groups/chunks, making it easier to remember. In this case, one way to separate the number is to put them in smaller groups: 0322-7834-6722.

In Chinese, a Chinese sentence as long as this:

我一点儿都不喜欢打网球。 [Translation: I do not like to play tennis at all.]

Can be taught through dividing the elements into small groups:

我, 一点儿都不, 喜欢, 打网球。 [Translation: I, not at all, like, play tennis.]

The chunk ‘一点儿都不’ is a typical chunk, it means ‘not at all’ or ‘not a bit’; it is a common chunk used in teaching Chinese sentences such as: 今年的冬天一点儿都不冷。 [This year’s winter is not cold at all.] and 他一点儿都不怕。 [He is not afraid at all]. By dividing a long sentence into chunks, each element can be processed more easily and in ways that can be readily adapted into other situations to express meaning. Furthermore, there are no set rules for grouping or chunking elements. The main point is that chunking knowledge into logical or sequential sub-groups helps our brains to remember the information in working memory. This way chunking helps students to connect the new information with the knowledge that has been learnt and stored in our long-term memory, thereby helping new concepts to be added onto their existing knowledge. Hence chunking makes it easier for our working-memory to process the new knowledge element. Therefore “the new information becomes an integral part of our overall knowledge, held in long-term memory” (Cooper, 1998, p. 3).

In this research project, in which students learn mathematics through Chinese with a grammar focus, (where students must process mathematics and their second

language simultaneously, which at times may also entail processing between their first language and the target language—between English to Chinese), the combined impact on cognitive load becomes critical. The first challenge is to establish an alignment between the types of mathematics problems, concepts and questions taught and the language and grammar demands that they entail, thereby minimising cognitive load. Thus mathematics and language curriculum and task design should take cognitive load into consideration. In addition, the visual and auditory cues used in the FFI must seek to minimise cognitive load and thereby aid students' learning. Finally, Cognitive Load theory helps to explain the efficacy of the FFI framework as FFI allows the automation of the language production through practice of the schemas (i.e., the target grammatical forms).

It is important to analyse the relevance and integration of cognitive theory and Cognitive Load theory, as they relate to this research. Cognitive theory studies cognition through brain and memory functions. It emphasises the connection between cognitive process and linguistic process (as discussed earlier in this section), where language learners are assumed follow the same sequential progression. Cognitive Load theory stresses the importance of teaching in ways that minimise the cognitive load associated with learning in order to optimise learning outcomes. Under cognitive theory, FFI was tailored to support the cognitive processes of language acquisition from declarative knowledge through to procedural knowledge. The focus of FFI interventions, therefore, is to provide enhanced support for the cognitive processes involved in developing language proficiency, and (under Cognitive Load theory) in ways that grasp the links between optimising cognitive load and successful learning outcomes. Both approaches are of value when designing L2 programs, and both were relevant to the design of this research intervention. Thus this research draws primarily

on cognitive theory by considering how, in applying FFI in a primary school Chinese immersion context, operationalising FFI into practical interventions can shape the learning environment by providing support to the acquisition of the Chinese measure-word form. The FFI framework employs the noticing, awareness-raising and production practice sequence to stimulate the cognitive process to progress from declarative knowledge to procedural knowledge.

2.5 FFI Framework

This section discusses past research findings on the effectiveness of FFI and, in the process, with Lyster's FFI framework described and explained in further detail.

2.5.1 Comparative Study of FFI Research

Lyster (2004) compared five French immersion classroom experimental studies – specifically Harley (1989), Day and Shapson (1991), Lyster (1994), Harley (1998) and Lyster (2004) which involved almost 1,200 students in Canada aged from 7 to 14 in 49 French immersion classrooms. In this study, Lyster analysed the impact of FFI intervention, specifically noticing, awareness raising and practice on French grammar acquisition for L2 learners. Lyster found, firstly, that those classroom instructions containing a balanced distribution of noticing, awareness-raising and practice FFIs were most effective. His study also found that activities entailing negotiation for meaning, especially if they constitute a major emphasis in the practise of FFI, were less successful in achieving learning outcomes when compared to a focus on controlled practice which provided students with more opportunities for planned feedback.

Another of Lyster's findings was that while production practice is inherently communicative in its nature, it can also be systematically planned and integrated with appropriate levels of difficulty in the target language form. Indeed, he concluded that

this premise was proven by the combined findings of all five studies. As Lyster acknowledged, it is very likely that the main reason for the positive impact of the three FFI practices (noticing, awareness and practice) was that they operate in immersion, content-driven environments. The communicative nature of the immersion setting allows learners to develop comprehension skills and advance their language ability through scaffolding assistance. Developed as an adjunct to the concept of ZPD, and introduced by Wood et al. in 1976, scaffolding describes the ways that students can be supported step by step (akin to the role of scaffolding in a building site), in acquiring new concepts and extending their learning within their ZPD (Coffey, 2012), albeit with an extensive amount of input and comprehension assistance. While immersion students generally reach high level of interlanguage competence, fluency and capability through controlled practice in L2, students often remain at a relatively lower level of proficiency in L2 grammar. Lyster asserted that “these learners need to be pushed to access target forms that are in competition with more readily accessible interlanguage forms. Supported empirically by the studies reviewed here, cognitive theory predicts the feasibility of pushing interlanguage development above and beyond the plateau by means of form-focused instruction” (2004, p. 53).

Lyster concluded that L2 learning benefits from systematically and strategically integrating FFI into content-based programs. In doing so, he found that a balance of both proactive and reactive approaches could deliver the most advantageous results (2004, 2006, 2007 & 2015). Therefore, balanced noticing, awareness raising and L2 practice with supportive feedback can be incorporated into FFI framework to best support grammar learning and improvements in L2 accuracy.

It is important to mention the fact that a number of researchers have identified some limitations of FFI research. Firstly, research based on a short period of data

collection may be problematic. This is because these data may not be able to adequately demonstrate progress in learners' language acquisition, as both language learning and the impact for any instruction method to work are "...gradual and cumulative rather than instantaneous and categorical, and they [learners] draw on memory for noticed features at subsequent points in development as learners process linguistic material at higher levels" (Long & Robinson, 1998, p. 40). Thus, the lesson for future studies is that research should allow for longer periods for FFI treatment to take effect, as language learning is a complex process.

Secondly, some research instruments (such as Doughty and Varela's research using 'recasting' as the FFI instrument) are based on the assumption that adult L2 learning should follow the same procedure as children learning their L1. Long and Robinson argued that further studies are needed to verify this assumption.

Finally, it is important to note that theories established as a result of research are based on their specific research contexts. A number of factors may have impacted on research findings. In particular, the majority of the classroom research on French immersion programs is based on English L1 learners, and in early full immersion settings of this kind. In addition, much of the remaining research was conducted on teaching and learning L2 English in Western contexts. Therefore we can say that most research findings are based on L1 European language learners studying another European L2 language. Little research has been done on Western (i.e., European L1) learners learning an Eastern language. In spite of these limitations, this body of research does draw insightful conclusions on the value of FFI in supporting bilingual proficiency.

Each of these factors influenced the design of this study. The classroom data collection period took a whole school term (10 weeks) to ensure sufficient time to

spend on both the mathematics content and the measure word form. The FFI methods used were tailored to students' age and factors associated with their Chinese language capacity. As such this study sought to provide some useful insights into enhancing Chinese immersion students' grammar acquisition through FFI.

2.5.2 FFI Definition and Framework

This section defines FFI and then proceeds to discuss the theoretical foundation for the key steps involved in the FFI framework; noticing, awareness-raising and production practice.

Based on cognitive theory (as discussed earlier in this chapter), Lyster drew from his own Canadian French immersion teaching experiences and research findings, and confirmed the efficacy of FFI in L2 students' interlanguage development in immersion programs (2004, 2006, 2007 & 2015). Lyster agrees with Ellis' (2001) definition of FFI, as "any planned or incidental instructional activity that is intended to induce language learners to pay attention to linguistic form" (Ellis, 2001, pp.1–2). In this regard, "[t]he term 'form' is intended to include phonological, lexical, grammatical, and pragmalinguistic aspects of language" (Ellis, 2001, p. 2). Thus, the teaching of form comprises the three-dimensional framework of grammar structures (morphosyntactic), meaning (semantics) and use (context-appropriate use) (Larsen-Freeman, 2014). Furthermore, FFI activities can be implicit or explicit, include the direct teaching of language (e.g., through grammatical rules), and /or reactions to learners' errors (e.g., corrective feedback), (Lyster, 2007). Moreover, in providing noticing and awareness-raising activities with opportunities for production practice, FFI entails "classrooms where subject matter is used at least some of the time as a means for providing L2 learners with enriched opportunities for processing and negotiating the target language through content" (Lyster, 2007, p. 1).

The FFI framework is discussed step by step below.

The first step of the FFI framework: noticing

Proposed by Schmidt in early the 1990s, the Noticing Hypothesis (1990 & 1994) claimed that learners' ability to notice linguistic features (words, sounds, grammar, etc.) is essential for L2 acquisition, representing "[t]he necessary and sufficient condition for the conversion of input to intake for learning" (Schmidt, 1994, p. 17). Ortega (2009) explained that

noticing refers to the brain registering the new material, with some fleeting awareness at the point of encounter that there is something new, even if there is no understanding of how the new element works, and possible even if there is no reportable memory of the encounter at a later time. (p. 63)

Learners can enhance their own awareness internally by realising the gap between the meaning they intend to express and their capability in deliver the message. Externally, noticing can be enhanced by the teacher or interlocutor through indicating where some clarification is needed to get the message across (e.g., Sorry? Can you say it again? Can you explain ...? Or raise an eyebrow, or change of tone to signal a grammatical gap in the discourse). By noticing the 'gap' between learners' utterance and the grammatically correct sentences, learners turn their focus to the new grammatical feature and modify their sentences either by themselves or with assistance from their interlocutor, the noticing process can result in optimal learning outcomes. Doughty and Williams (1998) add that selection of the form should be appropriate to a student's knowledge and skill level. Lyster (2004, 2006, 2007 & 2015), Lyster and Tedick (2014) stressed that the effect of noticing is to trigger learners' attention toward more linguistically accurate production, and therefore towards the attainment of declarative knowledge. In seeking to ensure that noticing

takes place in learners' cognitive processes, input can be enhanced verbally, visually or through increased frequency and quantity (input flood). Noticing is the starting point for FFI methods.

Furthermore, Mitchell and Myles (2004) found the attention paid to language forms may lead to language 'intake'. Yet it is important to note that noticing does not equate to intake. In this regards Mitchell and Myles acknowledged Schmidt's 1990, 1994 and 2001 contributions on the different levels and types of attention, namely noticing, understanding and awareness provide further explanation on the function of noticing. Schmidt defined noticing as recognition of some crucial point drawn to the attention of the learner. Understanding and awareness require both consciousness conception and knowledge in order to reach the level of 'attention' (Mitchell & Myles, 2004). However, noticing "enables learners to process forms in short-term memory but does not guarantee they will be incorporated into their developing interlanguage" (Ellis, 2001, p. 8). Hence Lyster (2004 & 2006) combines awareness raising and practice with noticing to complete the FFI framework. This leads us to the second step of the FFI framework: raising linguistic awareness.

The second step of FFI framework: awareness-raising

This section starts with a discussion on awareness-raising from studying feedback and its impact, as feedback is a commonly employed method to stimulate learners' engagement in awareness-raising and self-modification practice. Ortega used the terms 'error correction' or 'corrective feedback' to describe negative feedback (2009, p. 71). The definition of corrective feedback is sufficiently broad to encompass these terms in this study. Ortega pointed out that negative feedback arises in many forms and in different contexts: oral, written and technology-mediated

communication. In her 2009 discussion, Ortega focuses only on oral feedback. This research also restricts discussion in this regard to oral corrective feedback.

Strong evidence from past research underlines the importance of explicitness of corrective feedback in facilitating accurate output. According to researchers in the cognitive-interactionist area, feedback can be included as a way of negotiating meaning, as explained by Ortega (2009). She summarised the common types of feedback adopted in language classrooms from the more implicit approaches to the most explicit, including a set of nonverbal signals to draw learners' attention to form: (e.g., raised eyebrows or a hand signal system). A clarification request, such as 'what do you mean by ...?' serves to indicate to the learner that some attention should be given to either the form or meaning of his/her speech. In relation to 'recasts', Ortega explains it as "when an interlocutor repeats the learner utterance, maintaining its meaning but offering a more conventional or mature rendition of the form" (2009, p. 72). Elicitation is another way to provide feedback, it assists learners produce the correct form: 'how do we say x?' Or asking the speaker to try again. In the classroom, teachers may ask students to work together to arrive at the right form. Explicit corrections can be given to students, and can be conveyed in a number of different ways, including direct correction by saying the sentence correctly and pointing out the grammatical error to the speaker (2009, pp. 73–75). Repetition, prompt and translation can also be employed as forms of feedback. Each type can vary in its implementation, depending on the situational context, the individual characteristics of students, and teachers' preferences, noting that students' reactions to each of feedback can vary with a range of cultural and social factors. The types of feedback differ in terms of the nature (implicit/explicit) of delivery, convention and function. So as

summarised by Ortega (2009), choice in the most appropriate form of feedback depends on the discourse and pedagogical context.

According to Lightbown (1998), feedback only works where learners have some prior knowledge on which to base their learning. It would be useless to point out where a student has made a mistake unless they can understand the reason; in other words a student should “have some source of knowledge to call on in order to reflect on what they have just said. That is, there is no point in knowing that they made an error unless they have some way of knowing what they should have said” (p.194). Similarly, a teacher cannot simply point out the error without also providing support (explanations, corrections, etc.). While some in this field hold sceptical opinions on the extent to which, and how, feedback impacts on a learner’s grammar accuracy, researchers are agreed that some feedback on errors is better than no feedback. “The accumulating evidence suggests that providing negative feedback in some form results in better post-test performance than ignoring errors” (Ortega, 2009, p. 75).

The effect of corrective feedback can be enhanced through, firstly, making the feedback more explicit and clear. Because the degree of explicitness is an essential element, “explicitness can be defined as the perceptual salience (e.g., intonation) and linguistic marking (e.g., by metalanguage) with which the negative information is delivered and thus the corrective intent is made clear to learners” (Ortega, 2009, p. 75).

Secondly, the extent to which negative feedback is informative to the learner also plays a crucial role in the FFI process. Therefore, the amount of information provided in the feedback is material to its efficacy in inducing corrective production. Lyster (2004) further asserted that the pressure of ‘conversational urgency’ that is placed on interlocutors to rectify their production in response to negative feedback

can also contribute to the efficacy of feedback. Feedback induces knowledge processing through negotiation, as the two-way process of negotiating accurate production helps to facilitate language acquisition.

Furthermore, ‘recast’ is a frequently adopted method for providing ‘corrective feedback’. The term ‘recasts’ refers to “the adult ‘recasts’ the child utterance, and in so doing ‘expands, deletes, permutes, or otherwise changes the [child utterance] while maintaining significant overlap in meaning” (Bohannon et al., 1996, p. 551). Sokolov and Snow (1994) also explained that, recast provides negative evidence. They further defined recast as “utterances in which the caretaker produces an expanded and grammatically correct version of a prior child utterance” (1994, p. 162). An example, adapted from Sokolov and Snow (1994) is as follows:

Child: 我有五只金鱼。

[“I have five goldfish.” The child used an incorrect measure word – 只].

Mother: 太好了，你有五条金鱼。

[“Great, you have five gold fish.” Here the mother changed the use of measure word from ‘只’ to ‘条’ and stressed correct measure word in her voice].

In explaining the concept of a ‘Direct Contrastive Hypothesis’, Saxton (1997, 2005) offered theoretical explanations for the role that recast as feedback plays in first language development. In accordance with the ‘Direct Contrastive Hypothesis’, recast as feedback provided in response to children’s grammatical or lexical errors ensures that differences between inaccurate and correct forms become directly and immediately apparent to the child. This process in Saxton’s explanation may work well as a form of corrective tool. It explains how negative evidence could meet the needs of a corrective function. The Direct Contrast Hypothesis establishes when negative evidence is supplied, that child may perceive the adult form as being in

contrast with the equivalent child form. Thus the advantages of ‘recasts’ is that children pay attention to corrections that are based directly upon their speech and are therefore likely to gain some level of grammatical improvement in their utterance (Saxton, 2005). As evidenced by many studies, (namely Farrar, 1992; Hart & Risley, 1999; Otomo, 2001; Post, 1992; Saxton, 1997, 2000 and Saxton et al., 1998, 2003), “cognizance of a relevant contrast can then form the basis for perceiving the adult form as a correct alternative to the child form” (Saxton, 2005, p. 28).

Lyster (2004) has offered an alternate view, based on his analysis of FFI research, that ‘prompt’ from ‘recast’ should be differentiated: whereas prompt induces learners to self-repair their production without providing them with the corrected form, recasts reformulate student errors. For Lyster, prompts are proven to be more effective than recast as a corrective tool. Moreover, Lyster also contends that controlled practice is more targeted and systematic in building language proficiency than recasts.

In summary, consciousness-raising activities have increased in importance as “they attempt to raise awareness of language structure while providing learners with relevant language input and activity” (Skehan, 1998, p. 139). Particularly, a broad range of choices can be made in raising linguistic awareness, with corrective feedback being only one of the ways among many. In this way the input provided to learners through feedback works as “a catalyst for knowledge restructuring and transformation of the L2 system” (Zhang, 2016, p. 78). The explicitness of the ‘negative feedback’ or the effectiveness in increasing learners’ attention to FFI, the task essentialness for target language (TL) correct production, and the instructiveness of the linguistic feedback, all offer key measures for successful ‘negative feedback’. The only kind of ‘recast’ that can work as a form of ‘negative feedback’ must meet the Direct

Contrastive Hypothesis test: that is, recast should take place at the moment of error production, and it should provide the difference between the corrective form and the learner's mistake.

It is important to note that, "given the importance of implementation of feedback types and wider curricular and social context, in the near future it will be necessary to reconceptualise the all-or-nothing comparative approach that has characterized L2 research on negative feedback to date" (Ortega, 2011, p. 76).

The final FFI step: production practice

As to production practice, the importance of target language production has been examined in the output hypothesis. Swain explained that opportunity for using target language to express meaning has a significant impact on building immersion students' grammatical accuracy (1988). Production practice in FFI framework (Lyster, 2004) is a form of output practice, yet it is a planned, focused and systematic one. Production practice assists in the process of transferring knowledge from short-term memory to long-term memory, and therefore aids the transformation from a grammar concept to a skill. "Language users are more comfortable speaking about the familiar, and are able, by drawing on a capacious memory system, to produce a great deal of language quickly by means of routinized phrases" (Skehan, 1998, p. 285). Skehan argued that frequent use of the target language can stimulate the process from language concept to the ability for automatic production. He perceived automaticity as a skill building subject, "like driving a car, or, probably more relevantly, like playing a musical instrument" (1998, p. 18). Hence, focused practice can serve to familiarise students with the target grammar and speed up the language precision process. Language "performance is likely to be shaped by the familiar and the routinized" (Skehan, p. 286).

Production practice provides opportunities for grammar exercises in a controlled and targeted way, thus is an essential process in building target language fluency and competency. Ortega (2009) listed some conditions of output that could potentially optimise language learning, including increased opportunities for L2 production, and challenging learners' existing language level appropriately (i.e., without exceeding the learner's current abilities or discouraging risk taking attempts regarding increased L2 complexity). Swain (1995) further concluded that output can stimulate students' attention toward the targeted form by providing opportunities for learners to reflect on and make attempt in improvement in their target language utterance.

Putting the FFI package together, the following paragraphs summarise some key FFI concepts:

Firstly, the "noticing activities serve as effective catalysts for drawing learners' attention to problematic target features that have been contrived to appear more salient and/or frequent in oral and written input (for example, by means of typographical enhancement). Their aim is to affect change towards more target-like declarative representations of the L2" (Lyster, 2007, p. 336). Noticing activities optimise the chances for learners to pay attention to the grammar form. 'Optimizing the input' (Ellis, 2011) is one of the main methods in making the grammar feature noticeable and perceptible through input, but it is insufficient to influence input processing (Skehan, 1998). Increasing both token frequency and type frequency can result in consolidation and reinforcement of learners' memory. Repetition is one way to achieve maximized input. Chunking can also increase learners' type frequency to gradually attain sentence structure.

Secondly, using examples that are low in variation, yet high in generalisation, can assist when introducing new concepts. Intonational and visual enhancements of the grammar feature can help students to notice the form, and trigger the process of transformation from declarative knowledge to procedural knowledge (Skehan, 1998).

Thirdly:

Awareness activities, which include inductive rule-discovery tasks and opportunities to compare and contrast language patterns, followed by different types of metalinguistic information, generally serve to consolidate the restructuring of rule-based declarative representations. Practice activities provide learners with important opportunities to proceduralise their declarative knowledge of emerging target-like forms, in a variety of pedagogical contexts ranging from meaningful collaborative tasks at the communicative end of the spectrum of practice activities, to linguistic games and role plays at the other end. (Lyster, 2007, p. 336)

Awareness-focused activities and controlled practice with feedback can be provided through communicative output opportunities. In the interactive process, awareness activities include corrective/negative feedback, as well as recasts or explicit brief instruction of the grammar form itself. Also, elevated L2 output in the communicative context can also be supportive in enhancing grammar proficiency, and can potentially lead to learner-initiated negotiation of form and self-initiated output modification during collaboration (Swain, 1995). Swain explains when a learner is engaged in a meaningful, interesting and encouraging communication with others, their language production attempts can in themselves be a learning and self-modification process, especially if the target form is essential in conveying the correct message. As part of this process, feedback can potentially raise learners' awareness of

the linguistic ‘gap’ – noticing the difficult or unsure linguistic element in their target language production, and ‘negative feedback’ can also offer ‘recast’ on learners’ erroneous utterances. Through self-initiated negotiating, modifying, self-correcting, recasting, etc., learners can progress towards grammatical proficiency (1995).

Crucially, the communicative context is relevant to all of the methods discussed above. As Fey et al. (2003) concluded, “grammatical intervention should function to increase the frequency, saliency, meaningfulness, and opportunity to make use of target constructions in pragmatically felicitous contexts” (p. 5).

The next section discusses the specific challenges of teaching and learning Chinese as a second language.

2.6 Learning Chinese as a Second/Foreign Language

While some five decades of research into the theory and practice of teaching and learning Chinese as a second/additional language has provided a useful body of knowledge for teaching professionals to draw on, it remains a relatively new and under-developed field of enquiry. Hence, the practice of Chinese L2 teaching has tended to be guided more by generic L2 acquisition theories and pedagogy derived from research into teaching and learning other languages. However it must be noted that the specifics of its pictographic writing and tonal speaking systems means that the differences between the Chinese language and alphabetical languages (such as European languages) are considerable. This section discusses the specific linguistic factors of the Chinese language for L2 learners as compared to European languages; differences that are essential to acknowledge in this research.

As alluded to above, Chinese is a much more difficult language for European first language (e.g., English) students to learn than (for example) other European languages. In this regard Orton (2008) identified four separate contributing factors:

Firstly, Chinese is a lexically specified tonal language. Most Chinese words have four tones – flat, up, up and down and down. Some words have five tones including neutral/light tone. For example: over 20 words would appear (the common ones) under the PinYin of ‘qu’. If one were to apply each of four tones to just four common meanings of the PinYin ‘qu’ word (tones are indicated on top of the ‘u’), these four words could be as follows:

qū
区 (the flat tone/first tone, means ‘district or area’);

qú
渠 (the up/second tone, means ‘trench’);

qǔ
取 (the down and up/third tone, means to pick-up or to get) and

qù
去 (the down/fourth tone, means ‘to go’)

As shown in this example, each tone comes with its own meaning. It is hard for English speaking people to recognise and pronounce each of them correctly, as Orton explained: “while babies are able to pick up the sound system of whatever language is in their environment, the ability to hear distinctions that do not occur in one’s own language becomes reduced once childhood is passed” (Orton, 2008, p. 28). However it’s not impossible to acquire a tonal language, and there are ways to assist English FL students to learn intonations successfully.

Secondly, Homophones: (i.e., different words that sound the same 同音字母, 同音异义词) such as ‘jiǔ’ in Chinese can mean ‘number 9: 九’ or ‘alcohol: 酒’. There are large numbers of homophones in Chinese, a fact that adds to the difficulties in comprehending Chinese. As Orton observed, “there may be more than 20 words all pronounced exactly the same, and half a dozen common words for many of the most

commonly encountered syllables, two or three of which might be real possibilities in an utterance” (Orton, 2008, p. 29).

Thirdly, the characters 字: English language system is a “sign-sound combinations of an alphabetical writing system, most words heard can be written and most written words can be pronounced, and this facility leaves the learners generally able to write whatever they can say and facing only the task of vocabulary accumulation” (Orton, 2008, pp. 28-29). In contrast, the written and verbal forms of words in the Chinese character system are separate from each other. Whereas one typically needs to know around 4000 characters in order to read contemporary Chinese newspaper, knowledge of around 8000 characters (out of approximately 48000 known in total) would be required to undertake academic studies. By comparison, a Year 12 graduate in Australia is expected to have learnt around 500 Chinese characters. It is important to note here that, by the end of Year 6, Mawson immersion students are also expected to know around 500 characters). The stroke order system is another structure that requires training and practice to master. The pinyin system is a Romanised phonetic system that allows people to pronounce the characters. The alphabetical system is also used in word processing applications to process Pinyin to Chinese characters. Provided that one appreciates that the Chinese writing system is the characters, Pinyin is a very useful tool to assist in character learning, potentially enabling students to tackle character learning early in their schooling.

Fourthly, particles: Particles are the individual components of Chinese written characters. In Chinese, particles provide an indication of the nature of the word, covering things like movements, feelings, indications of action stages, conveying

meaning. Orton suggests that the ability to notice particles is of great benefit to learning the language.

In addition, there are many grammatical concepts in the Chinese language that have no real counterpart or analogue in English. The measure word concept is but one example of this fact. This distinction becomes even more difficult for an English speaker to learn when encountering words that possess a grammatical function, but which have no real meaning to convey. Such is the case for those measure words which do not in themselves convey meaning. In such cases it is very difficult for L2 Chinese learners to refer back to their first language. Furthermore, Chinese grammar is constructed by word order or by the use of independent grammatical particles, whereas much English grammar consists of prefixes and suffixes or changes to a word (Zhang, 2016).

In contrast to these more difficult aspects of Chinese, there are also some characteristics that can be considered easy to learn for students from English speaking backgrounds:

The fact that some elements of Chinese grammar is not too dissimilar to some English grammatical elements (such as the significance of word order), means that some Chinese grammar can be quite easy for English speaking students to comprehend. Moreover, the Chinese language has minimal morphological changes such as the changes in tense that are so common in English. As Chinese words do not change with the time or sequence of the action, tense in Chinese is more easily understood by learners from English speaking backgrounds. Similarly there are no gender difference in nouns to learn in Chinese (unlike French for example); no declension endings to mark case, (for example: in English, I – me, he – his, him); and

no changing forms of verbs (unlike many other European languages, for example, French).

However overall, L1 English learners face considerably more challenges in seeking to become proficient in Chinese compared to (say) French. Potentially, the successful incorporation of the FFI framework in content-focussed language education could make a significant contribution to the quality and efficiency of Chinese teaching and learning.

2.7 Theoretical Underpinnings of FFI Implementation

Different approaches to FFI are discussed in this section. The key literature in this area includes Ellis (2006), Lyster (2006 & 2007), and Doughty and Williams (1998), who all deal with FFI in classroom executions in developing L2 learners' communicative competence and grammatical proficiency. In particular, this literature discusses issues of what FFI methods to apply and how to apply them in the communicative classroom context. These extensive academic discussions on various key issues relating to FFI choices (such as the choice of grammar features to target), are highly relevant to this research design.

2.7.1 The Appropriate Form and the Level of Linguistic Difficulty in Applying

FFI

Over time, the linguistic target of FFI has been extended from its initial focus of grammar to a much broader suite of developmental areas (e.g., lexical, phonological and syntax). The challenge of selecting the right linguistic target for the application of FFI is not always a straight-forward process. According to Ellis (2006), “problematicity (i.e., the feature chosen is, for one reason or another, seen as constituting a learning problem)” (p. 30) is the main criterion. He listed a number of methods to establish problematicity, including: assessing the complexity of the form

for learners to acquire; determining the best sequence for grammatical developmental (from easy to hard, drawing on linguistic theories); and applying psycholinguistic processing theory in order to establish the learnability of the concept relative to learners' processing capacity.

Lyster (2006) in his comparative analysis of five major FFI studies concluded that the criteria for the choice of linguistic forms to be targeted are “generally because they differ from the students' first language or lack prominence in the discourse of subject-matter instruction” (p. 44). He further explained that these forms are selected and targeted specifically. Doughty and Williams (1998) asserted that, firstly, learners' error analysis could be one of the important factors to consider when making FonF linguistic choices. These choices should be based on either commonality of errors made by learners or linguistic difficulty levels for the learning group to acquire. The need for choosing a linguistic form to focus on is especially crucial if taking a proactive approach as to this research. It needs to be designed in a “natural, useful, or essential” (Doughty & Williams, 1998, p. 211) way within the communicative classroom interaction. Hence the decision on form choice should be an informed one. Secondly, the linguistic choices also should be made upon investigation “research on learning and learnability” (Doughty & Williams, 1998, p. 212) in realisation that not all errors are treatable by FFI.

It is crucial that the selection of target forms is based on difficulty levels, learnability, students' linguistic capacity and commonality of needs. In other words, the choice of the target form and associated pedagogy is informed primarily by learners' stage of L2 development. However the possibility for learners to acquire linguistic forms with levels of difficulty that are beyond learners' developmental levels has been a source of some debate for researchers. Pienemann (1987, 1989)

believed that it is impossible for L2 learners to attain language forms that are more advanced than their current stage of language development. Long and Robinson (1998) expressed a differing view, arguing that the level of difficulties for a grammatical form could be either within or not too far above learners' levels of comprehension. In expressing her views on the matter, Lightbown (1998) argued that differentiated language levels made it difficult to find a level of learning appropriate for each student, and furthermore that focusing on a form can accelerate the learning process by enabling students to store the knowledge and master the form at later stages of their development. In the process learners can develop the capacity to "internalize advanced language" (1998, p. 216). Furthermore, Lightbown contended:

A pedagogical focus on advanced forms can have some long-term, if not immediately noticeable, effects. ...the inventory of documented developmental sequences remains small and insufficient for designing effective pedagogical strategies. Further, even when more is discovered about the language forms that develop sequentially, not all prerequisites for moving from one stage to another are based on processing constraints. (Lightbown, 1998, p. 216)

It is important to mention that, in the main, these research findings reflect the specific context of the research so they vary from case to case depending on the context, the classroom condition and the complexity of the form. These findings may not be generalised to all learners of different age, background and circumstances. Thus, Lyster (2006), Ellis (2006), Doughy and Williams (1998) and Turner (2013a, 2013b) acknowledged that methodological and pedagogical decisions should be largely based on the specific learning context. Such elements include: the difficulty of a grammatical form and the possibility for learners to acquire it, students' learning

capacity and their L2 proficiency. In any immersion educational setting, the teacher invariably exercises judgement in moderating FFI interventions and making choices about target forms. Factors affecting these choices can include the teacher's understanding of students' learning needs (i.e., is the error made by a majority students?); the potential for students to acquire linguistic features when the learning opportunity coincides with subject content; and opportunities to provide students with challenges that expand their learning horizons. It is all about taking both learners' errors and their developmental stages into account to meet the specific needs of the group. The choices are informed via a broad range of considerations, including the teacher's own teaching experiences.

2.7.2 Reactive and Proactive FFI

The key features of reactive and the proactive FFIs are summarised here, drawing on Doughty and Williams' analysis (1998, pp. 205–211). The distinctions between reactive and proactive and reactive FFIs are relevant to the classroom pedagogical choices employed in this research.

Doughty and Williams (1998) defined the incidental (or reactive) approach as a “responsive teaching intervention that involves occasional shifts in reaction to salient errors using devices to increase perceptual salience” (P. 205). Thus focus on form takes place instantaneously when needs arise, dealing with pervasive grammatical errors by drawing learners' attention to the form as and when a grammatical error occurs. Reactive approach deals with learners' grammatical errors immediately and responsively, it does not need teachers to plan for the intervention and fits well with any communicative language teaching approach.

There are various ways to deal with errors reactively, include

Explicit hypothesis reject:

Response = ‘wrong’ plus metalinguistic statement. This method provides an explanation to the error.

Explicit Utterance rejection:

Response = ‘Wrong’. It provides an indication of correctness.

Implicit negative feedback:

Response= Recast with correction.

Implicit negative feedback:

Response = ‘Are you sure?’ It provides a cue for correcting the error.

(Carroll & Swain, 1993, pp. 357-386)

In application, the reactive focus on form best suits classroom settings where students have the same first language background (Doughty & Williams, 1998). However this approach places high demands on teachers’ experience and linguistic knowledge as it requires that the need for linguistic intervention is detected and acted on immediately. It requires the teaching skills to employ set techniques for effectively drawing attention to, and correcting, grammatical errors. It also requires that teachers exercise judgment by intervening primarily on those errors that are shared by the majority and therefore beneficial to the class as a whole.

In contrast, proactive FFIs (planned FFIs) are systematically planned to support students in learning that the target form is essential to expressing meaning. This approach targets on common grammatical errors and is very adaptable to the majority of language teaching settings. It is pre-planned, based on thorough analysis of learning needs. Effective examples of this approach include enhanced input, noticing, awareness-raising and controlled practice through learners’ use of the form

and supported by the teachers' corrective feedback. Proactive FFI methods have been well researched and are commonly employed in classroom teaching. The main challenges faced by this approach concern designing teaching methods and materials that ensure students focus on the target linguistic element and its importance in successful language production and communication. It requires the designing tasks that fit naturally and meaningfully within content-focused learning interactions.

Doughty and Williams (1998) consider that there are a number of activities well-suited to proactive FFI. The Garden Path Technique (Tomasello & Herron, 1988 & 1989) is one such method aimed at helping learners to avoid making generalisation errors in their grammar production by focusing both on the grammatical rule as it is generally applied, as well as the exceptions to that grammatical rule. Task Essentialness (Loschky & Bley-Vroman, 1993) is another useful proactive method, where tasks are designed specifically to emphasise the essential nature of the target form in expressing meaning. Here students learn that the task cannot be expressed correctly unless the target form is incorporated. Dictogloss (Swain, 1998). Transformation exercises are another proactive widely used method. This activity provides opportunities for students to work together to reconstruct texts in ways that maintain the original meaning. The texts are designed by the teacher with focused form in the texts. An example of such a task is for students to change the sentence from an active sentence to passive one:

车撞了我的小猫。 A car hit my little cat. (Active)

我的小猫被车撞了。 My little cat was hit by a car. (Passive)

In summary, both reactive and proactive methods can each work effectively as part of an FFI intervention designed to best meet the needs of the learning group.

Long takes a reactive FonF stance, on the basis that this approach directly targets the

mistake when it occurs, and does not require the teacher to predetermine the linguistic form. However this approach relies by and large on teachers possessing high levels of L2 teaching knowledge and expertise, and the ability to make sound linguistic decisions and judgements in real time. Doughy and Williams (1998) also point out that the reactive approach is much more difficult to apply effectively in classes where students are from different first language backgrounds compared to classes where students have the same L1 background. In exploring this further, and in the context of teaching Chinese as a second language, Zhang (2016) found that learners from similar language backgrounds, and learners who had received similar language instructions in their L2 learning, made similar patterns of errors. Many of such errors tended to be associated with students' specific first language backgrounds. Zhang concluded that reactive FFI would prove most effective by targeting errors common to the majority of students.

In classroom settings where the teacher understands and is familiar with students' learning needs and capacities, the proactive approach enables teachers systematically select the grammatical feature(s) to be taught and to design a unit with a linguistic focus incorporated. However the balance between reactive and proactive methods does not have to entail an exclusive choice; both methods can and should be used effectively. As most teachers prefer to be flexible and adaptable in their choice of teaching methods, they may choose to draw on both reactive and proactive methods as appropriate to students' particular needs in their second language development (Doughy & Williams, 1998). In adopting a proactive grammar teaching approach, where target grammatical features are systematically incorporated into content based teaching units, most teachers will also elect to respond to some classroom errors instantaneously in a reactive way.

Due to the nature of the research setting and student participants in this project, the FFI methods used in this study combine both proactive and reactive methods. The medium-level Chinese proficiency levels of the MIP student participants, where students had acquired some basic grammatical knowledge, planned and targeted FFI was considered most feasible and appropriate to the student group, complemented with occasional reactive interventions as the teacher considered appropriate for the circumstances by the teacher.

In conclusion, given all the choices and options to integrate FFI in the language classroom, the most important declaration can be summed up in a few simple principles. Firstly, a long-term commitment and systematic approach are vital to FFI success. Using ‘feedback’ as an example, as Doughty and Williams (1998) conclude: “it is important to take a long-term approach to the use of feedback. There would seem to be little benefit in providing feedback if the learner does not have fairly firm knowledge, implicit or explicit, of the form in focus. In addition, effective feedback is sustained and focused” (p. 256). Secondly, L2 teaching without any form of grammar instruction would not deliver high accuracy in the target language. Thirdly, the decision of whether, and when, to take proactive or reactive FFI approach should be based upon learner variables and context. The choice of tasks and techniques should also be made upon the learner and the form. On the whole, it is important to be flexible and combine FFI approaches on the basis of the learning environment. Effective instruction requires both proactive and reactive approaches; they are complementary.

2.8 Assessing and Analysing Second Language Acquisition

The primary theoretical underpinning of language acquisition development is cognitive theory, which covers the shift of knowledge from conceptual to practical. This process entails progressing from learning the language to producing it automatically in a communicative environment. “This involves the ability to apply rule-based knowledge to cognitive operations, such as solving problems or following steps toward an end goal” (Lyster, 2007, p. 18). Ellis (2001) explained “acquisition has been measured in terms of grammaticality judgments, comprehension and production. The use of grammaticality judgments is widespread in L2 acquisition research, including FFI” (2001, p. 33).

Acknowledging the complexity of establishing the validity and reliability of measuring grammatical accuracy response to a pedagogical framework, Ellis categorised the definition of language acquisition into three parts: (i) “Internalisation of a new linguistic feature”; (ii) “Increased control over use of a linguistic feature”; and (iii) “Progress along an acquisitional sequence” (2006, p. 37) and further developed methods for measuring acquisition using the Methods and Measuring Acquisition framework (2006), Table 2.1. In a similar vein, Ortega (2009) describes interlanguage processes in four phases of simplification, overgeneralisation, restructuring and U-shaped behaviour in which aligns with building, revising, expanding and refining L2 grammar developmental process. According to Ortega, in the simplification phase, learners display only a rudimentary understanding of the grammatical form, typically manifested by a capacity to comprehend just one single meaning of the form, or a single way in which the form can be applied. Overgeneralisation refers to a stage where learners employ just one variation of the grammatical form (or rule) to circumstances where one or more different versions of

the form are required. When language learners progress to the restructuring stage, they start to display a more advanced knowledge of the form by self-correcting some of their productions. This requires learners to retrieve schemas from their long-term memory, and in the process entails some degree of modification to their existing knowledge. While this restructuring process may not necessarily equate to improved language accuracy, it can nevertheless be “assumed that restructuring involves knowledge changes that can be large or small, abrupt or gradual, but always qualitative and related to development or progress” (Ortega, 2009, pp. 117-118). The final stage, termed U-shaped behaviour, describes the phase where accuracy in usage of the target form or rule deteriorates somewhat, and where apparent fluency may increasingly be error-prone and punctuated by hesitation (i.e., the downward part of the U-shaped curve), before learners then proceed to re-establish their fluency and confidence in accurate production (i.e., the upwards part of the U-shape curve). In this phase, what appears on the surface to signal a regression in learners’ proficiency actually reflects a predictable pattern along the path to proficiency in the target form or rule.

Table 2.1 below, describes the methods adopted from Ellis’ acquisition measurement for this project.

Table 2.1 Methods Used to Measure Improvement of the Target Form

Definition of acquisition	Method of measurement	Instruments
Internalisation of a new linguistic feature	The occurrence of at least the two instances of correct measure word usage (which was absent in the pre-intervention stage), recorded by comparing and analysing students' performances during communicative tasks and assessments.	Chinese production tasks: classroom observations and students' assessment analysis.
Increased control over use of a linguistic feature	Evidence of improved control and increased accuracy in students' usage of the measure-word form, and their choice of the specific measure words relevant to their tasks. Such tasks may include (for example): <ul style="list-style-type: none"> • translation tasks • language games • completing mathematics comprehension and problem-solving questions in Chinese • pre and post tests performances. 	Metalinguistic judgment in measure word. Constrained selected response. Free constructed response.
Progress along an acquisitional sequence	Evidence of improvement in the application of measure word in communicative production tasks. Tasks that comprise a dual focus on both content and language (e.g., constructing and solving mathematics questions in Chinese).	Chinese production tasks that elicit freely constructed responses.

Note: adapted from Ellis, 2006, p. 37.

2.9 Chapter Summary

In summary, while the theories and literature reviewed in this chapter have confirmed the significant advantages in comprehension skills and communicative ability development (Lyster, 2006) that immersion programs afford (Cummins, 1998, 2011; Swain & Lapkin, 1982; Genesee, 1994a; Swain & Johnson, 1997; de Courcy, 2002; Lyster, 2004, 2006 & 2007; Ellis, 2001 & 2006; Long, 1991; Long & Robinson, 1998), at the same time they have also served to highlight the grammatical gap—the limitations and weaknesses that seem inherent in the immersion model in relation to grammatical proficiency (Lyster, 2006; Harley, 1992; Cummins, 1984, 1978; Harley & Swain, 1984; Baker, 2006; Swain, 1984, 1985, 1988, 1991b; Genesee, 1994; Harley, 1986, 1992; Doughty & Williams, 1998). In response to these limitations and weaknesses, the FFI framework offers the possibility of addressing this ‘grammatical gap’ through noticing, awareness-raising and production practice with feedback. Swain, Harley, Lyster and Ellis’ work on FFI, combined with my understanding of cognitive theory and Cognitive Load theory, served to enrich my knowledge about L2 teaching and learning. Lyster’s cognitive application in FFI theory resonates particularly with this research, which has been tested and applied to many different languages, including French and Japanese. In relation to this research project, would FFI deliver the same benefits through its application a Chinese immersion context? How can FFI be applied in a Chinese immersion classroom to facilitate Chinese grammar acquisition? These are the challenges that this research has investigated.

Significantly, to separate L2 learning theories and approaches judge them for their particular strengths and weaknesses, risks oversimplifying such a complex phenomenon as language acquisition. “The dichotomy between linguists who believe

that language is a separate innate module in the mind, and linguists who believe that language is just another form of information which is processed using general mechanisms, is of course somewhat caricatural” (Mitchell & Myles, 2004, p. 96). In retrospect, neither language input, nor output, or interaction and feedback can by themselves magically lead to successful L2 learning. Language acquisition is a complicated system, as it forever evolves, integrates and progresses within its social and cultural framework.

The body of theories and literature discussed in this chapter forms the foundation upon which this research is derived and informed. Furthermore, this research seeks to build on the existing knowledge to gain insights into how pedagogical changes can affect grammar development in the context of teaching Chinese as a L2. The design of the FFI intervention was closely based on the research findings discussed in this chapter.

CHAPTER THREE – RESEARCH METHODOLOGY AND METHODS

3.1 Introduction

This chapter deals with the methodology and methods of this research. It discusses the motivation for adopting a case-study methodology. Drawing upon the theoretical framework and consistent with the research objectives, the research design is also discussed. The methodological foundation for data generation and analysis is addressed and, finally research credibility, limitations and ethics are explained.

The research design is underpinned by its theoretical framework, as well as the motivations and objectives for undertaking this research. By adopting a case-study methodology, together with a guiding theoretical framework that accords with the educational context (as specified below), the research objectives and questions are best able to be addressed. It is important to acknowledge and explain the role that theory plays in this project, noting particularly that this research was guided by a theoretical framework from conception. As is explained further in this chapter, in designing and implementing a pedagogical classroom intervention, and in examining the intervention through a case study, this research has benefited from a theoretical direction. Furthermore the choice of research methods used to collect and interpret data was influenced by the methodological approach. Given the importance of the case-study approach to this research, it is relevant to discuss the strengths and limitations of this methodology in this chapter.

The research design process comprises the choice of the research questions and the methods employed to answer the enquiries, plus the framework for collecting and analysing data. According to Yin (2014), designing a project requires

consideration of the ‘logical sequence’ from the research problem and questions, the collection of data, the data itself and finally the research findings. In this way the research questions and objectives connect with the criteria for data collection and analysis.

This study was designed as a largely qualitative case study of classroom pedagogies in a Chinese immersion classroom context. The study was guided by cognitive theory (as discussed in Chapter Two—Literature Review), and draws on form-focused instruction (FFI) research as a theoretical framework on which to base a classroom intervention in a content-based Chinese immersion setting. Firstly, the study investigated the characteristics of the Chinese immersion program at the research site. Secondly, it investigated how FFI could be operationalised in the content teaching processes. Finally, it examined the efficacy of this FFI intervention on students’ grammatical accuracy in the use of the target form. By addressing questions relating to L2 acquisition in immersion education, this study emphasises the development of language processing skills and the connection between FFI and language acquisition. A case study was found to be an appropriate approach to addressing these questions.

3.2 Theoretical Foundation

This research draws on cognitive theory, particularly through the use of language-focused instructions in aiding the development of students’ grammatical proficiency. It also applies Cognitive Load theory, which emphasises the significance (and limitations) of learners’ memory process load in language acquisition, and complements cognitive theory. It is important to note that cognitive theory acknowledges that the context within which learning takes place is one of the variables that affect language learning. In other words, L2 education cannot be

divorced from its learning and teaching and context; a point that is recognised in this research. As discussed in Chapter Two, contextual background can differ significantly from one immersion program to another. In this research, the student participants' backgrounds and other environmental aspects do play a role in shaping the classroom pedagogy and learning outcomes associated with this study.

3.3 Research Design

Having established some theoretical foundations, the nature of this research and the motivation behind the choice of research design are discussed in this section. Here the characteristics of the case-study methodology are addressed, followed by discussion of data collection and analysis procedures as appropriate for the purposes of this study. The limitations, credibility and ethics of the research are also discussed.

3.3.1 Combining Qualitative Enquiry with Supporting Quantitative Data

Qualitative case-study research methodology emphasises the holistic, real-life, contextual and in-depth investigation of the social case, rather than by quantifying or generalising a social or individual phenomenon (Yin, 2014; Atkins & Wallace, 2012; O'Toole & Beckett, 2010). In seeking to deliver a comprehensive investigation of an FFI integration in Chinese immersion classroom setting, it is crucial to the success of this study that it emphasises the contextual, holistic, in-depth understanding of the case in its implementation, including the classroom dynamics and the outcomes of the FFI intervention.

Equally important is that this study builds on its qualitative data by including quantitative data to assist qualitative data in verifying the research findings. It is apparent that an examination of a classroom pedagogy and its efficacy on students' learning outcomes would be incomplete, and would have missed an obvious

opportunity, if it did not include some quantitative analysis (via assessments) of learning outcomes over time. Without question, a quantitative element can, and does, assist the qualitative data in establishing and describing research findings (Yin, 2014), a fact that further confirms the choice of the case-study methodology. Since the functions of a case study entail comprehensive examination of case/cases, which entails a qualitative approach, quantitative data can also be used in serving the purposes of the investigation (Yin, 2014; Bryman, 2012). While this study demanded the collection of qualitative data relevant to the impact of FFI on students' grammatical proficiency, the inclusion of quantitative data (assessment results, combined with some statistical analysis), to measure students' proficiency in the target form was useful to cross-reference with the study's qualitative data. The use of qualitative and quantitative data in this way "can permit researchers to address more complicated research questions and collect a richer and stronger array of evidence than can be accomplished by any single method alone" (Yin, 2014, pp, 65–66).

Having discussed the application of a primarily qualitative approach mixed with quantitative elements, it is relevant to now define the case-study method employed in this research:

3.3.2 Case-study Methodology

The justification for adopting a case-study methodology for this project stems from an analysis of the attributes and strengths of the approach, combined with the objectives of the research. Before I discuss the specifics of the rationale behind employing a case-study approach, I mention some of the benefits offered by the case-study approach.

Firstly, the three significant conditions for a case study are its contextualisation, in-depth investigation and time span (Yin, 2012). Case studies generally focus on a specific environment and the broad range of information embedded therein. “Case study is not strictly speaking a ‘methodology’, but rather a choice of what is to be studied: where we examine some phenomenon by identifying it, then observing and documenting a ‘typical’ or ‘exemplary’ instance of it” (O’Toole & Beckett, 2010, p. 55). A case study is usually a thorough examination of a particular location, community, or organisation (Bryman, 2012). Thus the term covers a broad range of specific individuals, contexts or practices and depends on the choice of the investigation. Case studies are used extensively in educational research and they place considerable emphasis on the context of its setting and on studying people’s experiences in their particular environment. While the cognitive approach to language acquisition emphasises memory functions and the cognitive process of transforming knowledge to a level of proficiency, it must also be acknowledged that the often significant differences in contextual background affect teaching and learning in many ways. As this project is set in a distinctive context of teaching Chinese to L2 learners in an Australian primary school immersion program, it provides the advantage of contextualising the research to this environment. Therefore, the flexibility of the case study allows researchers to investigate small or large-scale cases

in various contexts and from individuals to large groups. It provides researchers with methods for exploring patterns and contexts using rich and thick descriptions, thereby enabling a thorough exploration of the research questions. Furthermore, the qualitative case-study methodology supports opportunities for detailed observation and investigation into Chinese immersion classroom teaching practice, taking all aspects and variations into account, in order to examine the connections between the practical application of FFI and grammar acquisition. In addition, the time spent by the researcher on a case is a significant element in case study. The fact that I have been working at the research site as part of the immersion team for a prolonged period affords the researcher a distinct advantage in undertaking comprehensive study of the case. With the benefit of this insight and familiarity, I have had a unique opportunity to assess the ways in which FFI interventions affect classroom interaction patterns, and to gain an informed insight in understanding the learning outcomes attained as a result. On the other hand, the advantages mentioned above also raise questions about the impartiality of the researcher; a matter that is addressed later in this chapter.

A second reason for choosing a qualitative case-study approach is its 'real world' nature, as it provides ways for a researcher to investigate the real world, such as a classroom, in all its complexity. This rationale is especially important in educational research. As a researcher and a teacher, I have chosen to examine the operationalisation of FFI in a real classroom setting to gain an up-close and comprehensive understanding of the case in its complex, ever-changing reality rather than in a language laboratory. The naturalistic and real-life experience aspects are stressed in undertaking case-study research. Hence, a case study was applied as the method in capturing and examining the classroom instruction and interactions inherent in this project. It enabled me as the researcher to observe classroom

interaction in its naturalistic setting and thereby to explore its diversity of perspectives in teaching content while at the same time maintaining a focus on observing the teaching of the linguistic form.

Thirdly, case studies proceed in a systematic way (Yin, 2014), entailing the steps of planning, designing, preparing, collecting data, analysing data and disseminating process. Furthermore, the iterative nature of the case study “involves links between non-consecutive stages for the purposes of reflection and clarification; so that, for example, we might decide to return to our research design and make some changes in the light of our initial experience of collecting or analysing the data” (Atkins & Wallace, 2012, p. 109). Thus, the qualitative case study provides effective methods in systematically investigating and responding to research questions that demand this iterative approach. In this study, in addition to systematically designing the FFI intervention, at each stage (every two weeks) of the intervention I consulted with the mathematics teacher in order to reflect on its effectiveness and adjust the approach as required. This iterative element provided important flexibility to the overall study process.

Having established the merits of qualitative case study in a study of this nature, this section explores some more specific benefits associated with the choice of case study for this research.

Case study allows this research to focus on the classroom pedagogy and practice aspects of the case. As summarised by Yin (2012), a case study entails conducting a thorough investigation into a case, taking all variables into account, and thereby affording the advantages of systematic exploration, thorough description and explanation, and evaluation the studied case. Thus exploration, description, explanation and evaluation are the four main purposes served by case studies. These

attributes are well matched to the objectives of this research. This research uses a case-study approach to investigate the characteristics of the MIP program, consider how FFI can be operationalised and assess its impacts on Chinese immersion students' grammar learning. It does this by making use of through multiple sources of qualitative data, (i.e., contextual data, classroom observation, interviews and questionnaires), together with quantitative assessment results. Thus the case-study approach provides the methods to study the FFI framework beginning with the curriculum planning stage and at various points of delivering and fine-tuning the intervention within the school research setting.

Additionally, the relationship between theory and research in a case study provided an opportunity to ground this research in established L2 teaching theory. "Here the researcher has a well-developed theory, and a case is chosen on the grounds that it will allow a better understanding of the circumstances in which the hypothesis will and will not hold" (Bryman, 2012, p. 70). This study applied cognitive theory to classroom practice in order to test and extend our understanding of FFI when applied in a Chinese immersion setting. "For case study research, the availability of theoretical propositions not only serves the design function well but also helps to explain how one might generalise from a completed case study. The procedure even applies well to the holistic, single case study, which has been commonly criticised for having no generalisability value" (Yin, 2012, p. 148). In establishing a theoretical basis for a case study, the research is equipped with a better understanding and knowledge of the focused topic, and a ready-made guide to both the research design and empirical work required. In this way, case studies allow a theory to be used in directing the research and framing its hypothesis. The relationship between theory and

research in case studies enables research to be more explicitly guided by an established theoretical framework.

In summary, the unique characteristics of case-study research can be summarised as constructive, contextual, systematic and practical (Yin, 2009, p. 1). The ‘constructivist’ aspect refers to ways in which qualitative case studies obtain new knowledge through systematic investigations, verifying theories and constructing or testing theories. The ‘situational’ focuses on the specific context of case-study research from which research findings are drawn. The ‘practical’ element refers to the choice of the research question as closely relating to the classroom practice, combined with the fact that outcome of the research can be applied directly into practice. ‘Systematic’ refers to nature of the design and planning aspects of the research. Each of these elements is apparent in this research in that the study follows a developmental sequence, where the methods are continuously adapted and improved through an iterative process of reviewing class observations and consultation with the teacher (Atkins & Wallace, 2012; Bryman, 2012; Yin, 2014). Thus the research plan is sequenced connectively, where a gradual, step-by-step progression toward research goals enables the investigation to produce more reliable and trustworthy findings. In this way case-study entails a sequenced, iterative and methodical flow in order to draw research findings.

3.3.3 The reflective element of this case study

This research includes a significant element of practitioner—as—researcher, where the researcher investigates his/her own practice. This approach is especially apt in the field of educational research. Stenhouse (1975, 1983) used the term ‘practitioner researcher’ to describe how teachers can participate in the design and implementation of educational research. When used in an educational context, the

unique aspects of a reflective-practitioner case-study approach are twofold. Firstly, the researcher is also a participant (i.e., as a teacher) in the study environment. Secondly, the research context is typically the researcher's own classrooms or school. Furthermore, the motivation for reflective-practitioner case-study research in education is to deal with practical issues confronting the teacher/researcher, with the ultimate goal of improving teaching practice and learning outcomes. In adopting this reflective-practitioner case-study approach, it is acknowledged that the decision to study the researcher's own class also entails some risk of researcher bias or loss of objectivity, and hence a risk to the validity of research findings. This risk was mitigated in a number of ways, including by the researcher observing FFI interventions administered in the teacher's own class, but by another teacher, and by incorporating quantitative evaluations of students' proficiency in the measure-word form. This approach also raises some ethical issues that needed to be addressed. These matters are addressed later in the chapter in sections 3.7 and 3.8.

This reflective nature of a case-study approach offers significant benefits to this study. It allows the researcher to play a more active and interventionist role in the research process than would otherwise be the case. The researcher's in-depth understanding of the research environment not only informed the conception of the research problem, but also guided the planning of the intervention design and data collection and subsequent data analysis. As the researcher enjoys familiarity with, and the confidence of, the research participants, the approach also placed the researcher in a stronger position both to gain direct and honest feedback from participants via interview, and to gather in-depth and comprehensive information directly from the classroom setting. A further benefit to the research process was the researcher's first-hand experience in the setting's content learning context, thereby helping to inform

the design and application of FFI. Overall this reflective-practitioner case-study approach afforded significant benefits to the researcher as a professional educator engaging in research, by adopting a role of third-party observer of teaching methods and practice, and of classroom interactions, in a familiar and naturalistic school setting.

The objective of this research is to investigate ways to enhance L2 immersion students' grammar accuracy on certain Chinese grammatical features without compromising content learning outcomes. The classroom-based practical nature of a reflective-practitioner qualitative case-study fits with the aims of this project, affording the researcher with the flexibility to observe and report on the classroom experience holistically and in ways that capture nuances and complexity. Of equal importance is the fact that this methodology allows the researcher to follow a theoretical framework in investigating the FFI framework extensively and intensively, as a specific complex entity.

3.4 Research Questions

As discussed above, the case-study methodology was selected as the most useful approach to addressing the research questions and propositions. It should be noted here that an explanation of research objectives, hypothesis and questions is provided in the Literature Review chapter (Chapter Two).

This research explores the effectiveness of pedagogical approaches, classroom instructions, and production practice tasks, predominantly used in Chinese immersion mathematics lessons, in order to improve students' grammatical accuracy in the use of measure words. Development of the research questions was informed both through the literature review and from the motivation of the research—a concern that

immersion students' grammatical acquisition is overlooked, and in this case, mistakes in students' measure-word usage have become a persistent problematic area.

As mentioned in the literature review, the research questions are as follows:

Question 1: What are the characteristics of the Chinese partial immersion program at Mawson Primary School?

Question 2: How can the FFI framework be operationalised in this Chinese immersion program in order to facilitate students' grammar acquisition?

Question 3: What effect does the integration of FFI into Chinese mathematics primary immersion pedagogy have on students' grammatical accuracy?

As discussed in the previous section, the reflective-practitioner case study was found to be a valid tool for undertaking this enquiry and answering the research questions.

3.5 Data Collection

In this section, the research setting and participants, together with my role as a participant-observer researcher are explained. The validation of the data collection instruments and procedure is also discussed. Consistent with Farrell's principle on data collection where "... it is most important that the information collected is reliable in that the procedures that are used measure accurately what they claim to measure" (Farrell, 2007, p. 98), multiple methods were employed to collect data and to triangulate its accuracy.

3.5.1 Research Setting and Participants

Mawson Primary School, a Chinese immersion school in Australia, was chosen for the case study, noting that it is one of just six Chinese immersion (or

partial immersion) schools in Australia. As the majority of the immersion students are not from Chinese-speaking backgrounds, the school suited the objectives of the research to investigate certain pedagogical aspects of teaching Chinese grammar to L2 immersion learners with potential to improve learning outcomes in English-speaking students.

In this regard, the selected class is broadly representative of other upper-grade primary school Chinese L2 partial-immersion programs where English is the first language. As classroom pedagogical methods were emphasised, a Grade 5/6 Mandarin Immersion Program (MIP) class in which persistent grammatical errors in students' written and oral Chinese productions were observed, was well suited to be adopted as the case for this study. The MIP Grade 5/6 composite class catered for 17 10-year-old to 11-year-old students, all of whom were willing participants in this project. The mathematics immersion teacher was also a willing participant. The choice of this immersion class was also influenced by the fact that I, as a teacher of the MIP class at the school, had worked in the immersion class for a few years and gained an appreciation for those areas of language development where students were falling short. A detailed discussion on the research site and participants is provided at Chapter Four, noting that the names used for each student participant in this research are pseudonyms.

3.5.2 Classroom Observation

In a reflective-practitioner case study the researcher takes a crucial role, where all information and data are selected, collected and analysed by the researcher based upon their understanding and conceptions toward the research (Lichtman, 2010). This enables the researcher to study and gather information on the immersion pedagogy directly from the classroom setting. In this study, I was both a teacher at the study

school and the researcher. While I taught the class that was the subject of this research for two days per week, my colleague Ellie, a native Chinese speaker and an immersion classroom teacher, also taught the class on her own for one hour per week while I was on my scheduled release breaks. For this research, the teaching role for the mathematics unit (the source of data for this research project), comprising two 30 to 45 minute sessions per week, was performed by Ellie. This arrangement suited my research very well as I was able to use my release time to undertake observations and collect data. As a teacher and researcher, designing and evaluating processes were all performed by the researcher in consultation with the subject teacher, thereby allowing the researcher the opportunity for modification and fine-tuning. With the mathematics classroom teaching component undertaken by my colleague Ellie, I could focus on planning and refining all classroom FFI interventions and assessment tasks, and on the data collection process. In addition, regular discussions with the immersion mathematics teacher were helpful to the process of evaluating and adjusting FFI approaches as the data collection process progressed. It was also important that the researcher connected with participants by closely engaging with them in their learning experiences, thereby helping to inform the researcher in refining and developing new teaching strategies.

The classroom -observer role assists this research to study how FFI approaches assist the language acquisition process through classroom observation and by documenting the reflections of both students and the teachers on their respective learning and teaching experiences. The researcher can listen, observe and assess within the classroom, a privilege that has helped build a better understanding of ways in which the student group learns, and the pedagogical strategies that are most appropriate to meet these students' needs.

Although the researcher had planned this mathematics unit with FFI integrated in the data collection period, the researcher was an observer during the mathematics learning process, audio-recording the classroom process and filling-in observation sheets. By observing another teacher at work in the researcher's own classroom, the researcher was able to take a fresh perspective in observing classroom interactions during FFI interventions, providing a first-hand, practical insight into pedagogical design within a Chinese immersion program context.

It was important to build and maintain a positive rapport between the researcher and the immersion mathematics teacher, students and school community. In this case, rapport was underpinned by standards of ethical professional conduct, an ethic of care for students and a passion for teaching; hence conversations with all sides of the MIP community were based on familiarity, trust and mutual respect. My familiarity with the student and teacher participants also assisted me in my ability to notice whether my observations were causing any unintended anxieties or changes in behaviour in the group. I have noticed despite my overt researcher role through the data collection phase, neither students nor the teacher felt anxious or pressured by my presence in the Chinese immersion mathematics classes. On the contrary, it was observed that students felt sufficiently relaxed and open to express their opinions on interview, almost certainly as a result of my own status as an insider. In this way all students, especially student participants, were able to articulate their opinions, feelings and thoughts in response to interview questions within a supportive and nurturing environment. As mentioned above in section 3.3.2, it is acknowledged that doing research in one's own work environment raises ethical issues and a risk of biased outcomes. This issue is addressed in sections 3.7 and 3.8.

In conclusion, by drawing upon previous FFI research and well-established FFI methods and tools, a case study provides the researcher with opportunities to apply, modify and test theories in her practice according to the distinctive situational context of the class (e.g., students' cultural backgrounds, learning skills, language levels, levels of family support and learning needs). At the same time, the insights of students' learning needs can help the researcher to conduct her research in a reflective, critical and iterative way, where FFI teaching strategies were able to be tested and refined over time to find those most suitable and effective for this group of student participants. Such educational research strives to improve teaching and learning outcomes.

3.5.3 Data Collection Instruments

Consistent with the propositions of this research, the data collection methods were selected for the systematic compilation of information required to gain insights into the application of FFI to a Chinese immersion program, including the incorporation of FFI into classroom instruction and grammar teaching pedagogy. As discussed above, the primary means of data collection were qualitative, with quantitative data also gathered to measure and cross-reference the observational data. Qualitative data were collected through audio-recorded classroom observations, semi-structured interviews of teacher and student participants, a questionnaire and some field notes. The results of pre and post assessments, assessments during the intervention and a delayed post assessment were also gathered in order to measure learners' progress against the target objectives of the research.

Table 3.1 Summary of Data Collection Methods

Instruments	Rationale	Method of Collection
a. Classroom observation (audio-recording and field notes)	To investigate classroom FFI interactions in immersion learning process. Field notes were taken in conjunction with the audio-recorded data to ensure the observations were comprehensive, accurate and thorough.	Audio-recorded observation data. Brief notes were taken to record notable observations on interactions between students and teachers.
b. Questionnaires	To explore student participants' Chinese learning history and family backgrounds in order to place this research in its sociocultural context.	Student participants filled in the questionnaire during class time and the researcher was present to explain and answer any questions if required.
c. Semi-guided Interviews: individually with the immersion teacher and collectively with the student group.	To elicit: <ul style="list-style-type: none"> • discussion on grammar focus and what to focus on and reflections on the FFI process from the mathematics teacher and • students' reflections on those FFI methods that worked best for them. 	Open-ended questions define the research objectives. Student participants sit in a circle in their classroom; researcher asked questions. The interviews of the mathematics teacher were conducted prior to, and after the FFI data collection period.
e. Assessment results	Assessment results from pre, during and post the FFI intervention were collected for use in triangulating and verifying qualitative data and add weight to research findings.	All assessments were conducted in class time and results were recorded on the Students' Assessment Result table.

Note: Data were collected in accordance with the methods listed in the table.

a) Classroom observation and field notes

In the research context, observation generally describes the act of watching carefully to notice or perceive classroom procedure and interactions for a purpose. “The act of observation provides a powerful insight into the authentic life of schools and classrooms. You can systematically observe the activities, people, and physical aspects of your educational setting” (Efron & Ravid, 2013, p. 86). A semi-structured observation plan was designed to observe, listen, learn, inquire, think and record, the

process of FFI implementation as shown at the top of the second column in Table 3.1. The protocol for observation was as follows. Firstly, as described above the researcher's role during mathematics class data-collection time was limited to observing the class at a distance with limited involvement in the mathematics classroom teaching; an arrangement that allowed the researcher to look into a familiar setting from an unfamiliar perspective. Secondly, the observation was focused on all instructions on the target grammar, interactions between the immersion teacher and students and student-to-student interactions.

By observing the mathematics lessons in this way, I was able to adopt a different perspective from the usual role of teaching and instructing the class, enabling me to reflect on teaching instructions and task design from both a learner's and an observer's point of view. Brief discussions with the MIP mathematics teacher were conducted after several lessons to reflect on and modify FFI interventions for the coming lessons, and checklists were prepared on the FFI methods employed.

As observed behaviours are limited to what is observable, every effort was made to form a fresh and receptive view. Audio recording was used to assist and cross check with observation notes. Thorough descriptions were prepared, including transcribed conversations, in order to capture the lively, detailed moments of grammar teaching and learning.

Field notes

Field notes include descriptions, accounts or a record of observed events, including observed non-verbal communications. For example, notes were taken to indicate times when students were silent or whether students are working individually or in groups; to describe things such as facial expressions, the environment/setting, and/or the classroom procedure in operation at the time. Field notes were a key source

of data, often taken while observing the classroom interactions. As such field notes represented an un-structured way of capturing the researcher's more salient and real-time observations, thereby complementing the role of audio-recording and (in some instances) filling the gaps by recording the subtle or visual aspects of class interactions that audio recording may miss. Also, following the data collection protocol and research questions, it is important to control and filter what is to be recorded in field notes, while at the same time capturing immediate reflections and responses, thoughts and feelings (O'Toole & Beckett, 2010).

As a participant-observer, objectivity is central when involved in the fieldwork. In the course of observing FFI interventions in the classroom, I took care to describe my observations in writing while audio-recording the proceedings. These written observations served to supplement the audio-recording data. A field note collection form, (which is included at Appendix C), was divided into columns with the intention that brief comments are recorded to be read in conjunction with transcriptions of audio recordings. An example of such a field note is at figure 3.1 below:

George hesitated, stoped (for a short while), then he corrected the sentence by himself: 哦, 三 (pause) 只 (pause) 狗。 Translation: oh, three (pause) <i>(mw)</i> (pause) dogs.
--

Figure 3.1 Example of field note.

b) Questionnaires

Questionnaires are “among the most popular” and “widely used” educational research instruments, owing to their great utility and the relative ease with which they can be designed, managed, collated, and analysed (O'Toole & Beckett, 2010, p. 135). Good questionnaires are motivating and help to establish trust from the participants, provided they are precisely designed and worded, clearly and logically developed and

include some time-frame controls (O'Toole & Beckett, 2010). In this research a questionnaire was designed to capture details of student participants' Chinese learning history, such as the length of time spent learning Chinese and whether students receive any assistance at home. The questionnaire is set out in figure 3.2, below.

Questionnaire: Year 5 and 6 Chinese Immersion Program Students

1. Gender: Male Female
 2. Grade: _____.
 3. Age: _____.
 4. How long have you been learning Chinese?
 _____ years in LOTE. _____ years in the immersion program.
 5. Do you have someone at home who helps you in your Chinese learning?
 Yes, _____ . No
 6. What is your family cultural background? And what language do you speak at home?
.....
.....
 7. How do you feel about the learning ‘measure word’ through Mathematics?
.....
.....
 8. What method the teacher used in teaching measure words worked well for you? And why?
.....
.....
- The following questions are about the oral presentation (speaking activity) that you completed earlier:*
9. How did you feel about the Mathematics oral presentation you have just completed in Chinese?
.....
.....
 10. What was the hardest part about your presentation? Why?
.....
.....

Thank you very much for taking the time to fill in this questionnaire form, your participation is much appreciated 非常感谢。

Figure 3.2 Questionnaire: Year 5 and 6 Chinese Immersion Program Students.

It is important that those background variables with a potential to directly impact on Chinese learning outcomes (e.g., whether Chinese is spoken at home;

whether the student had spent time living in a Chinese-speaking environment) are recorded, as such factors may potentially impact on the research findings and/or limit potential to generalise findings to other contexts. This questionnaire was designed in plain language to ensure easy comprehension, and using simple terms in order to elicit short and relevant answers. Explanations were made available if needed.

c) Interviews

Interviews are one of most common instruments for collecting qualitative data. They can be described as a conversation in which views are elicited and exchanged on a selected topic (Efron & Ravid, 2013). The transparent, systematic quality of the interview makes this method a reliable and a trustworthy one in gathering data. It is important to design interview questions that do not ‘lead’ the interviewee or present an unbiased view on the subject matter.

Ensuring ethical conduct is the first aspect to be considered when conducting interview (discussed in more detail in the Research Ethics section of this chapter—section 3.8). Taking students’ age, sensitivity and cultural traditions into account in planning the interviews is vital to the objective of obtaining data that is both reliable and rich—data that can truly inform the answers to the research questions. It is equally important, particularly for a practitioner researcher, to take advantage of the familiarity he or she enjoys with the participants, while also recognising that practitioners should have sound strategies in place to avoid manipulating or leading interviewees in ways that provide the answers that the researcher may wish to hear; to do so requires skill in being a supportive, inviting, considerate and trustworthy listener (O’Toole & Beckett, 2010). When considering ways to ask questions, some useful points were suggested by Brikci and Green (2007), including starting an interview with a general question to familiarise participants with the topic, and using

language and everyday vocabulary that is appropriate to the interviewees. They further suggested leaving the more sensitive questions towards the end of an interview, designing open-ended questions wherever the researcher is looking to avoid short answers and asking neutral questions to ensure that the interviewer is not perceived as judgmental.

Prior to the commencement of data collection within the classroom setting, a semi-guided interview was conducted with the mathematics immersion teacher to discuss students' mathematics and language learning. Here, grammar teaching pedagogy and students' grammatical proficiency were the central topics discussed. The semi-guided questions were framed around the research questions and informed by grammar teaching pedagogy as they apply to immersion settings. Key areas discussed with Ellie included how to focus on grammar teaching, why such a focus is useful or important, and the best and most appropriate approaches to correcting grammatical errors during mathematics teaching time. In addition, a post-research interview was also conducted with Ellie to elicit feedback from the teacher's perspective on the FFI intervention. Interview questions were guided by the plan set out at figure 3.3 below:

**Pre Classroom Observation and Post Research Interviews with
the Mathematics Chinese Immersion Teacher**

Semi-guided interview questionnaire

1. What can you tell me about the key features or characteristics of the year 5 and 6 mathematics learning Program in MIP days?
 - In what ways does the program differ from other mathematics and Chinese LOTE programs?
2. Can you describe for me the general structure of your year 5 and 6 MIP mathematics program?
 - How do you choose your topics? Does each topic form part of students' curriculum?
 - How do you plan each unit of work?
3. How important, do you think is grammar in learning a second language? [Why is it so important?]
 - In comparison to a LOTE context, do you think teaching and learning Chinese grammar is harder or easier in an immersion context? Why?
4. Can you tell me about your approach to integrating Chinese grammar into your mathematics lessons?
 - Do you have grammatical component in each work planning unit?
 - What sort of (are there any common) grammatical errors that students from English speaking background make in Mathematics learning?
 - Can you give me some examples of how you incorporate grammar into your lessons?
5. Are you familiar with the term 'form focused instruction'?
 - Can you briefly explain the ways that you make use of 'content' in teaching Chinese language to your students?
 - And how, specifically, do you make use of this 'content' in teaching Chinese grammar?

After the data collection period:

6. Can you give me some examples of FFI used in your mathematics teaching approach?
 - Specifically, how do you ensure that your students' grammar skills are strengthened in the process of developing their Chinese production skills?
 - How and when do you correct your students' grammatical error/s?
 - What FFI method do you like to apply in teaching mathematics and do you think those methods are effective?
 - Do you think a FFI integration with content the teaching is feasible?
7. How would you describe the level of your students' Chinese speaking and writing skills and the rate at which their language productive skills are improving?
 - In what ways, do you think, does the FFI in the content focused context make a difference to the development of students' grammar proficiency in their Chinese production skills?
8. Are there any other comments you would like to make, especially on the FFI intervention?

End of interview questions

Figure 3.3 Pre classroom observation and post research interviews with the mathematics Chinese immersion teacher.

After the end of the class-based data-collection period a semi-guided group interview was also undertaken with the student participants with the aim of

encouraging them to reflect on the FFI implementation methods used in their mathematics learning process. This provided an additional source of insights into participants' internalisation process in acquiring the measure-word form. Here the questions covered students' perceptions such as how they felt about the FFI intervention, whether and to what extent they found the FFI intervention helpful in their grammar learning, their reactions to the FFI methods employed and the specific methods that students considered worked best for them. Questions posed in this interview were guided by the plan set out in figure 3.4, below:

End-of-Research Interview
Semi- guided group interview – Year 5 and 6 Chinese Immersion Program Students
1. Did you notice that sometimes your teacher raises her voice and repeats some sentences during the lesson? Do you know why she does that? When do you think she is most likely to repeat sentences in this way?
2. How did you feel when your teacher asked you to repeat or rephrase your sentence?
3. Can you still remember some of the sentences or phrases that your teacher asked you to repeat? (if yes) Can you give me an example?
4. Would you be able to tell me why we use “个” before a noun, sometimes?
5. How do you say the following sentences in Chinese? I have three teachers teaching my class, one of them is Chinese, one is from England and another one is from Queensland. I have a dog, a cat and 3 gold-fish.
6. What FFI method that your teacher used during Mathematics lessons?
7. Which method worked for you in learning the ‘measure word’?
Thank you very much for participating; your feedback is much appreciated.

Figure 3.4 Semi-guided group interview – Year 5 and 6 Chinese Immersion Program Students.

Overall these interview data were useful in gauging the extent to which the interventions were effective in assisting students to acquire the target Chinese grammar elements and, in particular, in identifying those methods that interviewees thought worked best in comparison to the methods that did not work so well. The

interviews were conducted in the familiar environment of the students' normal classroom, which helped the researcher to ensure that students were as relaxed as possible. Specific examples were used (rather than abstract linguistic questions or concepts) in order to make it easy for students to understand the questions, and a 'Pass' option was made available on all questions so that students would not feel coerced into answering the questions. Some students opted to take the 'Pass' option when unsure of their answers to some questions.

d) Assessment data

Assessment (exams or tests) data are useful to check teaching and learning outcomes and provide quantitative and qualitative feedback. Formative and summative assessments on mathematics and Chinese learning were carried out throughout the term. For example, a short introductory speaking task was administered to students at the start of the intervention to examine their abilities in the use of measure words in their oral production. As the task entailed an introduction of students' family members and pets, each student was able to talk about the number of siblings and pets in their families. In this and other tasks, such as solving mathematics questions and singing in Chinese, measure words comprised a critical part of accurate expression. Details of the assessment tasks are discussed in Chapter Five. These assessment scores were used in concert with the range of qualitative data to evaluate and demonstrate students' learning achievements over time. One possible limitation of assessment data is that it "may not accurately capture student performance, the content taught, or the effectiveness of the teaching strategy" (Efron & Ravid, 2013, p. 68). Deficiencies in the capacity of assessments in this regard could be attributable to (for example) poor design of the assessment instrument, or the quality of a student's performance at the time of the assessment for reasons unrelated to their schooling. In

acknowledging this potential limitation, it is important to note that all assessment tasks were carefully designed and that quantitative assessment data is utilised to complement, and to assist in the evaluation and verification of, the qualitative data collected on FFI implementation (Table 6.2 in Chapter Six). Furthermore, it is also the case that the results derived from analysis of qualitative data have in fact confirmed the validity of the quantitative assessment data as discussed at Section 3.3—Research Design.

Obviously, each of the methods mentioned above has its strengths and limitations. However the combination of four different methods (classroom observation, questionnaires, semi-guided interviews and assessment results) employed to investigate the issues, and to compare and affirm research findings, is an important way to minimise inaccuracy in this research. The benefit of using combined sources of data is therefore to guard against inconsistency.

3.5.4 Data Collection Procedure

The data collected on students' and the teacher's participation in this research is detailed in Table 3.2.

Table 3.2 Summary of Data Collection Instruments

Participants	Data collection instrument
Student participants	<p>Audio-taped classroom observations, subsequently coded and transcribed</p> <p>A number of pre, during and post assessment in order to examine students' acquisition on the focused form</p> <p>Delayed post-test assessment</p> <p>Semi-guided group interview with students at the end of the term</p> <p>A questionnaire form at the start of the term</p>
MIP mathematics teacher participant	<p>Pre and post interviews and discussions of FFI implementation, choice of grammar features, techniques, with Ellie</p> <p>Teaching during audio-recorded classroom observations</p> <p>Discussions and reflections several time after classroom observations with the teacher regarding the lesson and FFI process</p> <p>Administering the questionnaire to students and assisting them in its completion.</p> <p>Assisting in a semi-guided group interview at the end of the data collection</p> <p>Administering the pre and a post assessment on the focused-form elements</p> <p>Administering the delayed post-test</p>

Note: These data sources illustrate the breadth of data collected.

3.5.5 Classroom instructional task design

The FFI methods adopted from Lyster's framework were designed in groups of noticing, awareness-raising and production practice. These groups are explained in Chapter Two. The three groups follow a spectrum of intensity and implicitness (or explicitness). They were developed according to the degree of emphasis on the target form, and also decrease in their subtlety from implicit toward more explicit approaches. For example, increasing the frequency of the target form in language input is less obvious and less intrusive to content teaching processes than corrective feedback treatments. However, a balanced mix between degrees of intensity and implicitness/explicitness can work well together in effectively targeting the problematic features (Lyster, 2007).

The sequence of instructional tasks commenced with noticing activities in week 2, followed by awareness-raising tasks in weeks 3 and 4. In weeks 5, 6 and 7 practice tasks were intergraded into mathematics teaching. Subsequently, weeks 8, 9, and 10 are assessment weeks to measure students' learning outcomes. This process and the resultant data are discussed in detail in Chapter 5.

3.6 Data Analysis

Moving on from the data collection method and procedure, this section deals with the data analysis process. Qualitative data were categorised and coded thematically to assist in data analysis. Data analysis then entailed an examination of all collected materials in order to draw systematic conclusions and answer the research questions. This section describes the approach taken to data coding, analysis and interpretation. Additionally, assessment and analysis of quantitative data are also discussed in section 3.6.3.

3.6.1 Categorising (Thematic Analysis) and Coding Qualitative Data in Relation to Research Question Two: The operationalisation of FFI in a Chinese immersion classroom

Data collected in the study were categorised using thematic analysis—a type of coding commonly employed to organise qualitative data. Thematic analysis essentially entails sorting data into groups based on patterns or themes (Bryman, 2012; Yin, 2014). Most qualitative data analysis starts from coding. It involves sorting through transcripts and putting them into different categories. The aim of categorising data is to support the distillation of salient information in ways that enable links, commonalities or other patterns to be ascertained, thus helping the researcher to draw meaningful conclusions from the data (Efran & Ravid, 2013). The categorisation of

data is also crucial and can emerge, for example, from research questions or the literature review itself. Bryman notes that the challenge of selecting themes is “a remarkably undeveloped procedure, in that there are few specifications of its steps or ingredients” (2012, p. 580). Nevertheless, Bryman does proceed to describe how a researcher can construct a theme by drawing on the available data and by developing an understanding of the potential for the research to contribute to the researcher’s field of learning or practice (Bryman, 2012).

The criteria for analysing qualitative data in this research have been laid down after reviewing the literature and research questions. The proposition that FFI could potentially assist immersion students’ L2 grammatical acquisition was predominantly based on Lyster’s (2004, 2007) FFI framework, comprising the sequence of noticing, awareness-raising and production practice with feedback. The FFI theoretical framework and relevant literatures were described in Chapter Two – Literature Review. This proposition is the foundation of the research design. Therefore the data analysis process entailed working carefully through data to find evidence of FFI and its impacts on student participants. Lyster’s FFI framework was intended to enhance grammar acquisition by immersion students, the purpose of collecting data on the research intervention was to assist in identifying whether and to what extent the hypothesis worked in practice for L2 Chinese immersion students.

The first step involved carefully examining the FFI implementation data transcript and compiling all FFI methods into units, sorting units into groups. Observational data were then coded consistent with established categories and subcategories of FFI interventions, under categories of ‘N’ (noticing), ‘AW’ (awareness raising), ‘PP’ (production practice) and ‘O’ (other).

For example:

a stressed or changed tone on word ‘条’ (a *mw* used with a word for something thin and long) was identified with an ‘N’ marked next to the transcript.

Where the teacher provided feedback such as: “where is the glue (between a noun and a number)?”, an annotation – ‘AW’ – was made to denote an awareness raising intervention.

a ‘PP’ was annotated into the transcript when Ellie invited students to repeat after her: “来, 咱们再说一遍 ...” (“come, let’s say it once more”).

The exemplifications were provided to demonstrate how FFI was applied in practice. This process is explained in the section 2.5.2 in the Literature Review chapter.

In this way, the qualitative data were organised and conceptualised in ways that could to confirm that the FFI interventions were carried out as planned, to more easily inform interrogation, analysis and discussion of the data, and ultimately to assist the process of answering the research questions. In particular, this approach was useful to reviewing how FFI was actually applied and adapted in the new context of primary-level Chinese immersion education in an Australian setting. Despite the fact that the research plan was established beforehand, the units of meaning and thematic categories were further refined during the course of the research. O’Toole and Beckett (2010) stressed the importance of ‘listening’ to the data and taking a fresh look at the data analysis process in case-study. As a teacher and researcher, it is very important to take a step back from a teacher’s perspective and take a ‘fresh look’ into the data, find the patterns that were planned or anticipated, while at the same time not missing any new or unexpected elements that the data might offer. In the process, this approach

also allows the researcher to let the data speak and bring the interactions to life in order to allow readers to feel and see the FFI at work.

In addition, the rich, intricate and contextual nature of the qualitative data demands comprehensive examination of data in the course of the gathering, interrogating and confirming process. This is done with the aim of establishing a correlation between categories and results as part of a systematically coherent analysis. Transcribed classroom observations and interview data were thoroughly examined with units of meaning selected (e.g., a gesture to indicate a measure-word error had been made or a stress on the voice to remind a student to self-correct). Subsequently, those units were formed into categories, such as visual enhancement or corrective feedback. In this way, open-coding categories were studied and patterns affirmed according to the categories of the FFI, as mentioned above. This information was then used to describe and map how FFI was used in classroom teaching interactions, listing the common FFI methods employed during mathematics teaching.

Furthermore, in this research, different sources of data were employed to assess and cross-reference findings. Teacher's and students' reflections on the FFI methods used were also categorised thematically. Quantitative data were incorporated into the data analysis process to measure changes in grammatical proficiency over time, therefore to verify the findings from qualitative data and to better understand the effectiveness of the FFI implementation. These statistical data enhanced the clarity of the research in demonstrating the outcomes from the FFI intervention.

One of the more metaphorical descriptions of the process of working through collected data that I find particularly apt is as follows: "Laurel Richardson's (2000) crystallisation, like bricolage, applies to the whole data analysis process, not just the preliminary cast-through, but seeing the cognitive coherence emerging and growing

like crystals from all the various data sources” (O’Toole & Beckett, 2010, p. 172).

Hence, data are thoroughly examined to check for evidence, as well as to interrogate for consistence between categories, all at once, in order to search for evidence in the data that contradict the hypothesis to ensure precision.

3.6.2 Assessment and Analysis in Relation to Research Question Three: the Impact of FFI on Students’ Measure Word Acquisition

This section discusses the approaches to analysing and measuring L2 acquisition.

Guided by cognitive theory, language acquisition is assessed through the process of developing knowledge from declarative to procedural, as discussed in Chapter Two. Ellis’ framework of acquisition assessment (2001) suggested measurement of grammaticality judgments, comprehension and production.

Following the same principle, Ortega (2009) assesses interlanguage processes in accordance with the four phases of simplification, overgeneralisation, restructuring and U-shaped behaviour; sequential phases that align with the progressive acquisition of L2 skills.

Therefore, progressive observations of students performing language tasks were recorded and documented, and pre and post test results were compiled, in order to assess students’ acquisition using both formative and summative modes of assessment (Table 2.1 in Chapter Two, refers). The first, “internalisation of a new linguistic feature” stage entailed observation of incidences where two or more measure words were used either during classroom activities (individually and in group activities), or in post-test results. The second stage of acquisition was evaluated from students’ usage of measure words, and their choice of the specific measure words relevant to their tasks: the extent to which students understood the need for the correct measure

words required in counting the relevant nouns, and whether they were able to competently and fluently construct sentences using the correct measure words. Students' comprehension and production skills were tested in the designed tasks: translation of the Chinese song "1001 wishes", language games, solving mathematics questions and presentation. The last stage of language skill assessment was undertaken in two ways: firstly, via a mathematics presentation task (entailing each student posing a mathematics question, explaining the method and answering the question, in oral and written Chinese); and, secondly, by a set of interactive and open-ended verbal tasks designed to elicit usage of measure words. For example, an exercise called "My Aunt's Suitcase" (adopted from Harley, 1998), where students were asked to describe the number of contents in the suitcase, without knowing that the focus of the observation was on measure word acquisition. Furthermore, by the end of the data collection stage, the use of explicit classroom FFI interventions was reduced, with a corresponding increase in the use of more implicit and incidental interventions, in order to better measure students' progress in acquiring the target form. Table 2.1, in Chapter Two sets out the methods adopted from Ellis' acquisition measurement for this project.

3.6.3 Quantitative Analysis – Assessing Students' Accuracy in the Use of Measure Words

The method for qualitatively assessing students' grammatical development is discussed in Chapter Two, section 2.8. This sub-section describes the protocol developed for quantitatively assessing and recording students' measure word usage through their Chinese productions in classroom activities and assessments.

The data coding for examining interlanguage proficiency was based on a point system. For decision 1, the total number of measure words required to complete each

task correctly was counted and this number was used as the base number or denominator. One point was awarded to each correct measure word used in the production. For example, if 28 measure words should have been employed in a designated task, and if one student achieved 15 correct and missed 13, then that student scored 15 out of 28 correct, (or 54% accuracy for this task). For decision 2, no point was awarded for an instance where the measure word itself is not the most appropriate one, regardless of whether the measure word was placed in the right position between a number and a noun. Such errors were awarded a zero mark despite the fact that the student in question demonstrated awareness that a measure word was essential to completing such phrases. This decision was made after consulting with other Chinese teachers, the majority of whom consider that a misused measure word represents a failure to convey meaning correctly.

For example:

学校图书馆有三千六百八十九本书。我们班有四百二十本书。 (2 points)

我的弟弟有五个鱼。 (0 point) [As the measure word for fish should be 条, instead of 个].

The accuracy of students' Chinese speaking and writing were analysed, with individual and collective results compared pre and post FFI treatment. A class average was calculated for each assessment to detect the overall changes in measure word accuracy over the term. Students' results were recorded on the assessment result sheet. More specifically, oral and writing tasks were compared separately. Thus, the data were intended to inform conclusions on the efficacy of the FFI pedagogical strategies employed, and of the overall FFI intervention in supporting improvement in students' Chinese grammar accuracy. The purpose of this step was to evaluate the

impact over time of the FFI framework on student participants' grammatical accuracy and proficiency in the target measure word form.

3.6.4 Data Interpretation

While it is common to use statistical analysis to quantify the significance of findings, case-study analysis is often demonstrated or described in thick descriptive, interpretative or evaluative forms. In addition, as there are a few established formulas to guide the case-study data analysis procedure, findings tend to be highly dependent on researchers' judgements (Yin, 2014). This reflects the difficulties in establishing a set principle for data analysis. Hence, the criteria for accuracy in interpreting case-study data can be difficult to define. Despite this complexity, Yin provided four basic strategies to deal with the issue: "relying on theoretical propositions; working your data from the 'ground up'; developing a case description; and examining plausible rival explanations" (2014, p. 136). Yin (2014) explained the importance of following the same theoretical framework that instigated the research questions and hypotheses, within which can be found the best way of approaching data interpretation. It was useful to have a plan in place prior to data collection, as it set parameters for the case study in its theoretical direction, data organisation, the extent to which the contextual elements are relevant, and the questions to be investigated. The 'ground up' approach entailed examining the data to find patterns and generating findings inductively.

In summary, this research followed a combination of analytic strategies to approach data analysis, thereby providing some assurance of the credibility and validity of its findings. Firstly, cognitive theory—a well-developed and researched theoretical framework—was followed in guiding the research design and data analysis process. Secondly, research findings were compared with the theoretical foundation and prediction upon FFI framework. The results of data analysis in this study were

compared against Lyster’s FFI framework to check for consistent patterns. Yin also stressed the importance of identifying alternative or ‘rival’ explanations (such as the null hypothesis, investigator bias or rival explanations), in order to test whether the researcher’s interpretation of results can be falsified (2014, pp.140–142). Some possible rival explanations, such as threats to validity, investigator’s bias and participants’ social backgrounds, are all addressed and discussed in the research outcome analysis section (Chapter Seven). Additionally, in this case study, the mathematics lessons remained relatively unchanged apart from the FFI intervention, thereby eliminating the possibility of other rival explanations.

3.7 Limitations and Credibility of the Research

This section begins with a discussion on the limitations of case-study methodology, leading into an analysis of the credibility of the research and the approaches taken in addressing these limitations.

3.7.1 Limitations

It is important to recognise that there are limitations or pitfalls in case-study (Atkins & Wallace, 2012; O’Toole & Beckett, 2010; Bryman 2012; Yin, 2009, 2012 & 2014): each case study is set in its unique context, so it can be an intricate task to generalise its findings. “[A] key tension at the heart of case study is the relationship between the uniqueness of its terms of reference and the generalisability of its results” (O’Toole & Beckett, 2010, p. 73). Thus, it is difficult to use the research findings from any particular case study as the basis for generalisation. According to Atkins and Wallace (2012), a key vulnerability of case studies is that they may be open to claims of over-generalisation (i.e., that the particular evidence produced by the case study is insufficient to support the generalisations drawn by the researcher. The limited numbers of cases investigated via this methodology (one case in this research), can

often mean that the research findings may apply only to the specified context, and generalisation to other social environments is a problematic task. Therefore, the data gathered through one case study may not be consistent with other similar case studies (i.e., results may not be readily repeatable).

However, this limitation does not prevent case-study findings from being legitimate representations of outcomes (within certain boundaries) that might be replicated in other contexts. It is hoped that the case-study findings “might be generalisable across the whole category” (O’Toole & Beckett, 2010, p. 57). In his 2011 rebuttal of five common misunderstandings of the limitations of case studies, Flyvbjerg strongly contests the assertion that case studies cannot be used to make generalisations and hence have limited value in scientific development (2011). Instead, Flyvbjerg’s analysis concluded that:

...one can often generalize on the basis of a single case, and the case study may be central to scientific development via generalization as supplement or alternative to other methods. But formal generalization is overvalued as a source of scientific development, whereas ‘the force of example’ and transferability are underestimated. (Flyvbjerg, 2011, p. 305)

A clearly and precisely defined ‘case’ that seeks to validate its theoretical premise is important to ensuring that the case-study findings prove valuable or applicable to other cases. This is so, provided that the boundaries of the findings are comprehensively described and established.

The need to ensure rigour in a case study is another challenge that researchers face. As Yin (2009) observes, “too many times, the case-study investigator has been sloppy, has not followed systematic procedures, or has allowed equivocal evidence or biased views to influence the direction of the findings and conclusions” (p. 14). In this

regard, this research was only designed after thorough examination of issues relating to the research site and thorough preparation to minimise the risk of bias. Issues of credibility are discussed further in the next sub-section.

In addition, ethical issues can arise in instances when potential research students feel under pressure to participate. In classroom research such pressure (real or perceived), may also impact on classroom behaviour and learning efforts during observation. In adopting an observer role, it is possible that the close relationship formed with student participants can have either a positive or negative impact on students' behaviours. For example, in a school context, if student participants like and relate well with the researcher, the quality of the relationship can serve to motivate students' learning attitudes and efforts. The converse can also apply. Hence, in some cases it may be difficult to separate the personal relationships from the teaching pedagogy elements that may have contributed to learning outcomes of the case study. As is further discussed in section 3.8, this potential weakness was in part addressed via a professional and ethical approach to all aspects of the study and by the use of another teacher in administering the FFI interventions.

In acknowledging the challenges, there are ways to prevent or minimise such risks through carefully designed research plans and by taking care to reduce the likelihood of such issues arising. As a case-study researcher and observer, and while noting the importance of becoming familiar with the research site, it is equally important to be able to "make a familiar context 'strange'" (O'Toole & Beckett, 2010, p. 52). On-going reflective and critical practice are essential to staying true to the investigative and analytical objectivity of the case-study approach. Moreover, by obtaining and comparing data in different forms, (e.g., by comparing data from observations against data from group interviews and students' reflections, or against

assessment results), the researcher can triangulate research findings and establish a more balanced and valid view on the veracity of the data and research findings. The following part discusses the ways in dealing with those issues.

3.7.2 Establish Credibility

The credibility of case-study research can be increased through testing construct validity, internal validity, external validity and reliability of the research (Yin, 2014). According to Yin the four tests of construct validity, internal validity, external validity and reliability can be examined through an array of evidence. Table 3.3 below sets out these tests and the methods employed in this research for establishing validity (Yin, 2014, p. 45).

Table 3.3 Establishing Validity

Tests	Case-Study Methods Used by this Research
<p>Construct validity: The accuracy with which a case study measures reflect the concepts being studied.</p>	<ul style="list-style-type: none"> • Use of multiple sources of evidence: data comprised from different data collection sources: classroom observations, interviews, and assessment results. • Member check – discuss case-study findings with the mathematics immersion teacher.
<p>Internal validity: The strength of a cause-effect link made by a case study, in part determined by showing the absence of spurious relationships and the rejection of rival hypothesis.</p>	<ul style="list-style-type: none"> • Pattern matching: compare data patterns gathered from this research with the FFI framework. • Address rival explanations: address a plausible alternative that is different from the study’s originally stipulated propositions for interpreting the data or findings. • Use logic methods: analysis of case-study data by comparing the empirically based conceptual scheme with the conceptual scheme specified prior to data collection.
<p>External validity: The extent to which the findings from a case study can be analytically generalised to other situations that were not part of the original study.</p>	<ul style="list-style-type: none"> • Apply the theory guiding the research design and data interpretation process: a theoretical framework based on the cognitive theory, and specifically the impact of FFI on aiding the language learning process, was used for guiding the research questions, research design and data analysis process.
<p>Reliability: The consistency and repeatability of the research procedures used in a case study.</p>	<ul style="list-style-type: none"> • Use case-study protocol: the procedural guide for collecting data, including a set of field questions to be addressed by the researcher, representing the questions and topics that motivated this study.

Note: The information in this table is summarised and cited from Yin, 2014, pp. 45, 237–241.

As is described in Table 3.3 above, multiple sources of evidence, including both qualitative and quantitative, were cross-checked and analysed, thereby ensuring construct validity. These different data sources were triangulated to both validate the accuracy of the patterns in the data and verify the results of associated data analysis. In order to increase trustworthiness and credibility, different data sources can be cross-checked to ascertain whether the data collected under each method is capable of supporting the same conclusion. Additionally, member checks were conducted with the immersion mathematics teacher to clarify FFI methods and learning outcomes. Here, classroom observation data and assessment results were compared to check whether their respective findings were corroborated, thereby adding confidence and reliability in the research findings. Triangulation refers to the cross-checking of data from single or multiple sources using the same method. In the data analysis process, qualitative and quantitative data were analysed separately, and findings from both approaches were compared and contrasted to determine whether, and to what extent, results were comparable. Internal validity was tested through a thoroughly designed data analysis process, by addressing rival explanations (e.g., by considering and assessing all other possible factors that could have contributed to the learning outcomes), and by providing detailed explanations for research findings. Additionally, the guiding theoretical framework was applied for the purpose of recognising FFI patterns and categories as mentioned in Table 3.3. External validity was tested by using theory to guide and consolidate the processes of research design and data analysis. Finally the reliability of the research was reinforced by applying the case-study protocol to this research.

As noted above, I was a staff member of the school and the class MIP teacher of the class in which this research was conducted; a fact that, despite the risks to

research objectivity and credibility, also afforded me the advantages of possessing extensive professional knowledge and prolonged involvement with, and observation of, the MIP program, combined with a pre-existing rapport with students. In order to maximise the credibility of the study, and to manage the risk of biased or partial judgements, the FFI intervention integrated into the mathematics lessons was not taught by me, but by the participant teacher Ellie, enabling me as researcher to observe class interactions with a level of objectivity. Additionally, information contained in the mathematics teacher's regular reflections in itself represented quite a valuable source of data. While these factors do not in themselves equate to credibility, they are nevertheless contributing factors in this regard. The methodological issues arising from the pre-existing relationship between researcher and participants are discussed further at Section 3.8, below.

A group interview with all 17 students was conducted at the end of data collection session to elicit students' perceptions about the grammar that was taught during mathematics sessions. The results of this group interview can be compared against the results of data analysis from classroom observations. Hence the group interview results assisted by confirming and validating classroom observation outcomes. Data from pre-test, post-test and delayed post-test were used for further cross-checking and verification of findings.

All classroom observations and semi-guided interviews were audio recorded for data collection purposes. All recording was undertaken in a natural classroom setting, where students and teachers were in a familiar and comfortable environment; a not insignificant factor in seeking to gather natural, authentic data. Data were collected directly from source by the researcher, and data interpretation and analysis was undertaken explicitly and thoroughly.

In conclusion, this research intended to use primary sources of data, collected in its natural environment, in order to draw rich descriptions and experiences. The process of data collection, description and interpretation has been as direct as possible in an effort to ensure the credibility of the studied community. Every effort was made to validate this study and to make findings as rigorous as possible.

3.8 Research Ethics

The safety and well-being of students and the need for confidentiality were key ethical considerations in conducting research. After ethics approvals were granted by the Monash University Human Research Ethics Committee, the Australian Capital Territory Department of Education and the school principal, I commenced preparatory discussions with my colleague, the MIP mathematics teacher Ellie to check whether she was interested in participating in the research project as the teacher while I was observing. Subsequently, I firstly discussed this research project with the Grade 5/6 MIP students in class and, secondly, explained it to their parents/guardians via a letter detailing the project objectives, data collection procedure and students rights as participants in this research (should students and their parents/guardians consent to their participation). I took particular care to explain to students that they were under no obligation to take part in this project, assuring them that they could withdraw their participation at any time during the research, and also assuring them that all participation would be on an anonymous basis with no circumstances where students or teachers would be identifiable by anyone else but me. Overall, every effort was made to ensure students, parents and teachers did not feel coerced into participating.

The detailed research Explanation Letters (refer to Appendix A) and Permission Forms (refer to Appendix B) were sent home with students for their parents or carers to consider. All 17 students in the Grade 5/6 MIP class and their

parents/guardians agreed to take part in this research and to all data collection conditions (i.e., participation in audio-recorded classroom observations, learning procedures, group interviews, answering a questionnaire form, etc.) via signed support forms. Ellie, who was excited about the project, also provided her signed consent via the form provided after reading the Explanation Letter. She agreed to abide by the ethical standards and protocols applicable to the research. While an alternative learning arrangement was put in place by the school in the event that any student(s) opted to cease their participation in the research, the need for it did not arise.

In other circumstances, ethical issues may arise where potential research participants feel under pressure to participate. Such pressure may impact on classroom behaviour and learning efforts during observation, and hence on research findings. Here I must note that, as the teacher of the class in which I was conducting my research, I have been afforded a considerable advantage through students' and parents' familiarity and trust in me and the MIP program; a fact which I am sure contributed to students willingness to participate in the study. Overall, I was moved by the support and enthusiasm given by the whole school community, especially by my students and teaching staff, towards this L2 teaching and learning research project. I emphasise again that all students and parents were thoroughly informed about the nature, benefit and aims of this study, their rights through the research process, and that the study would take place in a safe, friendly, trustworthy learning environment. I have ensured an ethical and professional relationship between researcher and students. I have provided to students a clear ethical code of conduct that the researcher is required to observe, so all students were aware of their rights in this project.

Regarding the data management, this research complies strictly with the University's Data Management requirements: only the researcher was afforded access

to the original data. Collected data are retained in the Department for at least five years. All the information provided for the project is confidential and students have been renamed with pseudonyms in this research. However the data are re-identifiable initially until they are matched and then all identification files will be deleted or shredded. All data are coded and aggregate results used for analysis, and as a result no individual identities will be discoverable.

3.9 Chapter Summary

In this chapter the methodological aspects of the research were discussed. The reasons for the choices of methodology and methods were also provided, with particular emphasis to the rationale for adopting a case-study research approach. The ethics, plus the generalisability, internal and external validity and reliability, (which are important to case-study research), were analysed. Following this, the data were collected and analysed, and the protocols and framework were explained and discussed. The research design process endeavoured to ensure the research findings of this project were formed through a thoroughly planned, systematic inquiry using a variety of sources of data: field notes; observation transcripts; open-ended interviews; assessment results; reflective accounts; and background data. In this way, the research findings were informed by comprehensive data collection and analysis, combined with researcher's lived experiences in the research setting over an extended period.

The next chapter, Chapter Four, discusses the nature and operation of the Mawson Chinese immersion program and the process of preparing for the FFI intervention.

CHAPTER FOUR – THE CHARACTERISTICS AND CONTEXT OF THE CHINESE IMMERSION PROGRAM (RESEARCH QUESTION ONE) AND PREPARATION FOR THE FFI INTERVENTION

4.1 Introduction

As discussed in Chapter Two, cognitive theory seeks to inform effective language teaching pedagogy by understanding ways in which students process information as they acquire a second language. However one criticism of cognitivists is that they are “concerned primarily with the individual, and do not view the learner as a social being” (Mitchell & Myles, 2004, p. 129). In other words, by emphasising the learning functions of the brain, cognitive theory provides a perspective that to some degree is isolated from the diversity of learning contexts. Noting this, and given the rich variety of global contexts in which the immersion model is applied, it is appropriate that the first research question examines the nature and characteristics of the Mawson Chinese immersion program. Hence, this study discusses the immersion context in some detail—an Australian primary school level Chinese immersion program—and how this context relates to the motivation behind this study, the nature of the research intervention and the research findings. What follows is a discussion of the Mawson Mandarin Immersion Program (MIP) and its student population, as well as the process of integrating a grammatical emphasis into MIP mathematics lessons. This contextual discussion also serves to showcase the immersion teaching process, and specifically how students learn mathematics through their second language.

The second research question (How can the FFI framework be operationalised in this Chinese immersion program in order to facilitate students’ grammar

acquisition?) relates to the procedure for implementing FFI and entails an examination of effective and practical ways to integrate FFI into a Chinese immersion setting. Hence detail on both the pedagogical approaches employed prior to the intervention and on the associated FFI intervention process (as is discussed further in Chapter Five) are important to answering this question and are discussed in this chapter.

4.2 The Research Context

This section positions this research within its contextual background. Background and environmental information make a significant contribution towards case-study research and the credibility of its findings. Before moving on to the discussion of the MIP program, it is important to discuss the range of, and differences between, immersion settings to further establish the unique contextual aspects of this research. Most importantly, this background information forms the context upon which the research findings were based.

Invariably there are major structural differences between immersion programs from one setting to another, depending upon the specific context of each program. These variables may include: time allocation (total, partial); program priorities (language, content, or both); socio-cultural objectives and motivations (maintain heritage or indigenous language; gain an additional language; maintain an ethnic community language; preparation for work in a foreign country; etc.); learners' age (early, middle and late immersion); and whether it has an additive (with the aim of adding a second language to learners' first language) or subtractive (where the aim is to replace a native language with the dominant language) purpose. "Content-based approaches are known to come in many different shapes and sizes" (Lyster, 2007, p. 6). In fact, the great advantage of the content-based model is its flexibility. It can be

adapted in many different ways to meet the needs of the community, school and environment (Johnson & Swain, 1997). It is clear that the success of either content-focused or content and language integrated learning systems (i.e., immersion or CLIL) are largely dependent on their context. For example, in discussing Japanese teaching in mainstream Australian schools, Turner (2013a) stresses the importance of the context within which a particular second language teaching approach (such as CLIL), is adopted. Her analysis concerned the adoption of a CLIL approach to learning Japanese in many Australian schools. In recognising the achievements of CLIL in developing students' communicative abilities in teaching an additional language in European countries, Turner nevertheless points out that transferring this success to Japanese throws up some specific contextual challenges. These include the extent of difference between students' first language and the target language and cultural differences; aspects that may well impact on learning outcomes. Turner (2013a, 2013b) recommends caution when applying a European CLIL approach in the mainstream Australian school system without customisation to taking into account local differences.

Turner's analysis provides some indication of the importance of contextual factors both to language education generally, and specifically to this research. In this sense it is essential to specify and compare the unique characteristics of the Chinese (partial) immersion program studied in this research with other immersion representative models, such as the French immersion program in Canada and European language immersion programs in Europe such as CLIL.

Many research findings about language immersion programs were based on the early French total immersion programs in Canada, especially during the early phase of immersion studies in the late 1970s and early 1980s. The Canadian total

immersion model entails students starting immersion learning from kindergarten (aged 5) for two to three years. English support comes in at Grade 2, and in Grades 3 and 4 some subjects (e.g., science, geography) are taught in English. About half of each language is used as medium instruction in Grade 4 (Cummins, 2011 & 2014). Further, French immersion programs are additive bilingualism in nature to promote language competency with the aim of achieving ‘native-like’ proficiency in French language for Anglophone students (Garcia, 2009). The immersion opportunity is not compulsory for all students; instead, only students with strong French learning convictions, aided by their families or teachers, take up the offer (Baker, 2006). Immersion teachers are classroom-trained teachers who are bilingual, thus those teachers are specialised in subject teaching. By and large, French immersion students are from English-speaking backgrounds and the exposure of French is largely in the classroom. Students start their total immersion learning from early primary school for the purpose of becoming proficient in an additional language.

In Europe, L2 programs have been developed according to their educational and social-cultural objectives which promote multilingualism, cultural understanding, linguistic capacity and lifelong learning (Garcia, 2009) since the 1990s. These objectives differ from those of the Canadian immersion programs, as Garcia (2009) noted: “for the European Union, with an understanding that all students should be fluent in their Mother Tongue + 2 languages in the near future” (2009, p. 130). As a result the European Commission adopted the CLIL approach (developed from the immersion approach) for all students (Garcia, 2009). The term CLIL originated in 1994 in Europe to describe a dual-focused teaching approach in subject area and language learning (Marsh, Maljers, & Hartiala, 2001). CLIL provides the opportunity for content learning, while at the same time providing the exposure to another

language through subject learning. Language teaching works alongside the content. Hence Garcia contends that over time, CLIL provides a practical means to offer European citizens with the opportunity to attain plurilingualism (2009, p. 130). Native-like proficiency in the target language is not necessary for CLIL teachers; often they are qualified classroom or subject teachers. There is no time restriction on allocating L1 and L2 either: target language exposure time can vary from five percent to 50 percent of a student's learning time. Mathematics and science are common subjects taught in English for many CLIL programs (Garcia, 2009). Clyne (1986) noted that Scandinavians (in Sweden, Denmark and Norway) have for many years been equipped with a high level of English proficiency, in addition to their abilities in their mother tongues, as reflected in the fact that English is taught to all students from Grade 3. By the time most Scandinavians reach university, they have been learning the language for 10 years.

In comparison, "Australia has a different sociolinguistic situation and different needs, opportunities and aspirations to other countries and experiences cannot be readily transferred" (Clyne, 1986, p. 15). Despite Australia's geographical proximity to Asia and diversity of cultural and language groups, English is its only official language (De Courcy, 2002). Since 1970s, L2 education has made great inroads into the Australian school system, reflecting increasing awareness of Australian's growing cultural diversity; an increasing appreciation the value of connecting local schools to the different cultures that make up the school community; an increased awareness of the importance of cross-cultural and global communication; and a growing demand from immigrant communities to recognise languages that other than English in local primary schools. As a result, Australia has taken a novel approach to language education: "a distinctive feature of Australian language policies has been the

complementarity of English (as common language of all Australians) and the retention of community languages by their speakers and the learning of these and foreign languages by other Australians” (Jenkins, et.al., 1995, p. 7). In 1982, the state of Victoria introduced LOTE (languages other than English) at the primary school level on a large scale. However the subsequent implementation of LOTE through the 1980s in Victoria was accompanied with a range of problems including poor quality of programs and educational outcomes, lack of continuity between primary and secondary schools, and high levels of uncertainty regarding program availability from year to year due to an inability to sustain funding and to retain skilled staff. From the late 80s to the mid-90s, bilingual/immersion programs also started to grow across Australia. According to Bianco and Slaughter, in 2006,

of Australia’s estimated 350 spoken languages 133 (including 50 Indigenous languages) were taught in some kind of formal education program. 97 percent of all students are enrolled at mainstream schools, specialist public language schools or through distance education to study one (or more) of the following languages: Arabic, Chinese, French, German, (modern) Greek, Indonesian, Italian, Japanese and Spanish. (2009, p. 39)

This indicates both a significant increase in languages taught over time, and a growing population of learners, with Asian languages in particular beginning to thrive (e.g., Chinese and Japanese).

As a trading partner, a near-neighbour and a country with growing cultural and economic links to Australia, China is a country of growing significance to Australia’s future in the 21st century. It’s encouraging, therefore, that people from all walks of life, from government policy makers to business communities, school students, parents, have slowly come to appreciate the significance of Chinese language

education. It is vital to the success of Australian Government ‘Asian Century’ initiatives that seek to provide all Australian children with the opportunity to develop both linguistic and sociocultural communicative competence in Asian languages. As the key tool of social communication, language develops within its social-cultural context. Hence, competence in a second language not only affords a communicative advantage, but also helps the learner to develop a deeper understanding of its associated culture (Asian Century White Paper 2012). The Asian Century White Paper also requires all students to be provided with Asian language learning opportunities, with Chinese (Mandarin), Hindi, Indonesian and Japanese all identified as priority languages. The initiative incorporates clear language education policy directions for the development of a National Asian language curriculum, including adequate funding and resources for school Asian language programs and incentives (such as overseas scholarships) that reward high performing students.

4.2.1 The Mawson Immersion Context - Research Question One

The semi-bilingual Chinese model which was established in 1998 at Mawson Primary School in Canberra, according to Scott and McEwin (2002), is again very different from the models mentioned above. Firstly, English-speaking background students in Australia study an Asian script language—written Chinese is a different form for European language speakers to study. More broadly, the distance between English and Chinese is considerable in terms of vocabulary, pronunciation and writing systems. Secondly, the immersion model studied in this research is partial immersion in time allocation where students study some areas of their general curriculum in Chinese for two full days every week (40 percent of students’ schooling time per week). Students study Chinese and part of curriculum areas in Chinese, such as parts of the mathematics, science and socio-studies curriculums, two days out five days per

week. Thirdly, there is no entry test for MIP. An application form is the only paperwork needed to be signed by parents or carers.

Finally, while students who attend the local primary school, including MIP, are from quite diverse backgrounds (e.g., European, Asian, African, Middle-eastern), Anglo European Australians form the majority. Thus it is a typical government primary school in a generally middle-class community with an immersion Chinese program added on. Hence, there are very few Chinese-background students enrolled in the program, and most students started their Chinese learning at the school and receive little or no Chinese learning assistance from their families. At the same time, there are few opportunities for students to use Chinese beyond their school environment.

The following section discusses the characteristics of the MIP in more detail.

4.2.2 Mandarin Immersion Program Background

Chinese immersion programs, in both primary and secondary schools, are rare in Australian mainstream education. As such, the background data for this research are significant in a number of ways: it describes the original intent of the MIP and its origins and development over time; it describes students' cultural backgrounds and demonstrates how and why the MIP operates in terms of program aims, content and language curriculum planning, and the MIP classroom pedagogical approach. Furthermore, detailed information on the MIP student population, the classroom interactions and instructions, and the typical daily MIP activities, were gathered to reflect the program as a whole, and to assist in comparing and contrasting pre-intervention conditions against the changes evident after the FFI intervention had taken place. Most of all, contextual factors directly impact on the FFI intervention from the rationale to the design.

Research Site

Mawson Primary School is an Australian Capital Territory (ACT) government primary school located in south suburban Canberra. Mawson is a typical, mainly middle-class Canberra suburb, comprising mostly low-density housing, plus public housing flats and shopping centre, with beautiful bushland hills nearby. The school lies adjacent to sports grounds and parklands. As the only Chinese immersion school in Canberra, the school logo “Strive for Success! 努力学习,追求成功!”, together with most other school signage, is written in both English and Chinese. A display cabinet in the school reception area exhibits an array of Chinese art and craft and books that have been presented to the school as gifts from Chinese visitors. A ‘spirit of the dragon 龙墙’ wall painting and a Chinese-style pagoda with a green garden feature in a Chinese courtyard.

Student Population and Research Participants

The majority of the student population at Mawson Primary School is of English-speaking, Anglo-European background, with students from Asian, African, Middle-Eastern, Pacific Islander, American and European backgrounds making up the difference. Students in Mawson MIP classes broadly reflect this same ethnic mix. The 2013 February census showed 61 out of over 180 students were registered on the database of students with English as an Additional Language or Dialect (EAL/D). Around one third of the Mawson student population whose first language is one other than English, have one or both parents born overseas and speak a language other than English at home.

Most of the students enrolled in the school live in the local area, but occasionally one or two children attend from further afield specifically to participate in the MIP program. Generally the parents of these non-local students have either

previously resided in China as diplomatic staff, or intend to do so in a future diplomatic posting. The Chinese population in Mawson is not large. According to 2013 figures approximately six percent of students in Mawson are Australia-born children with one parent of Chinese heritage, but whose first language is almost exclusively English. There also tends to be a small number of Chinese-speaking students at the school born in China, Singapore or Malaysia who are generally quite fluent in speaking Chinese at a basic conversational level, but who possess only limited Chinese writing skills (equivalent to Year 1 Chinese school literacy level). Hence, with a majority of English-speaking students, primarily from Anglo-European backgrounds, and mainly middle-income families.

Scott and McEwin (2002) are academics and researchers in the field of bilingual education who have previously studied Mawson Primary School MIP. Both have maintained a key interest in the program's development over time. Indeed Scott was a key advocate for the program's establishment in 1998. Compared to 2001, when 14 percent of the school population was enrolled in MIP (Scott, 2002), the 2013 MIP participation rate was 55 percent of the student population. A constant factor since the program's inception is that the clear majority of MIP participants are not from a Chinese-speaking background. In writing about the MIP program over the decade prior to this research. Scott and McEwin observed, "It is important to note that only a minority of the students (7 of the 25) were from Mandarin-speaking families. The maintenance of the perception and reality that MIP is a program for all children is a vital element of the management of the program as a whole" (2002, p. 11).

In my more recent teaching experience at the school, only rarely have there been one or two Chinese speaking background students with competent speaking skills in general on basic topics, and only limited character writing skills.

In terms of the Year 5 and 6 composite immersion class that was the subject of this research, English is the first language for 16 students. Only one student was born overseas and he speaks both Arabic and English at home. Thirteen students are from European English-speaking background families, one student speaks Arabic at home, and three students are Australian born with one Chinese background parent.

A summary introduction of student participants' language background and Chinese learning history is presented below in Table 4.1. Brief introductions of each student participant are also provided in Appendix O.

Table 4.1 MIP Research Student Participants' Background Information

Participants (17 students in Grade 5/6)	Age	Years spent in MIP/ LOTE Chinese	Country of Birth	First language and language spoken at home
<i>Year 5:</i>				
Claire	10	LOTE: 3 years; MIP: 2.5 years	Australia	English
Susan	11	LOTE: 3 years; MIP: 2.5 years	Australia	English
John	10	LOTE: 3 years; MIP: 2.5 years	Syria	Arabic*
George	10	LOTE: 3 years; MIP: 2.5 years	Australia	English; Mother Chinese- speaking (limited)
William	10	LOTE: 3 years; MIP: 2.5 years	Australia	English
Peter	10	LOTE: 3 years; MIP: 2.5 years	Australia	English
Emily	10	LOTE: 3 years; MIP: 2.5 years	Australia	English
Rebecca	10	LOTE: 3 years; MIP: 2.5 years	Australia	English
Louise	10	LOTE: 3 years; MIP: 2.5 years	Australia	English
Fiona	10	LOTE: 3 years; MIP: 2.5 years	Australia	English
Kate	10	LOTE: 3 years; MIP: 2.5 years	Australia	English
James	10	LOTE: 3 years; MIP: 2.5 years	Australia	English
<i>Year 6:</i>				
Paul	11	LOTE: 3 years; MIP: 3.5 years	Australia	English; Mother Chinese- speaking (limited)
Tim	11	LOTE: 3 years; MIP: 3.5 years	UK	English
Robert	11	LOTE: 3 years; MIP: 3.5 years	Australia	English
Amanda	11	LOTE: 3 years; MIP 3.5 years	Australia	English; Mother Chinese- speaking (native speaker)
Rose	10	LOTE: 1.5 years; MIP: 2.5 years	USA	English

* *John's first language is Arabic, speaks Arabic and English at home; Parents are Arabic-speaking with fluent English.*

Note: The table summarises student participants' family and language backgrounds.

Mandarin Immersion Program (MIP) Time Allotment and Numbers of Student in 2013

Generally, the immersion approach at Mawson Primary School allows students to study some areas of their general curriculum in Chinese for two full days every week (40 percent of students' schooling time per week), except for Kindergarten and Year 1 students, who spend one day per week in MIP.

The class arrangement at Mawson follows a general method of dividing students into MIP and non-MIP classes from Years 3 to 6. MIP students from Kindergarten and Year 1 are organised differently: on their MIP days, all MIP students come out from their usual class to attend their MIP lessons. The remaining students proceed with their subject study in a separate class. Thus, each level from Years 3 to 6 in 2013 had a MIP class and non-MIP class. There are also two mixed Kindergarten classes (with MIP and non-MIP students in one class) and two Year 2 LOTE classes in 2013 (no MIP option in current Year 2 level). This arrangement is described in Table 4.2.

Table 4.2 Student Numbers (in Term 2) and Time Allocation of the MIP Program in 2013

Year level	Kindergarten (Prep) year	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Total number of students
Immersion program per week	1 day	1 day	LOTE (90 minutes)	2 days		2 days		
Number of students in MIP	28	26	N/A in 2013	33 combined		17 combined (18 from Term 3 as 1 new student commenced in Term 3)		104 students in the MIP programs (approximately 55% of school population)
Numbers of student in the year level	42	30	34	42		41		189 students (school total)

Note: The table lists the numbers of MIP students in each year and time spent in the MIP in 2013.

Students at the school who choose not to be in the MIP program study LOTE Chinese. Kindergarten to Year 1 students have 90 minutes LOTE Chinese per week, and Years 2 to 6 students have 60 minutes Chinese per week.

As reflected in the MIP (and Chinese LOTE) participation rates (and as indicated earlier in discussion about the establishment and consolidation of the MIP program), the level of parental support for, and commitment to, the program is in itself a significant factor in enabling this FFI research to be undertaken at the school.

Classroom Setting

MIP has its own classrooms. This means that the children are truly immersed in a culturally rich learning environment. In the Year 5/6 MIP classroom, an interactive whiteboard stands front and centre, surrounded on either side by charts of Chinese vocabulary, classroom instructions, times-tables in Chinese, pictures of China, a map of China and posters written in Chinese characters. Freshly-painted Chinese calligraphy, together with examples of each student's special projects, are generally on display, as are coloured paper lanterns with character writings hanging from the ceiling. The bookshelf is full of Chinese picture books and readers. Away from the desks, a length of red silk lies on the carpet, ready to be passed from student to student during language games and class discussion sessions. Every effort is made to enhance students' experience of immersion and Chinese culture.

MIP Teachers

All MIP teachers are qualified language teachers, having satisfactorily met Australian Capital Territory Department of Education assessment criteria. Generally, they are Chinese native speakers who have completed a Diploma of Education in Australia. In most cases, MIP teachers are qualified language teachers. Two native-speaking part-time Chinese teachers were employed in 1998 when MIP was

established to manage, develop and teach the program. In 2013, three part-time Chinese native-speaking teachers (the researcher and one colleague were from China and another colleague is from Taiwan) were working at the school, delivering all MIP and LOTE classes. Three teachers share the five days of schooling with other classroom teachers as follows: Year 3/4 and 5/6 MIP teachers take the classes for two days and the non-immersion classroom teachers take the classes for the remaining three days; the Year 1 MIP teacher takes the class for one day and the normal classroom teacher takes the class for the other four days.

Curriculum Design Prior to this Research

This section describes the MIP curriculum prior to the FFI intervention.

According to Scott's observations over a decade ago, the Chinese language part of the curriculum "is theme based" (2002, p. 3) in its organisation.

The themes can be returned to at various times, and allow for activities related to all the key learning areas. Take mathematics for example: numbers and measure words are introduced and used in relation to many themes, as are prices and comparisons. The emphasis in mathematics is very much on language, operations being covered with peers in the non-MIP classes.

(Scott & McEwin, 2002, p. 12)

Samples of topics were appended to Scott's research document, and included themes such as 'My Day', 'Animals', 'About Me', 'Families', 'Transport', 'Food', 'Celebrations' and 'Environment'. Speaking, listening, reading, writing and sentence patterns/vocabulary/grammar were separated into columns for planning purposes. Some modifications to the MIP curriculum were made by the teacher in charge at the time. However, 'theme-based' learning has remained a key part of the method, with

elaboration over the years. The content of Chinese text books is adapted to fit the themes employed in Chinese language teaching.

The immersion sessions at Mawson Primary School originally attempted to copy the full-immersion model and deliver all content through Chinese during immersion days. However, due to a number of factors this approach was not possible. Initially, as MIP began in 1998 from Year 3 onwards, it quickly became apparent that it was not possible to match Year 3 subject areas (such as mathematics and science) with the Chinese language capabilities of Year 3 students. At that time, students' previous LOTE Chinese knowledge proved insufficient to cope with the Chinese language capabilities required to learn the subject content in L2 alone, so MIP teachers responded by combining content with L2 Chinese as much as possible, effectively operating an "extended thematic-based approach", as Scott named it (2002, p. 13). Here, the term 'extended' describes the fact that the time allocation for L2 is longer than in a typical LOTE program.

In more recent years, MIP teachers have been working hard to incorporate as much content into L2 Chinese lessons as possible, drawing on both new developments in the LOTE Chinese syllabus and curriculum documents from ACT, Victoria and New South Wales. This approach endeavoured to forge stronger links between other subjects (such as mathematics, science and social studies) and the L2 Chinese syllabus by making more use of Chinese language instruction in teaching other subjects (where the subject content reflects themes learnt in L2 Chinese lessons). Thus, while some mathematics content is taught in English where it is not possible to use Chinese, a greater proportion of mathematics content is taught in Chinese than was previously the case. Similarly, parts of the science and social studies curricula are also taught in immersion time through Chinese instructions. Both productive and

receptive skills are targeted. An example of productive skills is the planning of a unit of water in science where students in the Year 5/6 MIP class were asked to present and explain the water cycle in Chinese, after having learnt water-based content during L2 Chinese lessons. Examples of receptive skills include geography (a unit taught in L2 Chinese that covers countries, people and their languages), and social studies (a ‘celebration’ unit combining Chinese food and cultural celebrations). As these lessons are taught through Chinese, students’ listening and reading comprehension skills are targeted. The use of Chinese games or playing sports in Chinese also works very well for MIP students. New Chinese cultural content, including art and music, is introduced to students each term. However, only a small part of the science, geography and social studies curricula are taught on MIP days, with topics and concepts selected where they relate most closely to the Chinese language curricula appropriate to that level.

Mathematics is an integral part of the MIP curriculum and is planned and designed in collaboration with the English-speaking classroom teacher. The mathematics curriculum is shared between the two teachers. It is important to note here that the mathematics content taught through Chinese is not the same as the content covered on English-speaking days. During MIP classes, mathematics combines new content with revision of concepts learnt on non-MIP days. MIP teachers endeavour to deliver mathematics exclusively in Chinese. This includes mathematics operational skills, computations and problem solving questions that are appropriate to students’ Chinese language level. Mathematics content covered in immersion lessons is limited to concepts that students can understand in Chinese.

The Australian National Curriculum is followed for subject-area teachings on MIP days. From 2013, the scope and sequence of the draft National Curriculum for

Chinese was put in place to guide Chinese language part of the curriculum. For the most part, the MIP Year 5 and 6 MIP language component endeavours to follow level 3 (Year 9 and 10) standard for continuous (students' who started learning LOTE Chinese from their primary school years) LOTE achievement, scope and sequence indicators. Despite the breadth of subject areas delivered through Chinese, students' accuracy when speaking and writing Chinese had not developed to the same level of fluency. From this it is apparent that MIP content teaching lacks sufficient focus on grammatical elements. As affirmed by the immersion teacher in an interview:

The Mawson immersion program focuses on the content of the subject matter, so students' comprehension and production skills are emphasised, rather than grammatical accuracy. I try to use as much Chinese as possible, grammatical mistakes are generally ignored. I only stop to explain an error when it is crucial [to express meaning correctly]. Grammar is not a focus in the curriculum plan. Subject matter [is the main focus], instead of grammar.

(The immersion mathematics teacher, Ellie, 2013)

Hence prior to the FFI research intervention, coverage of grammatical features was confined to language arts lessons, with no corresponding Chinese grammar content in other subjects. Identification of this crucial gap indicated a need for better coordination between language and content in MIP which reflects similar findings in other parts of the world: greater fluency and issues with accuracy are a major short-failing of immersion programs, and hence the focus of the study.

A Typical MIP Daily Schedule and Activities

The MIP daily schedule and focus of each session are discussed below. In the majority instances, a typical MIP day for 5/6 class is as follows:

Table 4.3 A Typical MIP Daily Schedule and Activities

Time	Activities	Language skills targeted
9:00 am to 9:30 am Introduction to the day	<p>The teacher usually starts the day by greeting students in Chinese, marking attendance and listing the day's schedule for the class to work through.</p> <p>'Circle time*' is frequently conducted during the introduction period where the teacher speaks as much Chinese as possible depending on the language comprehension level. School values and revision of learnt knowledge is usually carried out during this time slot.</p>	<p>Listening comprehension and speaking practice are prioritised, and grammar is not emphasised.</p>
9:30 am to 10:00 am Chinese language session (language arts session)	<p>MIP teachers use this session to explain grammar, teach sentence structure, new vocabulary, and (at the end of the session) conduct language-focused exercises to reinforce the concepts covered earlier in that lesson: Filling gaps; translation activities; reading for comprehension and answering questions; listening and responding are common activities used.</p> <p>In building up students' language knowledge, this period also serves as vital practice in preparing students for the grammar and words they need for content areas covered later.</p>	<p>Mainly theme-based language arts lessons. The primary skills focus is on speaking, reading, writing and listening. Some of the main activities involve learnt vocabulary and sentence structures (grammar).</p>
10:00 am to 10:15 am Fruit time	<p>While students eat their fruit, discussion of 'my favourite fruit', 'I like to eat ...' takes place in Chinese is part of their daily routine.</p>	<p>Listening and speaking skills The main focus is on fluency, not grammar.</p>
10:15 am to 10:45 am Chinese language session continues	<p>This is often the period for group-work, language activities and worksheets. It includes Chinese language reading and writing time, where students work in small groups on either reading or writing tasks. Group discussions are an essential part of session. Students are able to ask questions of each other and help each other. They are required to speak in Chinese at this session, with some assistance provided by the teacher in Chinese expressions.</p>	<p>As above – Primary skills focus is on speaking, reading, writing and listening. Main activities involve learnt vocabulary, grammar and sentence structures.</p>
10:45 am to 11:15 am Morning break	<p>Students play in the school ground.</p>	<p>No language or grammar focus. Students are encouraged to use Chinese.</p>

<p>11:15 am to 1:00 pm</p> <p>Immersion learning time—mathematics and science (sometimes, history or other) sessions</p>	<p>It is important that at least one half an hour to 45 minutes-long mathematics session takes place each day. Details of the mathematics immersion lessons are discussed in Chapter Four. Followed by science, or history or social-studies sessions. Mainly content and subject matter are targeted.</p> <p>Note: From my observations during MIP mathematics classes, I estimate that the teacher uses Chinese in communicating (both verbally and in writing) with students approximately 90% of the time, and that students' communicate with both teachers and other students in Chinese approximately 90% of the time.</p>	<p>Listening and reading comprehension, speaking and writing productions related to content.</p> <p>No language or grammar focus. Grammar errors are corrected very briefly to minimise disruption to subject learning. Occasionally, the teacher may point out an error and offer a brief correction.</p>
<p>1:00 pm to 2:00 pm</p> <p>Lunch time</p>	<p>Students eat their lunch and play in the school ground.</p>	<p>No language or grammar focus. Students are encouraged to use Chinese.</p>
<p>2:00 pm to 3:00 pm</p> <p>Art/PE/Music/ Dance/ Computer and 'show and tell' students' news time</p>	<p>Physical Education is timetabled for 30 minutes on most days. During this time, MIP students often play games or sports in Chinese. A rotation of art and music, computer/iPad/laptop online language programs are often a feature of these daily sessions.</p> <p>Other activities often incorporated at any time during the day include:</p> <p>Language games, Chinese music, songs, dances and Chinese traditional and historical stories. Chinese movies, dramas (content and age appropriate) are always welcomed by MIP students.</p>	<p>Listening and reading comprehension. Speaking and writing productions.</p> <p>No grammar focus.</p> <p>Chinese cultural knowledge is also taught through a range of activities.</p>

* Quality Circle Time was developed by the NZ Department of Education as an activity format to encourage positive behaviour and collaborative learning. It has been widely adopted.

Note: The table shows a typical schedule of activities and subjects taught during MIP days. The proportion of teacher-student communication conducted in Chinese varies from subject to subject

It is worth noting that the sessions described above represent a sketch, or a generalisation, of a typical MIP day's activities. Overall, language and mathematics sessions constitute the major content focus of every MIP day. As a result, other subject matter, including special research projects, arts, music and dance, are rotated, and may each be limited to one session every fortnight or, in some instances, once every term. Apart from language and mathematics and science (or history, social-studies) blocks, the timing and frequency of other learning sessions is generally flexible. Teachers make adjustments according to students' age group, the particular strengths and weaknesses of the class group, and personal judgements about what they believe to be most effective. While the sequence of the day may differ from teacher to teacher and year to year, the overall coverage of the MIP program remains fairly constant.

MIP Resources

Live television broadcasts from China and Taiwan (via a satellite dish) were used to improve students' comprehension skills in Chinese in the early stages of the MIP program (Scott, 2002). At the time this was quite a radical innovation. Now, with the rapid innovation of computer technologies, and using an interactive whiteboard connected to the internet, the amount of educational material in Chinese language teaching that is readily available to MIP students has increased dramatically, and includes music, film, children's programs and on-line L2 Chinese learning programs.

Table 4.4 MIP Program Resources Employed

Type of resources	Languages
Technology: PC, iPad, interactive whiteboard	Mainly in Chinese with English instructions and explanations
Media: Chinese news programs, Youtube	All in Chinese, authentic materials
Text books: Ni Hao, Qing Song Xue Han Yu and Han Yu	Mainly in Chinese with English instructions and explanations
Music and speech CDs	Mainly in Chinese
Television programs, children's programs	All in Chinese
Film (age and content appropriate) and dramas	All in Chinese
Chinese readers	Mainly in Chinese with some English subtitles
Youth magazines	Mainly in Chinese with some English sections
Chinese cookbooks	All in Chinese with graphics

Note: MIP resources and language (Chinese/English) employed in teaching.

Chinese movies, dramas (content and age appropriate) are always welcomed by MIP students. These resources are adapted for improving students' listening, reading comprehension skills and cultural education purposes. All such resources have proven to be successful in engaging students and fuelling their interest in Chinese. There has been a recent increase in the number and range of L2 Chinese teaching and learning resources, including through text books, bilingual story books,

YouTube and many online learning resources, computer games and computer-assisted learning programs. Many of these e-learning resources can now be accessed via Mawson Primary laptop computers and iPads.

Whole-School and Community Approach

School assemblies take place on Friday each week and always include some spoken Chinese. The school principal's greetings are often in Chinese and all students (MIP and non-MIP) are expected to respond in Chinese. The weekly school newsletter for students and families use both Chinese and English for most titles, and typically include both a section on Chinese language learning and two or three phrases or sentences in written Chinese.

The annual China Day is organised by MIP teachers. The School assembly includes student performances that demonstrate their Chinese language skills. Invited guests range from students' family members to education department officials, professors and other school principals. During the day, mixed Year groups rotate to participate in Chinese art and craft activities. Chinese lunch is the highlight of the day, followed by an afternoon where students are encouraged to write on their reflections of the day.

A sister-school relationship had been established with a primary school in Nan Jing, China. Students send their letters, with pictures and examples of their work, to the sister school from time to time. Cultural excursions and participation in Chinese-speaking competitions are all encouraged and supported by the school.

4.2.2 Connections between Background and FFI Intervention

The background data discussed above provides a profile of the Mawson immersion program and, in particular, demonstrates how grammar was taught prior to the research. These contextual factors affected the design of the FFI intervention in the following ways.

Firstly, as student participants are mainly born in Australia in non-Chinese families, they invariably lack a Chinese-speaking environment in which to learn or practice the target language. Hence their grammar acquisition is a result of classroom teaching only, with the exception of those students who have a Chinese-speaking background and are likely to have come across measure words in chunks (lexical building blocks). Native Chinese speakers are typically able to use measure words accurately in communications. Interestingly, while they grow up having processed the measure word concept to procedural knowledge through implicit input, many lack the declarative knowledge required to explain the concept of the measure word form (Zhang, 2014). As for non-background speakers, the measure-word concept does not seem natural, as it is very different from their first language (as discussed in section 2.6 of this thesis). Therefore, for the vast majority of student participants, the sequence of noticing, awareness-raising and practice opportunities provided through the FFI intervention represented the only opportunity for student participants to learn the measure-word form.

Secondly, all methods of FFI need to be suitable for the student participants' age (i.e., primary school students aged 10 and 11). They also require classroom instructions to be clear and to be appropriately scaffolded. Scaffolding can entail a range of supportive activities including: designing motivating tasks; providing clear instructions and demonstrating the quality of the work required by showing work

samples; breaking tasks into smaller steps and providing step-by-step assistance; providing constructive feedback to guide students through a task while checking on their progress.

Thirdly, given the structure of MIP, mathematics lessons are well suited for the FFI integration, representing a content-focused language environment ready-made for the exposure and application of Chinese grammatical forms. This is particularly so for the measure-word form and its use in relation to numbers. In this way grammar is acquired through communication. This point was discussed in the literature review chapter (Chapter Two).

An additional point relates to the fact that almost all student participants started their Chinese learning from Prep level, and by Year 5 and 6 had developed their Chinese to an intermediate level. While measure-words were introduced to students in Year 1 and 2, by years 5 and 6 students continued to make many mistakes. Failing to use a measure word completely or using the wrong one had become a persistent problem amongst MIP students. Thus measure word learning is critical at this level if students are to avoid problems as they progress to more advanced levels of Chinese. By selecting a grammar focus (measure word) that is isolated and targeted, other grammatical mistakes can be ignored if not critical for comprehension. This underlines a more serious point that in Chinese immersion education, a systematic approach to grammar teaching needs to be integrated into the broader curriculum, and phased in accordance with the age of students, their level of language proficiency and the content subject matter.

Here it must also be pointed out that students' language competence levels have a significant bearing on the FFI classroom pedagogy and the nature of the classroom interactions. For example, as is appropriate for Year 5 and 6 students,

teacher Ellie used word cards and many other language cues as tools to assist language acquisition during mathematics content teaching.

In summary, research question one, which concerns the characteristics and context of the Chinese immersion program, is addressed, acknowledging that student participants' age, language level, language background and the MIP structure have affected directly on how and why the FFI was conceived, designed (and refined) and administered. This is discussed further in the following chapters. The next section describes the process of preparing an FFI intervention.

4.3 Designing the FFI Intervention

This section describes the process of designing the FFI intervention. Table 4.5 outlines the areas in which the FFI intervention took place, and how it was implemented and supported.

Table 4.5 FFI Intervention Procedure

Areas with which FFI was integrated	Methods
Curriculum planning	The grammar focus of the measure word was added in the planning stage.
Mathematics unit	A variety of FFI methods were planned and applied during lessons on multiplication and division.
Language arts unit	Both the language (vocabulary and sentences structures) for the mathematics content and the measure-word grammar concept were taught, with the measure-word content serving to support and reinforce the FFI intervention.
Music, sports and drama studies	The measure-word grammar target was integrated into some music and drama activities, again in an effort to reinforce and support the FFI intervention.

Note: The table outlines the FFI intervention and associated support employed in this research.

Since the start of this project in Term 2 2013, significant changes have been made to the MIP immersion mathematics class: a language focus has been systematically added into the immersion program from the curriculum planning to the classroom task design, instruction and assessment process. The traditional, mainly content-focused immersion sessions were enhanced by improved coordination across subject content (mathematics) and language content (Chinese), and in the process a better alignment was achieved with the scope and sequence of the National Chinese Curriculum. In addition, and in response to evidence that some students were struggling to learn the measure-word concept based on FFI intervention alone, grammar-focused exercises were planned and incorporated into language arts (i.e.,

Chinese language) lessons and the music and performing arts areas. These changes are discussed in detail in the following sections.

4.3.1 Curriculum Planning with FFI Component

This part contrasts curriculum planning prior to, and post, the research intervention, highlighting the changes made by incorporating an FFI focus.

In the Mawson Primary School Year 5/6 immersion program, MIP Chinese was planned within mathematics to create a unit of work with the scope and sequence of both language and mathematics content. This development represented the start of a trial process of better integrating Chinese language, especially grammar within subject content. This approach was also evidenced in the Term Overview document (below) of a stand-alone statement about Chinese language learning objectives and subject goals as in the past years, the 2013 MIP Overview discusses the key language teaching goals incorporated into each subject area. The following is a section of the 2013 Year 5/6 Term 2 MIP Overview:

On MIP days, students learn and revise times-tables, multiplication and division using Chinese. The Chinese grammatical feature of Measure Words is developed through mathematics.

The Art curriculum includes a unit of Asian art through the term. Discussion takes place in Chinese to develop students' capacity to interact and exchange opinions.

In Literacy, self-expression using Chinese language learnt to date is a major focus in term one. Sentence building, the use of "Connection Words", (e.g., "because of... so that...", "not only... but also..."), and reading and translating between Chinese and English are also part of the literacy curriculum.

For Social and Cultural studies, students will learn about Chinese culture and interpersonal relationships and refer to others to suit diverse social contexts (e.g., in China, friends' children can refer to you as "aunty" or "uncle", "lao" plus surname can form a respectful term).

In Communication, students will practise how to describe their personal interests and experiences, and to express their ideas and opinions, through verbal interactions in Chinese.

A range of sports and games for students have been integrated into the PE curriculum where key phrases will be made in Chinese.

(Zhu, 2013, p. 1)

In the MIP mathematics curriculum documents, the 2013 approach combined 'language through learning – the grammar focus' (refer to Figure 4.1), 'language of learning – Chinese language focus of the unit' (refer to Figure 4.2), and 'language for learning – Chinese language used to learn mathematics content' (refer to Figure 4.3) are used by teachers to inform preparation of the mathematics unit. This approach is adapted from Coyle, Hood, and Marsh (2010). The choice of grammatical target for incorporation into the mathematics curriculum was made based on researcher/teacher's classroom observations and analysis of students' linguistic development. As a result, and after taking the mathematics concepts and identified Chinese language needs into consideration, the subject areas of one and two-digit division, and the correlation between multiplication and division, (both of which are taken from the mathematics national curriculum requirement for Grade 5 and Grade 6), were allocated to MIP days.

Language through Learning with a Grammar Focus

Measure Words were chosen as the main grammar focus to be integrated with students' Term 2, 2013 MIP curriculum in mathematics studies. Firstly, 'Measure Words – 量词' or a 'classifier', are used after a number and before a noun to describe the quantity of the noun (object or objects in some cases). Secondly, measure word is also used to classify a specific object, words like "this", "that" or "the" in English. For example:

English: 3 dogs.

Chinese: 三只狗 (three—measure word—dog)。

English: 12 students.

Chinese: 十二个学生 (twelve—measure word—students)。

English: that car.

Chinese: 那辆车 (that—measure word—car)。

In some cases, depending on people's preference and dialects, measure words can be used differently. Some measure words do not have meanings in themselves (e.g., 个 and 只). However, many measure words do possess descriptions of the object. For example, the measure word '条' means something long and slim, like 'a strip of something'. It is used with objects such as a scarf or trousers. A pair of trousers in Chinese is expressed as: 一条裤子. One + measure words (条) + trousers. Teng (2011) mentioned that the choice of the measure word can be done by correlating the measure word with the shape, function, form, etc. of the noun.

Crucially, the use of measure words when speaking or writing Chinese is not optional, except for those nouns that already have the measure word incorporated as a concept within the noun itself: for example, a year in Chinese is '一年' without a measure word between the 'one' and 'year'.

The concept of a measure word is fundamental to Chinese language and thus the knowledge of it in learning Chinese is crucial. However, given the considerable amount of time required for anyone to learn all the rules (and exceptions to the rules), governing the use of measure words, the measure word learning objectives for the student participants were established, in consultation with the teacher, as follows.

- To gain a basic understanding of the concept of measure words.
- To build students' knowledge and awareness about the use of measure words in Chinese sentences.
- To build student skills to use some common measure words in their oral and written Chinese.
- To understand and gain the knowledge and skill to apply appropriate measure word to match the noun.
- To improve understanding of exceptions to the rules in measure-word usage.
- To describe mathematical terms in Chinese.
- To understand common Chinese vocabulary used in the context of division:
 - Measure words: 节, 个, 门, 本, 块, 只, 条.
 - Language used in division: 除, 除以, 除法, 加, 减, 乘, 除, 等于

Figure 4.1 Example of a Planning Document for Teachers – The grammatical focus of the FFI intervention (language through learning). Measure word is set as the grammar target when teaching mathematics.

Language of Learning			
Art	艺术 / 美术	Indonesian	印尼语
Biology	生物学	Foreign language	外语
Chemistry	化学	Science	科学
Computer Science	电脑/计算机	English	英语
	科学	Japanese	日语
Drama	戏剧	Spanish	西班牙语
Economics	经济学	German	德语
English	英语	French	法语
Geography	地理	History	历史
Gym	体育	Class meeting/ school assembly	班会/ 校会
Health	健康学	Recess	课间休息
History	历史学	Lunch	午饭
Home Economics	家政	Buy	买
Mathematics	数学	Sell	卖
Music	音乐	Shop	商店
Physics	物理学	Library	图书馆
Political Science	政治学	School	学校
Psychology	心理学	This one	这个
Social Studies	社会研究	That one	那个
Chinese	中文/汉语		

Figure 4.2 Example of a Planning Document – Language of Learning. The vocabulary listed in this figure is the language focus of the unit.

Language for Learning

A. Connective phrases to explain reasons and connections

Some commonly used ‘Conjunctive Pairs’ (CP) will be taught and practised for explaining mathematics questions. Wen-Hua Teng in her book ‘Yu Fa! – A Practical Guide to Mandarin Chinese Grammar’ defined CP as: Conjunctions are used to connect two words, two phrases or two clauses. The relationship between the words, the phrases or the clauses is indicated by the meaning of the conjunction. In Chinese, a conjunction can be a word or a pair of words” (2011, p. 259). As Teng (2011) described, the basic and commonly used ones are often in pair form, so that the ‘Conjunctive Pair’ was termed in Chinese grammar.

因为... 所以 ...	because, therefore
不但 ...而且...	not only, ... but also
虽然... 但是...	although ... but
不是... 而是...	it’s not ... but
又... 又...	both ... and
除了... 以外...	besides...
一边...一边...	doing something, at the same time as something else
假如... 也...	supposing/if, in the event that ... still
如果	If ...

B. Vocabulary for questions (revision):

多少, 几, 几点, 什么, 多长时间, 哪天,

C. Form of questions (revision):

有没有, 吗? 什么。。。?

你的学校有没有吃水果的时间?

你喜欢上美术课吗?

你最喜欢学什么学科?

Figure 4.3 Example of a Planning Document – Language for Learning. Phrases and sentences listed in the figure are the language students learnt or revised to enable them to perform mathematics and measure word tasks.

Specific learning objectives were identified according to the scope and sequence of the Australian National Curriculum (draft 2013) at the planning stage. Teachers set the teaching and learning goals for the planned period, (in this case, Term 2), as well as the assessment criteria listed for measuring learning outcomes. The curriculum documents were written in a concise format for teachers to follow throughout the Term (Figure 4.4). Pedagogical choices and decisions were also made at that stage. Additionally, the researcher/MIP teacher identified the methods to be used to delivery those learning objectives (for example, the classroom teaching approach, activity design). While this curriculum plan did require some further alteration during the Term, it was nonetheless very important have a clear map in place which served to guide teaching practice. (More Unit Planner and Lesson Plans are included at Appendices E and Figures 4.4 and 4.5).

Having established how FFI was integrated at the curriculum planning stage, the pedagogical aspects of the mathematics immersion lessons are explained in the following section (section 4.3.2).

Curriculum Planner - Chinese Immersion Program Term 2 2013

	National Curriculum Scope and Sequence	Language Content	Subject Content (where applicable)	Pedagogy	Assessment	Resource
Week 1 - 2	<p>Communicating: 4.3 Negotiate arrangements and complete transactions in collaboration with others 4.4 Write correspondence to express opinions, and provide reasons for opinions and decisions with reference to the needs or interests of the reader.</p>	<ul style="list-style-type: none"> • Negotiate arrangements and complete transactions in collaboration with others. • Developing and sustaining an argument using diverse devices such as topic sentences, inclusive language and rhetorical questions, for example: 你知道吗? • Measure words (grammar). 	<ul style="list-style-type: none"> • School value: discuss about school value: • Mathematics: division concept. • Introducing mathematics: dividing the whole numbers and multiplication in two-digit. 	<p>‘Circle time’ whole class discussion. Content and language integrated learning, focus on form in the Chinese immersion setting Implicit and explicit grammar corrections.</p>	<p>Diagnostic: Observation on students’ understanding on classroom instructions Observation on students’ participation on communicative tasks.</p>	<p>Chinese made easy book 2. Ni Hao book 2. Chinese story books.</p>
Week 3-4	<p>Obtaining and using information 4.7 Organise and present information and opinions in a manner appropriate to the needs and expectations of the audience 4.9 Write short informative texts using appropriate formats to present information about people, places and events to others.</p>	<ul style="list-style-type: none"> • State the mathematics division process. • Make sentences with ‘CP’s. • Explain reasons and result in Chinese. • Using language appropriate to purpose, audience and context when presenting information to others, for example when presenting to adults compared with presenting to peers. • Revision. 	<ul style="list-style-type: none"> • Mathematics computation in multiplication and subtraction. • Art: Introducing Chinese poems and Ink-painting: Drawing “梅花” page. • PE. 	<p>FFI – measure word Language games Group work: discussion and working together to complete tasks. Provide opportunities for students to use the language in real-life context.</p>	<p>Summative: Hands-on language tasks, writing tasks to identify comprehension on learnt topics.</p>	<p>Chinese made easy book 2. Art in Germany.</p>
Week 5-6	<p>4.11 Express a personal view on development of plot or storyline in contemporary media 4.12 Identify features of performance that reflect concepts such as humour and entertainment in diverse media.</p>	<ul style="list-style-type: none"> • Expressing likes and dislikes in different subjects in Chinese. • State reasons and results using connective pairs. • Introducing ‘connective pairs’ to construct writing. 	<ul style="list-style-type: none"> • ‘Two-digit multiplication’ questions. • Two-digit divisions for year 6 students. • Problem-solving division questions in Chinese. • Combine language and mathematics content. • PE. 	<p>Corrective feedback and repetition for grammar learning Accelerate the process of moving students ‘language knowledge to language skills through controlled practice.</p>	<p>Summative: hands on language tasks, writing tasks to identify comprehension on learnt topics.</p>	<p>Chinese made easy book 2. Go Maths books.</p>

Week 7-8	<p>4.21 Develop auditory skills to recognise and discriminate between pronunciations and tone in language spoken in diverse contexts.</p> <p>4.6 Identify meanings expressed with attention to how vocal quality, verbal choices and visual clues enhance understanding.</p> <p>4.7 Organise and present information and opinions in a manner appropriate to the needs and expectations of the audience.</p>	<ul style="list-style-type: none"> • Recognising ‘four tones’. • Revising learnt vocabulary, sentences in mathematics context. • Using ‘measure words’ and ‘connective pairs’ in students’ writing exercises • Play ‘my aunt’s suitcase’ to practice ‘measure words’ • Attain common ‘measure words’ in speaking tasks. 	<ul style="list-style-type: none"> • Practice “1001 wishes” Chinese music introduction. • Expressive speech. • Practice for China Day. • Go Maths division. • PE. • End of Term assessments (start in week 8). 	<p>Encourage students to actively think through and articulate their own learning.</p> <p>Develop metacognitive skills by making students learning ‘how to learn’.</p>	<p>Diagnostic: Observation on students’ understanding on classroom instructions</p> <p>Observation on students’ participation on communicative tasks.</p>	<p>Chinese made easy book 2. Go Maths books.</p>
Week 9-10	<p>Moving between/translating</p> <p>4.15 Recognise the impact of verbal and non-verbal features of communication on interpretation of meaning in Chinese in diverse contexts.</p> <p>4.16 Clarify context and purpose when translating into English the meanings of texts such as signs, advertisements.</p>	<ul style="list-style-type: none"> • Integrating language content with mathematics content • End of unit assessment • Measure words translation • Play “my aunt’s suitcase” in measure words. 	<ul style="list-style-type: none"> • Sing “一千零一个愿望”. • PE. • Stage performance: Mawson’s got talent. • Language games, pair work. • Matching ‘measure words’ in the speaking context. • Go Maths division: problem solving in Chinese. • End of Term assessments. 	<p>Students use learnt mathematics knowledge to solve problems, to gain understanding and to discover new meaning.</p> <p>Transferring knowledge to skill.</p>	<p>Formative: oral assessment on learnt sentences</p> <p>Summative: hands on language tasks, writing tasks to identify comprehension on learnt topics.</p>	<p>Chinese made easy book 2. Go Maths books Literature books in Chinese.</p>

Figure 4.4 Chinese immersion curriculum planning document (with FFI elements included in the pedagogy column) which combines language, content (subjects) and pedagogical information in one document.

Language and Mathematics (Term 2 2013) Unit Planner

Unit: Learning about division in Chinese
Level: Year 5/6 composite
Timing: 7 weeks (approximately 7 hours in total)

Background knowledge that students have already acquired

- Basic concept of division: Diagrams of splitting equals.
- Times-tables from 1 to 12 (some students are competent users of times-tables, some still need more time)
- Vocabulary and sentences were taught to all students through the theme of ‘School and learning’.
- Measure words and some connective pairs have been introduced to students.

Objectives of the unit

- To revise and teach the mathematical concept of ‘division’ through students’ second language Chinese.
- To learn, revise and use the Chinese language through the theme of ‘school and learning’ in the process of ‘division’ teaching.
- To revise times-tables in Chinese.
- To understand the fundamental concepts of multiplication and division.
- To combine students’ target language objectives with content language objectives within content teaching.
- To emphasise the grammar focus of ‘measure word’ knowledge while mathematics teaching and learning takes place.
- To practice ‘conjunctive phrase’ usage in students’ communicative interactions.
- To connect mathematics learning with Chinese cultural knowledge—learning about Chinese currency, roleplaying games such as ‘shopping in China to develop students’ intercultural competence.

Criteria for assessment

Classroom observation by the teacher as ongoing assessment, formative assessment and self-assessment will be carried out to check students’ achievement in the learning objectives and moderating teaching methods as follows.

- Dividing one-digit whole numbers with (for some students) or without remainders.
- Dividing two-digit or larger numbers with or without remainders for Year 5 students’ extension and Year 6 majority students.
- Interpreting remainders in the context of money. Chinese currency system will be introduced and discussed in the context of ‘buy and sell’.
- Using division for problem solving in everyday situation.
- Awareness and understanding of the grammatical function of the measure word in Chinese, using the basic measure word correctly.
- Using basic conjunctive phrases in explaining and reasoning mathematics questions.
- Attain most of vocabulary of schooling and learning covered in this unit in Chinese.
- Show capacity of describing/introducing students’ own schooling and learning experience.
- Improvements in communicative proficiency in Chinese language production.

Figure 4.5 Example of a Planning Document – Year 5-6 Mathematics Unit Planner (Term 2 2013).

4.3.2 The Immersion Mathematics Teaching Pedagogy for this Research

The immersion mathematics teaching pedagogy employed to conduct the immersion mathematics lessons that formed part of this study follows Sullivan's (2011) six key principles for teaching mathematics: at the start of the lesson, the teacher generally explains the goal and procedure of the lesson to students as clearly as possible (Principle 1). This ensures transparency so that the objectives are understood by students. Mathematics content is based on, and builds on, students' existing knowledge (Principle 2). This principle aligns with the cognitive theory that when the new knowledge is added to existing knowledge, the process of knowledge acquisition is more effective than would otherwise be the case, as it ensures that the new information is easier to process (Sweller, 1988, 1999). Principles 3 and 4 concern, respectively, differentiation and diversity in task design as required to sustain students' interest and engagement. As the combination of language and subject content entails learning language and content knowledge at the same time, it places a high cognitive load on students (Sweller, 1988, 1999). Hence these principles (3 and 4) are especially important in immersion teaching, requiring teachers to take on additional challenges such as: ensuring students are provided with a diversity of tasks; differentiating tasks to match students' existing language and subject knowledge; and allocating time to each task accordingly. While the structure of MIP mathematics lessons differs from lesson to lesson, students' are provided with an initial explanation of each lesson's arrangement beforehand, followed by a short revision session. Alternatively, and to inject further variety, some lessons begin with a mathematics question posed in Chinese for students to solve. These and other tasks include a mix of individual and group activities. By and large, student—teacher interaction, sharing work to the class or group, class discussion, and summarising the lesson and setting

homework, all take place towards the end of each lesson, thereby reinforcing learning outcomes (Principle 5). Consistent with Sullivan's Principle 6 of promoting fluency and knowledge transfer (Sullivan, 2011), practice in mathematical skills, including through solving division and multiplication tasks that are allocated and explained in Chinese, comprises the major part of mathematics lessons. Some examples of mathematics tasks are included in Appendix L. Indeed a key focus of the MIP program mathematics teaching approach is to encourage an inquiry-based learning approach where students are individually and collectively involved in problem solving. Finally it is worth emphasising that the fundamental principles of the cognitive theory as discussed in Chapter Two, including the aim of transferring knowledge from short-term memory to long-term memory (and hence enabling ready retrieval of the knowledge in future), apply just as much to mathematics teaching as they do to L2 education.

4.4 Chapter Summary

In providing some contextual detail behind the FFI intervention, particularly background information on student participants' ethnic and first language status, as well as the MIP setting and classroom pedagogy, this chapter answers the first research question by examining the characteristics of the Chinese immersion program and seeking to convey a clear picture of the Mawson MIP program as a whole. These contextual factors directly influenced the curriculum planning and pedagogical design of the FFI intervention. Detailed FFI integration process, as the same as the data collection process is presented in the next chapter, together with the analysis of the data in response to research question two.

CHAPTER FIVE – DATA COLLECTION AND ANALYSIS

RESEARCH QUESTION TWO

5.1 Introduction

In qualitative research, the data collection process is intertwined with data analysis (Glesne, 2010; Merriam 2009; Miles & Huberman, 1994). Hence, in this chapter, the FFI intervention process is introduced first in the stage-by-stage procedure of collecting FFI implementation data in order to provide a basis for data analysis and to inform discussion of research findings. This is followed by the process of qualitative data analysis which entails sifting through the data collected in the course of research and examining it for patterns and themes. This in turn enables discovery of inter-connections within the data and, from this, a meaningful interpretation and presentation of clearly argued findings (Hatch, 2002; Shank, 2006; Marshall & Rossman, 2011; Miles & Huberman, 1994; Efron & Ravid, 2013).

Subsequently, this part builds on the discussion about data collection by examining ways that FFI can be operationalised in content teaching in a primary-level Chinese immersion context in Australia. This chapter investigates the types of FFI methods employed during the immersion mathematics intervention and some language arts (production practice) sessions, and the ways in which they were integrated into the teaching process. It includes a comparison of language in mathematics immersion teaching pedagogy prior to and after the FFI integration. Finally the group interview with the student participants, and the interview with immersion teacher Ellie, are briefly discussed in this chapter. The information from these interviews serves to enhance understanding of the FFI intervention from participants' perspectives on the FFI methods employed.

5.2 The FFI Classroom Intervention/Data Collection Process

This section describes how FFI was incorporated into the MIP mathematics classroom process. As discussed in 3.5.5, the classroom instructional tasks were designed according to Lyster's framework in sequence of noticing, awareness-raising and production practice. What follows is a demonstration of the FFI intervention during immersion mathematics classes, also complemented by three 40-minute sessions of language arts lessons to assist in the measure-word learning process. Recognising that the reality of classroom teaching entails constant adaptation and modification of planned teaching approaches, the detail of the FFI intervention process is recorded in the following sections as a step-by-step weekly schedule, as adapted through an iterative process of trial and adjustment in an effort to optimise learning outcomes pertaining to the measure-word form.

5.2.1 Create Opportunities for Students to Notice the Target Form

Following a pre-intervention assessment of students' knowledge of the measure-word form, the FFI intervention commenced by conducting noticing and awareness-raising activities in the first two weeks of the data-collection period. Transcripts of a teacher/student FFI interaction (Figure 5.1) are included below to showcase the integration of FFI in action.

The classroom research process (10 weeks in total) started on the first week of Term 2 in 2013, with classroom observations, pre-intervention assessment, curriculum and pedagogical planning done during the first week, and the classroom FFI implementation process commencing in the second week. The speaking pre-assessment was conducted through eight basic phrase-making tasks in which students were required to express in Chinese the numbers of brothers and sisters, or pets, that they have. For the purposes of this study, students were marked for correct usage of measure words. A class average of 36 percent accuracy confirmed the imperative need for this project. These assessment results were used as the baseline against which the progress of students' grammatical proficiency was measured over time (refer to Table 6.2, column 1 in Chapter Six). In seeking to ensure a measure of consistency in measuring acquisition of the target form, each measure word was counted as one mark throughout the data-collection period (as discussed in Chapter Three). The most common measure words, considered appropriate for the MIP Year 5/6 students, were selected for use in the FFI intervention. These measure words are described in the figure 5.2, below:

Measure Word	Used for...	Examples
gè 个	Units of something. Common measure word for people or objects.	三个学生; 一个游泳池; 八百个字; 一个办法.
kǒu 口	Population on a small scale (for a number under 100), mouthful, family members.	六口人; 多吃两口.
mén 门	Subjects	八门课.
bēi 杯:	Glass of ..., uses with drinks.	一杯茶; 两杯水.
zhāng 张	Objects made of paper or flat, rectangular objects, a sheet of something (e.g., paper; map; bed; table).	十张票; 一张床; 两张桌子.
jié 节	Section of ..., commonly used with lessons.	六节课; 一节竹竿.
tiáo 条	Long, thin and winding objects (e.g., streets; rivers; fish; snakes, pants, scarf, tie).	两条鱼; 一条河; 三条裤子.
cì 次	Number of actions.	去过一次; 发生过两次了.
běn 本	Book-like objects (e.g., book, magazine)	九本书; 一本杂志.
jiān 间	Any kind of room (e.g., bed-rooms, kitchens, class-rooms).	三间卧室; 七间教室.
kuài 块	Things that come in chunks or lumps; a measure of currency (e.g., soap; piece of land; Olympic medals).	两块红布; 六块钱.
pǐ 匹	Horses or bolt of cloth	九匹马; 一匹布.
liàng 辆	Wheeled vehicles (e.g., car; bicycle).	一辆汽车; 一辆自行车.
jiàn 件	Clothes; luggage	三件行李; 一件衬衫.
zhī 只	Animals; one of a pair of body parts (e.g., hands; feet; ears).	两只老虎; 一只小鸟; 一只袜子.
biàn 遍	A measure of actions (going through a completed process).	念了四遍了; 查了一遍.
céng 层	Floor levels	三层楼.

jiàn 件	Items: clothes, matters	两件 <u>件</u> 毛衣; 三 <u>件</u> 家具; 一 <u>件</u> 事.
kè 课	Lessons or texts	难忘的一 <u>课</u> ; 第七 <u>课</u> .
fēn 分	Minutes (time reading); cent (money).	八点十 <u>分</u> ; 一 <u>分</u> 钱.
kuài 块	A piece of; unit of 100 cents (money: colloq.)	十 <u>块</u> 钱; 一 <u>块</u> 布.

Figure 5.2 Common measure words selected for the FFI intervention.

Note: This table lists and describes the common measure words applied in this research. Some information is informed by Ye and Wu (2010) & <http://www.ctcfl.ox.ac.uk/Grammar%20exercises/Measure%20words.htm>.

In the second week (the first session of the data collection period), the mathematics immersion teacher, Ellie, began applying FFI methods when teaching ‘division’, according to the research plan. The following transcript of a section of an audio-recorded mathematics lesson is an example of an FFI intervention practice that is typical for the whole data-collection period, with added explanations of the types of FFI methods employed.

By way of background, after explaining the goals and procedure for the lesson, the teacher often started her mathematics lessons with some times-tables revision and one or two problem-solving questions like the one below.

Times-tables in Chinese: Ellie pulled out a multiplication card (e.g., 7 x 9) and stated it in Chinese: “七乘以九等于多少?” (What does 7 times 9 equal?). The teacher then invited a student to answer it in Chinese: “七乘以九等于六十三。” (7 times 9 equals 63.)

Mathematics question in Chinese: after each student had their turn on the times-table task, she then wrote a problem-solving question on the board (measure words in bold and underlined).

在我的学校，学生每天有六个半小时在学校的时间，如果每节课五十分钟，早饭三十分钟，午饭时间有五十分钟，每天一共能有几节课？

[**English translation:** In my school, students spend 6 and half hours at school every day. If each lesson takes 50 minutes, 30 minutes for morning tea, 50 minutes for lunch. How many lessons will fit in each day?]

The above question exemplifies the type of questions commonly used in mathematics lessons through the Term (Appendix L, refers). In the process, the measure words ‘天’, ‘分’, ‘个’, ‘小时’ and ‘节’ appeared nine times in a short passage and were written in red and underlined on the board. FFI methods, such as input flood (where the quantity of measure words used in class is increased) and visual enhancement (increased visibility through use of signs, etc.) were integrated through the comprehension of the mathematics question.

The classroom discussions continued and each measure word was stressed in the teacher’s speech. Detailed analysis of classroom teacher and student interactions in solving mathematical questions are included in the data analysis section of this chapter.

Previously, grammar errors, such as measure-word errors, would not have been targeted as part of the mathematics-focused classroom dialogue described above, noting that in most cases such grammatical errors would not change the meaning of the sentences. Here, as part of the FFI intervention, noticing and awareness-raising FFIs were introduced to these classroom interactions, noting that the frequency of the target form was able to be increased by the mathematics subject matter. In order to bring learners’ attention to the target form, intonational stress (Lyster, 2007) and visual augmentation of the measure word were incorporated in the instructions. The

teacher also stressed (in a louder voice) measure words when reading and speaking about the question, and either underlined written measure words in red to stand out from the rest of the Chinese characters, or presented a measure-word sign to the class (Appendix K. Common Measure Word Flashcard, refers), in each case helping to draw students' attention to the target form.

Corrective feedback (e.g., prompting) was also provided to remind students that a measure word was needed in their sentences to induce corrective action by the students. After observing the first session, some teaching and revision that explicitly focused on the measure-word form was added at this point of the research intervention. In this way the researcher modified the teaching plan, where the concept of measure word was concisely explained to students in the subsequent mathematics session, after employing many 'number, measure word and noun' phrases in the questions and explanations. Ellie used vocabulary that students were familiar with, such as: 七口人, 一只狗, 三只猫, 八门课, 十本书 (seven people, one dog, three cats, eight subjects and ten books) to instruct the function and position of the measure-word usage in Chinese. In addition, she compared the differences in expressing number and noun between English and Chinese.

'Glue or cement' was used as a metaphor to describe measure words, in that the measure word glues the number and noun together, just like the cement between bricks when building a house. After discussion, Ellie began to use the '胶呢 – (glue/cement)' (in Chinese) idea in her lessons. As a prompting device, this metaphor served to connect a grammatical concept with something that students were familiar with; their real life experiences. The metaphor reminded students of the function of the measure-word form and help them to recall the grammar rule and use it in their productions. After this brief interlude the mathematics lesson was able to proceed.

Reflecting on these FFI interventions after a few sessions of mathematics teaching, Ellie and I came to realise that some students were struggling to comprehend both the new vocabulary associated with new mathematics content and the new measure-word grammatical concept, in addition to all other classroom instructions in mathematics being conveyed in Chinese (for detail, refer to Figures 4.1, 4.2 & 4.3). In response, Ellie and I discussed the issue and decided to write-up some basic classroom instruction signs, unrelated to measure words, in both Chinese and English. Our intention was that this would assist all students in this learning process, particularly those who found it difficult. This way the cognitive load on students was reduced, and they were better able to focus on the target grammatical forms. Classroom instruction signs were put up on the wall as follows.

这道题问的是什么? [What does this question ask us?]

你觉得应该用乘法吗? [Do you think we should use multiplication?]

怎么用数学公式来表达这个问题? [What is the formula to express this question?]

余数是多少? [What is the remainder?]

请跟我一起再读一下这道题. [Read the question with me again, please.]

请把你的答案写在白板上. [Please write your answer on the board.]

平均分给 [Divide them equally]

A 除以 B 等于多少? [What is the answer to A divided by B?]

As discussed above, only noticing and awareness-raising methods were integrated during the first two weeks of the data-collection process.

5.2.2 Balanced Noticing, Awareness-Raising and Production Practice FFI with Corrective Feedback

What follows is a further demonstration of FFI in operation during a mathematics lesson where students worked collaboratively in groups. An assessment was conducted and the result discussed.

In the third and fourth weeks of the FFI intervention, awareness-raising methods were again employed, primarily through corrective feedback with recast and prompt being the main methods applied. After applying the teacher-centred classroom teaching approach for a number of sessions, the classroom learning dynamic entailed student-initiated learning through the provision of some group-work tasks. In these small group sessions, students were given enough time to try to solve questions by themselves, followed by working with others in a group. In this way, and consistent with the mathematics teaching principles developed by Sullivan (2011), differentiation and collaboration opportunities were provided for students to work within their own capacity, while also exposing students to the assistance of others: students could take more control over their learning through language-production practice in group-discussions, negotiation with their student colleagues, and taking responsibility for completing tasks.

The transcript of interactions during a mathematics lesson included below provides a representation of how a typical group task-lesson unfolded, illustrating the classroom interaction, how teacher Ellie worked with students during the presentation process, and the way that the teacher assisted student Emily during her presentation. The curriculum planner (including the objectives and assessment criteria) are set out at Figure 4.4, and further details of the unit and lesson-plans are at Figure 4.5 and Appendix E).

At the start of the lesson, students were set to work in groups with the task of writing up their own mathematics questions in Chinese. They could create their questions freely in terms of both Chinese vocabulary and mathematics method, as long as the question was written in Chinese. While the use of Chinese characters in completing the task was encouraged, Pinyin was also acceptable. Each group was asked to nominate one student to present their question to the whole class at the end. Students were divided into five working groups of two to four students each, where each group comprised students across a range of Chinese language proficiency and Year levels. In constructing their mathematics questions, students were encouraged to discuss vocabulary and sentence structure, and to check for mistakes. Sometimes they asked teacher Ellie for assistance on unknown words. The group task took about 20 minutes, by which time all groups had produced a couple of questions in Chinese.

In noting that this task is a language-production practice task at the stage of raising students' awareness, it also served to "consolidate the restructuring of rule-based declarative representations" (Lyster, 2006, p. 43) through feedback by asking students to formulate mathematics questions.

The lesson included an extended example of interactions between the teacher and a student, presented as a figure (Figure 5.1, below), to illustrate the specific nature of FFI interactions employed by the teacher. Here, English translations are provided under Chinese sentences with FFI applications explained in the second column.

Classroom Interactions	Discussion of FFIs
<p>Teacher: 现在, 我们请一个同学来讲讲你们组的问题, 谁想先来? Now we invite a student to share your group's question, who wants to go first?</p> <p>Emily and John both had their hands up. Teacher, pointing at Emily:</p> <p>Teacher: 好, 你来, 开始吧: Ok, you can start:</p> <p>Emily stood up to share her questions to the class:</p>	
<p>Emily: 我们班有一百三十二 (missing <i>mw</i>) 书, Our class has 132 (missing the <i>mw</i>) books,</p>	<p>Emily missed the measure word in her speech.</p>
<p>Teacher: 我们班有一百三十二 (missing <i>mw</i>) 书? 什么书? Our class has 132 (missing the <i>mw</i>) books? Then she continued: What books?</p>	<p>Prompt: the teacher used a questioning tone when saying the word 'books' to indicate there is something missing here (a mistake has occurred).</p>
<p>Emily: 哦, 本书。 Oh, 'běn (<i>mw</i>)' books.</p>	<p>Self-correction: in response to the prompt, Emily realised that she had left a measure word out and immediately corrected the sentence herself.</p>
<p>Teacher: 啊! 本书。 Ah, 'běn (<i>mw</i>)' books.</p>	<p>Intonational Stress: the teacher stressed the measure word 'běn' to confirm Emily's speech.</p>
<p>Emily continues to talk about her mathematics question:</p> <p>Emily: 十一个同学 (correct form), 乘, 噢, 除以十一个同学, 11 (<i>mw</i>) students. Multiplies, oh, no, divided by 11 (<i>mw</i>) students.</p>	<p>Production practise: Emily continued, again using the required measure word correctly.</p>
<p>Teacher: 你刚才说了, 十一个同学, 呐! You just said, 11 (<i>mw</i>) students? Yes!</p> <p>Emily continued:</p>	<p>Feedback: The teacher reinforced Emily's correct use of the measure word by providing direct feedback.</p>
<p>Emily: 每 (stop and thought about which <i>mw</i> to use) 一个同学有几本书? How many books would each... 'gè' (<i>mw</i>) student get?</p>	<p>Production practise: the student paused her sentence at this point, obviously thinking about the correct measure word to use, and then applied it correctly in her speech.</p>
<p>Teacher: 我再重复一下你的问题: 我们班有一百三十二本书, 分给十一个学生, 每个同学有几本书? Let me repeat your question: Our class had 132 (<i>mw</i>) books, and will give them out to 11 (<i>mw</i>) students, so how many books would each (<i>mw</i>) student get?</p>	<p>Input flood: The teacher puts Emily's speech together and repeated it. (Four measure words appeared in the question.)</p> <p>Intonational Stress: The teacher then re-read the question emphasising each measure word.</p>

Teacher: 答案是什么? 我们用加减乘, 还是除法? 用哪一个? What is the answer to this question? Shall we use addition, subtraction, multiplication or division? Which one?	Intonational Stress: The teacher verbally emphasised the measure word 'ge'.
Emily: 除。 Division.	
Teacher: 是的. 答案是什么? 用一百三十二除以十一, 最后的答案是什么? Yes. What is the answer to 132 divided by 11? What is the final answer?	
Emily: 十二。 12.	
Teacher: 是十二, 是的! 答案是什么? Yes, 12. The answer is?	Prompt: by asking the question again the teacher prompted Emily to repeat her answer in a whole sentence so including the required measure word.
Emily: 每个同学有十二 Each student gets 12...	After the number, Emily stopped, as she is not confident which measure word to use. Nevertheless, her pause indicated the awareness that a measure word was required to be used in this context.
Teacher: 十二什么? 12 what?	Prompt: without providing Emily with the correct answer the teacher's prompt served to encourage Emily that she was on the right track; i.e., that a measure word was required.
Emily: 本书。 12 本 (mw) books.	Production practice: Emily used the correct measure word.
Teacher: 我把答案写上。你抄下来: 每个同学有十二本书。再读一遍。 I will write the answers on the board, you can copy it down.	Production practice: the teacher writes the answer on the board, and then asked Emily to read the answer again. This way, measure word application was practised through reading and speaking.
Emily: 每个同学有十二本书。 Each student gets 12 本(mw) books.	Production practice (speaking): another opportunity for Emily to practise the use of measure words.
Teacher: 好, 你把答案写下来。 The teacher writes the correct answer on the board.	Production practice (productive skill): writing.
Emily: writing down the answer from the board.	Production practice (productive skill): reading and writing.
Teacher: 好, 再念一遍你的答案。 Good! Please read the answer once more.	Production practice: reading and speaking practice.
Emily: 每个同学有十二本书。 Each student gets 12 本(mw) books.	Production practice (receptive and productive skills): Emily read out the

	answer from her book correctly and fluently.
Teacher: 好! 非常漂亮! 再做一道题吧。 Great! Beautiful! Please make another mathematics question like this. (End of interaction)	Input flood, intonational Stress and production practice: by inviting all students to write more, similar mathematics questions, and by emphasising the measure word, the teacher invited all students to practise the selection and correct use of the appropriate measure words.

Figure 5.1: An example of teacher-student interactions with each FFI interaction explained.

The lesson continued, providing other students with opportunities to present their groups' answers to mathematics questions. The FFI methods employed in the following interactions are discussed in the Data Analysis section 5.3.3 of this chapter.

William reads out his question clearly and fluently:

William: 莫森小学的图书馆买了二百零二本书, 分给二 (mistake¹)

个班, 每个个班有多少本书?

答案是一百零一 (missing *mw*) 书, 哦! 一百零一本书。

[**English translation:** Mawson Primary School library bought 202 books, allocate to 2 classes, how many books each class get? The answer is 101(missing *mw*) books, oh! 101(*mw*) books.]

Even though William used ‘二’ (two) instead of ‘两’, the teacher decided not to correct him. As a result, William’s speech was not interrupted. However, the teacher used ‘两’ explicitly while talking about mathematics method to indicate he should have used ‘两’ in this context. As we can see, the grammar in William’s

¹Briefly, according to Ye & Wu (2010): the general grammar rule defines using ‘二’ as an ordinal number- second, etc. Using ‘两’ as a cardinal number – two weeks, two months and two days.

writing and speaking is correct, and he is definitely aware of the use of measure word, but while he left the measure word out when talking about the answer to his question, he was able to correct his sentence without any assistance.

John has also got his question ready very quickly, which he presented to the class as follows:

John: 莫森小学有 one thousand 个 同学, (he used ‘one thousand’ in English), 有五个班, 每个班有多少个同学?

[**English translation:** Mawson primary school has 1000 students, 5 classes, how many students in each class?]

Teacher: 哦, 一千 个 同学, 有五个班, 每个班有多少个学生?

[Oh, 1000 classmate, 5 classes, how many students in each class?]

(The teacher realised that he doesn’t know how to say ‘one thousand’ in Chinese, so she filled-in the Chinese words for him without stopping the speech.)

John: 每个班有二百 (missing *mw*) 同学。

[200 (missing *mw*) students in each class]

Teacher: 二百同学? 还是二百...? 我们能把两块砖放在一起吗? 中间需要什么?

[**English translation:** 200 missing *mw* students or 200 ...? Can we put two bricks together? We need something in the middle.]

John: 个 同学,

[*mw* students],

Teacher: 非常好。

[Great!]

Paul's question is about a basketball team, which is the sport he loves to play:

Paul: 二百一十六个运动员，每个队有八个运动员，每个队有多少队员？

[**English translation:** 216 sports people, each team has 8 people, how many team members in each team?]

Paul made a mistake in forming the mathematics question, but his use of Chinese language in written form is correct. He remembered to include all measure words in this writing. However, he missed using the measure word once in answering his question. Teacher may give a clue as:

Teacher: 一百个学生，二百什么？对员？

[English: 100 *mw* students, 200 what? team member?]

(Paul quickly realised his mistake, corrected his answer, as:)

Paul: 二百一十六个队员。(216 *mw* team member).

Amanda found this task very easy. She wrote:

Amanda: 学校有六个班，每个班有七本书，学校一共有多少

(missing *mw*) 书？

[**English translation:** School has 6 classes, each class has 7 books, and how many books do the school have in total?]

(Again, she did leave the measure word out in her question, but fixed it immediately without any prompting from the teacher.)

Amanda: 多少本书？学校一共有四十二本书。

[**English translation:** How many books? School has 42 books in total.]

The above interactions are an example of operationalising FFI during the teacher and students interactions.

5.2.3 Focused Exercises and Controlled Practice to Improve Grammar

Acquisition

Having described the noticing and awareness-raising methods that were the focus of earlier stages of the FFI intervention, this section discusses the controlled activities used to provide students with opportunities for production practice in immersion mathematics lessons with additional opportunities provided during language arts lessons.

In weeks 5 and 6, while the teacher continued to integrate noticing and awareness-raising with corrective feedback through production practice (as described above), the researcher also started to conduct more controlled-practice activities in the language arts sessions to reinforce the acquisition of the target form. Exercises and activities performed in the Chinese-language learning sessions conducted by the researcher are summarised below:

A 30-minute phrase-making competition was performed by students. Students were divided into five groups, with each group comprising a mix of students with different language abilities. An envelope of over 60 cut-up Chinese characters with pinyin cards was provided to each group, where the cut-up words were mixed with nouns, measure words and numbers. The aim of this competition was to correctly match measure words with nouns and put the number, measure word and noun in the right order, as well as using the most appropriate measure word to match with the noun. By working collectively to look for numbers, nouns and measure words from

the word cards, students were told to make as many phrases as possible. The marking criteria was simple: one mark for every correct phrase where the number, measure word and noun were in the right order and where the measure word correctly matched with the noun. For example: using ‘个’ in the context of the number of subjects: ‘九个课’ instead of ‘九门课’ would not get any mark. This proved to be an engaging exercise for the whole class, and students were very focused on completing phrases correctly. The result is discussed in the following chapter.

On the following sessions, a number of other learning exercises were used to provide production practice in order to reinforce measure-word acquisition, as described below.

A well-known Chinese pop song ‘一千零一个愿望’ (One Thousand and One Wishes) was selected to teach students to support acquisition of the targeted grammatical element, noting that many measure words are contained in the lyrics, for example, “许下我第一千零一个愿望... 每一颗心都有一双翅膀... [made my 1001 (measure word) wishes... each (measure word) heart has a pair of (measure word) wings]. Again, students found this an enjoyable exercise.

The Silent Ball game was adapted into a “Measure-word Ball Game” and played in the MIP classroom at a time when students were a bit tired from sitting on their chairs. Here, students stood up in the classroom, passing a ball to one another, while being required to say a phrase of ‘number + measure word + noun’ on each throw. For example: one student throws the ball to another and says: ‘一个苹果 (one apple)’, the next student catches it and says ‘两个香蕉 (two bananas)’ while throwing it to the next student. The rules of the Silent Ball game can be changed depending on the learning objectives of that session. For example, one student who gets the ball has

to say a number, and then pass the ball to the next student to add a measure word for the number.

The game ‘11’ was also adapted as a Chinese measure word practice game. Students were asked to stand in a circle and participate in counting phrases such as: one student, two students, three students, and so on, using the ‘number + measure word + noun’ pattern, where the 11th person in each sequence is out of the game and has to sit down. Each person can choose to say between one to three numbers of objects, and in this way can manipulate the game to some extent in order to ‘get someone out’, thereby adding a bit more fun to the game.

‘My Aunt’s Suitcase’ (adopted from Harley, 1998) is another very easy language game to play in the classroom that was used in this same way. Here, students pick up a book/magazine/items of stationary and describe it to the rest of the class in Chinese: 我阿姨的箱子里有一本数学书,三本杂志和六支铅笔 (My aunt has got one mathematics book, three magazines and six pencils in her suitcase). Measure words are a crucial element of each sentence. (Phrase sheet is provided in Appendix P).

Sports played during PE sessions were also adapted by adding a measure word focus, where sentences with ‘number + measure word + noun’ structure were added to games to count and score: 十分 (two points) or 十五分 (fifteen points).

Shopping – buying and selling is an activity that students enjoy, as it is a relaxed activity where they can make conversations in Chinese and compare each other’s shops. Also, the words used for the denomination of Chinese currency (‘元, 角, 分 or 块, 毛, 分) are actually measure words that are essential to use when shopping (for example, to state a price in Chinese: 这个五块钱 – this one costs 5 yuan – in which 块 is a measure word required to describe money). The MIP class

keeps boxes of old toys and other children's things for '去商店时间买东西' (shopping time), which students are able to augment with their own little items brought from home. On the last session of Friday afternoon the students often set up their shops, and are required to use Chinese to buy and sell, walking around from shop to shop to purchase the items they want to buy. This proved to be an excellent exercise in Chinese social and cultural knowledge. Naturally, measure words become a mandatory part of the language used in students' conversation in the context of trading. Printed Chinese money: 元 (dollar), 角 (10 cents) and 分 (cent) are used in the trade. Languages in Chinese listed below are commonly used in this activity, measure words are highlighted in red:

我要买这个 (I want to buy this one).

我喜欢/爱这个 (I like/love this one).

多少钱一个? (How much each?)

那个多少钱 (How much is that one?).

好吧, 给你八块钱 (Okay, I'll give you 8 yuan).

找你六块钱 (I'll give you 6 yuan change).

不卖 (I'm not selling).

谢谢, 再见! (Thank you and good-bye!)

These controlled classroom activities were adopted and designed with an emphasis on measure words. As students were familiar with the format of these activities, they could deal with the added grammar features and benefit from the exercises. As these activities were also chosen to suit the students' age group, students were readily engaged in the activities and found them to be fun. Overall, these particular production practices achieved very good results in terms of students'

progress in learning the target grammatical element; results that the teaching staff found reassuring. It is highly recommended that students be exposed to additional controlled practice of the target form on an on-going basis. Such controlled practice, ideally in a communicative context, serves to engage students more fully in the use of measure words and assist in the transformation from conceptual knowledge to procedural knowledge.

As the end of the term was approaching in the seventh and eighth week of FFI intervention, the intervention and associated data collection entered its final stage.

Measure words were practised through singing the Chinese song ‘一千零一个愿望 One Thousand and One Wishes’. Students enjoyed the lyrics and music, and in the process the concept and usage of measure words were further reinforced. The aim was to accelerate students’ grammatical progression from declarative status to an application stage through a communicative approach. The music helped to consolidate the application of measure words in students’ memory. In addition, the play ‘莫森小学之星 Mawson’s Got Talent’ incorporated Chinese vocabulary and sentences taught this term in the interview lines. Students were fluent and accurate in most cases in their Chinese speeches and the play was the highlight of the assembly. Additionally, part of the end-of-term assessments started in week 8 and continued into week 9. Measure words were an essential part of the assessments, students’ acquisition of measure words were assessed in their comprehension and production. Detailed discussion of the end-of-term assessment is presented in the data analysis section.

By providing one whole-lesson observation transcript and parts of several others, this chapter is intended to demonstrate the classroom pedagogy, instruction and interaction as it unfolded in this research and, more specifically, the way in which a grammatical focus was integrated within the immersion mathematics lessons.

Overall, Chinese language is mostly used, with occasional English. During these observations, it was apparent that students seemed to be thinking in their first language, with a translation process often evidenced when they talk to themselves in English, looking for the correct Chinese word to express their thoughts.

5.3 The Second Research Question: How can the FFI framework be operationalised in this Chinese immersion program in order to facilitate students' grammar acquisition?

Firstly, this section compares the FFI intervention during mathematics class with the ways that immersion mathematics was normally taught (i.e., in the absence of a grammar component). Then, it examines and analyses the FFI pedagogy in some detail to demonstrate the FFI methods that can be incorporated in content teaching in immersion classrooms to enhance grammar learning.

5.3.1 Comparing Chinese Language and Immersion Mathematics Pedagogy Pre and Post FFI Intervention

Immersion mathematics teaching emphasises the delivery of mathematics content; mathematics methods and problem solving tasks that align with learners' Chinese language levels (refer to detailed discussion in Chapter Four, Sections 4.3.1 and 4.3.2, and Figure 4.5). In this research FFI was integrated into this immersion teaching process without changing its mathematics content focus. Until this research intervention, FFI methods had not been a feature of the MIP pedagogy at Mawson Primary School. Noting that this FFI intervention was also augmented by a limited number of language lessons that focused on the measure-word form (Section 5.2.3 refers), the FFI intervention has potential to change the way that both mathematics and Chinese language are taught at Mawson Primary School.

In this section I discuss a number of aspects that characterise the way Chinese grammar has traditionally been taught and learnt in the MIP, and compare this against the changes instigated through (and adopted as a consequence of) this research. The section describes and discusses these differences.

Chinese language and content teaching have always been separated in MIP. Scott summed-up the MIP Chinese language curriculum as a “theme based” approach (2002, p.3). The description was confirmed by the curriculum documents collected in this research (see 2010 Curriculum Planner in Appendix D). Prior to this research, thematically organised Chinese language curriculum, combining certain grammar elements, was taught to MIP students exclusively through language sessions. In the immersion (subject teaching through Chinese) sessions, Mawson MIP endeavoured to use as much L2 as possible and minimise interruptions, so English is often used either by the teacher to provide explanation, or by students to deliver their expressions (where they cannot say it in Chinese completely or correctly). As detailed in the previous chapter, typically each MIP day (two days per week), includes a one-hour language session. This Chinese language teaching followed a couple of text books: 轻松学汉语! Chinese Made Easy! and 你好! Hello! which to date have been the most popular and broadly used books by Chinese language programs in Australia schools. Importantly, while Chinese language and grammar (e.g., syntax, phonology, semantics, discourse and lexical parts of the language) were all taught during language lessons (termed Language Arts lesson), grammar correction was not part of the content teaching in the majority of cases, nor was it listed in the curriculum documents.

At Mawson, students use the language learnt in language lessons in their immersion content study as far as possible, after taking into account students’

comprehension level and the applicability of their language skills to the relevant subject curriculum. When using Chinese in subjects such as mathematics or social studies, firstly the input was modified to be comprehensible for immersion students, and secondly, grammatical errors have in most cases been ignored. Where errors were corrected in these situations, mistakes were generally pointed out by the teacher directly and explicitly, depending on the teacher's judgement of the importance of the grammatical mistake and the appropriateness of doing so at that time and situation. Fundamentally, the main focus of these MIP non-language sessions was the content. In situations where intervention was crucial for comprehension of the subject teaching, the MIP teacher often approached it as:

停一下, 你不能说: ‘八百六十护士’, 应该说: ‘八百六十 个护士’。记住啊! 量词。

[**English translation:** “Stop, you can't say: ‘860 nurses’, you should say: ‘860 + **measure word** + nurses’, remember, measure word, okay.]

This follows the explicit correction approach in targeting both language and grammar acquisition. However, this approach has not achieved a satisfactory level of development in students' language proficiency. As stated in the assessment prior to the data collection, students demonstrated a grammatical weakness that was characterised by persistent errors. While MIP students have gained a level of communication skills in Chinese sufficient to deliver meaning and to make sense of input, their relatively fluent target language skills in expressing and interpreting meaning have at the same time been limited by grammatical weaknesses. As these grammar errors were both pervasive and persistent, the need to improve grammar development and correct these errors is critical to the development of students' L2 proficiency.

This research initiated a number of changes to the prior approach of keeping content and language teaching separate: pedagogically, the FFI framework was implemented in mathematics sessions. The communicative language teaching approach is the fundamental base of FFI, opportunities for interaction in language production were provided in order to assist students in overcoming grammar errors. For example, the mathematics immersion teacher was encouraged to desist from the explicit ‘Stop and correct’ method and instead, to employ the FFI framework during the content learning process. A grammar focus was added in the MIP curriculum document (refer to Figure 4.4 for further detail). Measure words were the main grammar focus in mathematics for the term, as stated in the planning document. Lesson plans were also reformed accordingly. The following table (5.1) demonstrates the main alternations made to grammar teaching from prior to after the case study.

Table 5.1 Changes Made to MIP Grammar Teaching Practice Post FFI Intervention

Grammar and immersion mathematics teaching contexts	<i>Prior to this research in 2013</i>	<i>After the research</i>
Grammar teaching in language arts lessons	Arranged systemically among theme-based Chinese teaching units with exercise tasks.	Theme-based Chinese units with controlled production practice on language form.
In content-focused (mathematics) immersion lessons	Comprehensible input with Chinese learnt in language sessions. Explicit grammar teaching occurred occasionally to assist comprehension or production. Immersion mathematics teaching is mainly focused on mathematics concepts, operational skills (addition, subtraction, multiplication and division) and problem-solving skills.	While the immersion mathematics teaching approach remained unchanged, a grammar focus was added-in. FFI integrated into the mathematics teaching process: Input flood; enhanced input intonationally and visually to increase the chance for students to notice the target form. Corrective feedback and opportunities for production exercise in the content teaching process.
Result in grammar acquisition	Non-substantial improvement achieved, with grammatical errors persisting in students' Chinese language production.	Improved grammar acquisition arising from the FFI intervention (section 5.2 refers).

Note: The table demonstrates the changes made to grammar teaching in the Mawson MIP program that were initiated by this research.

So far in this chapter, I have discussed the differences in approach to grammar teaching before and after the FFI intervention. Now I proceed to analyse the FFI methods used in detail.

5.3.2 FFI Methods Employed in the Research Classroom

Consistent with the data analysis plan given in Table 2.1 (adapted from Ellis, 2006) in Chapter Two and discussed in section 3.6.1, research categories were pre-arranged in line with the research hypothesis derived from the literature review. Based on cognitive theory and drawing on Lyster's summary of FFI, the concepts of 'noticing, awareness-raising and production practice' (2006) were used as a framework for organising the data. Categorisation followed Bryman's (2012) and Efron and Ravid's (2013) guidelines, comprising a process of identifying categories, isolating and arranging FFI elements into units, sorting-out the units into each category, organising for themes or sub-categories within each category and, finally, presenting the categories with exemplification.

Through analysis of the classroom observation transcripts, FFI classroom implementation categories were derived as described in Table 5.2.

Table 5.2 Coded Summary of FFI Methods (Codes) Employed in this Research

Code:	Description
Category ‘N’: Methods to make the focused form noticeable and perceptible in the input	
FFI 1	Intonational Stress: Stressing or changing the tone of voice in speaking and listening materials or in the teacher’s speech to emphasise the application of the measure word.
FFI 2	Visual enhancement: Most common measure words are displayed in enlarged bright red individual signs. The teacher would use them during mathematics sessions when a measure word needed to be stressed or a mistake was made by the student in their measure-word application. Furthermore, typographic intervention techniques (such as bold printing, changing the colour or underlining of the measure word in reading materials), was used to draw student focus to those forms. Moreover, body language (such as a hand gesture or raised eyebrow) also makes a contribution by providing visual cues to draw attention to the form.
FFI 3	High-frequency appearance of the focused form in the communicative context: Input flood and systematically designed mathematics activities to include measure words in order to apply the focused form.
Category ‘AR’: Awareness-raising methods	
FFI 4	Corrective feedback:
FFI 4a	Repetition of the correct form.
FFI 4b	Recast: Repetition of student’s incorrect sentences with the error corrected; i.e., saying the sentence again correctly to highlight the intended meaning of student’s statement.
FFI 4c	Prompt: Providing metalinguistic clues for students in ways that bring on their self-corrective ability to produce the correct grammatical form. Use of a metaphor (e.g., a measure word is the ‘cement’ or ‘glue’ that connects the number with the noun) was the most commonly used corrective feedback in this research, and one that was well suited to the measure word form. Others, such as saying ‘什么? (Pardon?)’ or ‘一个数字和名词, 中间要有什么?’ (Between a number and noun, you need to have a ...?), served to provide clarification requests, especially after using an appropriate metaphor to describe the function and position of the measure word. Repeating a student’s mistake; (i.e., repeating student errors while emphasising the mistake in a way that indicates a problematic form that needs to be corrected).
FFI 4d	Briefly correcting the student’s error and explaining it explicitly.

Category ‘PP’: Production practice/controlled-practice activities

FFI 5	Production practice/controlled practice in a communicative context: Reading comprehension tasks, singing Chinese songs, games and exercises that provide opportunities for students to practise the grammar feature in focus. For example, ‘My aunt’s suitcase’, ‘Matching game’, ‘Silent ball’ with measure words emphasised, ‘Pat man’ (matching games), and ‘11’ (a number plus measure word exercise game), mathematics presentation in Chinese, classroom or group discussions and writing exercises.
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Note: This table emerged from, and assisted in, the data analysis on the FFI methods applied in the immersion pedagogy.

The summary above demonstrates the main features of the FFI methods that were integrated into mathematics teaching during the research intervention, noting that this was augmented by three sessions (40 minutes per session) focusing on the target form during language lessons in which an explicit communicative grammar approach was used. As described above, the FFIs that were employed fell into the three categories of noticing, establishing awareness, and combined with production/controlled practice, with different themes within each category. Consistent with the methodology and design of the intervention, the data demonstrated a range of FFI methods employed in attempting to enhance students’ accuracy in the target measure-word form.

5.3.3 FFI Chinese Immersion Classroom Implementation

The staged integration of FFI into the classroom procedure was presented in the data collection section previously. The analysis below is to more clearly demonstrate its practical application during immersion mathematics classes. FFI methods employed are discussed in stages, with examples.

The planning stage

Planning the FFI implementation was informed by cognitive theory and Cognitive Load theory, in addition to past research findings as discussed in Chapter Three. Planning for an FFI intervention such as this requires thorough consideration

of the background information, particularly information on students' stage of language development and their specific language needs in considering choices about the grammar feature (or features) to be targeted. Key considerations include the 'learnability' of the grammar feature and the specific methods to be used through the three-step approach (noticing, awareness-raising and production practice) as described above and also in Chapter Two. In planning the FFI intervention during mathematics lessons, it is also crucial to select the appropriate level of mathematical content to be taught, thereby ensuring that the FFI aligns with learners' cognitive structure and minimises the demands on their working memory. In this way, FFI demands that the number of grammatical elements to be targeted is limited based on factors such as the level of students' language skills and the difficulty of the target form. In the majority of cases only one grammatical form is targeted at any one time, and always within an appropriate learning context, to ensure that it can be systemically taught, practised and learnt within a communicative learning process. In this case, just one grammar feature—the measure word—was selected to fit within the scope and sequence of the curriculum and its twin learning objectives of mathematics (basic division and multiplication) and Chinese.

Implementing FFI - the first stage

During the first stage of the FFI classroom intervention (and noting that the primary purpose of immersion mathematics was to teach mathematics content prior to this research), FFI methods (refers to Table 5.2, FFI 1, 2 and 3 in this chapter) aimed at attracting learners' attention to the target form (i.e., noticing and awareness-raising) were emphasised according to FFI framework (section 5.2 refers). At the start of the FFI implementation, input flood, using stress or changing of tone to draw attention to the feature, and using bold printing, red colour or enlarged font in reading materials,

were all assimilated into classroom instructions and reading materials in order to lead students' attention to the grammar feature both visually and aurally.

Examples of mathematics interactions that were frequently observed during lessons are set out at table 5.3, below.

Table 5.3 Examples of Input Flood (FFI 3) Interactions

Chinese Characters	English Translation
1 学校买了一百三十九 <u>个</u> 足球,	1 The school bought 139 soccer balls,
2 要平均分给六 <u>个</u> 足球队,	2 It would like to give (equally) to 6 soccer teams,
3 每个队能得到多少 <u>个</u> 球?	3 How many balls will each team get?
4 还会剩几个 <u>个</u> 足球?	4 How many soccer balls will be left?

Note: measure words are in bold underlined text. The frequency of the target form was increased through the study of mathematics content.

Noticing is the first step toward ‘consciousness-raising’ (Schmidt, 1990, 1994), as “attention controls access to the conscious experience of noticing” (Harley, 1998, p. 157), and “registration of the occurrence of a stimulus event in conscious awareness and subsequent storage in long term memory” (Schmidt, 1990, p. 179). Harley (1998) supported Schmidt’s principles as language forms cannot be acquired without noticing them. Adding salience to the target form through instruction is crucial to increasing the likelihood that learners notice the grammatical element.

Often the immersion mathematics teacher would read mathematics questions aloud in Chinese with measure words stressed through changed tone or by adding volume to her voice during reading. Sometimes she would also repeat the questions more slowly, and interrupt her reading to explain some key words. After reading a question in this way, the teacher then checked for comprehension by asking students to translate and explain the question. Subsequently, the teacher discussed the mathematics method required for solving the question by asking: “How do we deal

with this question? Or “What is the formula to express this question?” Shall we use addition, subtraction, multiplication or division?” Students then replied to her question. Subsequently, the teacher asked students to work out the question step by step, in Chinese, knowing that many opportunities to practice measure words occur at this point. Thus the likelihood that students would notice the targeted grammar feature was further enhanced during this initial stage.

The second stage

In subsequent stages, and as illustrated at section 5.2.2 in this chapter, a range of additional FFI methods were used during classroom interactions in addition to continued use of the noticing activities mentioned above, in order to raise student awareness of where and when the use of measure words is appropriate. Once students were able to recognise and identify the grammar form, a shift in focus to awareness-raising serves to reinforce understanding and internalisation of the form and the rules for its application (Lyster, 2006; Paradis, 2001). In order to raise the awareness towards the linguistic form, corrective feedback, including prompting, with metaphor, recasting to remind students of the form, were methods commonly employed by the mathematics teacher. Corrective feedback methods work on grammar acquisition by indicating the ‘gap’ between the student’s expression of the form and accurate expression, so that they can make a corrective amendment. The teacher used questions that had been designed to stimulate student thinking around the concept of division in ways that would also encourage appropriate use of measure words at the same time. In a similar way, the teacher used FFI to remind students about the measure word usage throughout the course of each mathematics lesson.

Here students were encouraged to apply measure words in a range of contexts and to familiarise themselves through expression. For example, interactions (coded)

such as the one transcribed below at Table 5.4 are representative of common FFI methods used during mathematics problem-solving exercise. The coding formula for each type of FFI method was as described in Table 5.2.

Table 5.4 Excerpt 1 – Coded Examples of Various Classroom FFI

Interactions, Using Measure Words (*mws*), between the Teacher (T) and a Student (S)

Chinese Characters		English Translation	
Firstly, the teacher read the question aloud to her students			
1	T	堪培拉小学有二百零七个(FFI 1)学生，	1 T Canberra Primary School has 207 <i>mw</i> (FFI 1) students,
2	T	九 ^个 (FFI 1; FFI 3)班，	2 T 9 <i>mw</i> (FFI 1; FFI 3) classes,
3	T	每 ^个 (FFI 1; FFI 3)班平均有几个 ^个 (FFI 1; FFI 3)学生？	3 T Each <i>mw</i> class (FFI 1; FFI 3) on average has how <i>mw</i> (FFI 1; FFI 3) many students?
The classroom interaction continued along the following lines			
4	T	怎么做？我们用加，减，乘，还是除法？	4 T How do we do this? Shall we use addition, subtraction, multiplication or division?
5	S	除法。	5 S Division.
Students were given time to work out the answer			
6	S	二十三。	6 S 23.
7	T	二十三什么？(FFI 4c)二十三什么？(FFI 4c)	7 T 23 what? (FFI 4c) 23 what? (FFI 4c)
8	T	二十三 ^个 (FFI 4b)学生。	8 T 23 <i>mw</i> (FFI 4b) students.
9	T	二百零七 ^个 (FFI 1)学生除以多少 ^个 (FFI 1; FFI 3)班？	9 T 207 <i>mw</i> (FFI 1) students divided by How many <i>mw</i> (FFI 1; FFI 3) classes?
10	S	九班，	10 S 9 classes,
11	T	九班？(FFI 4c)	11 T 9 classes? (FFI 4c)
12	S	九 ^个 班。(FFI 4c)	12 S 9 <i>mw</i> classes. (FFI 4c)
13	T	对了，太好了！九 ^个 (FFI 4a)班。	13 T Correct, great! 9 <i>mw</i> (FFI 4a) classes.
14	T	现在咱们再一起读一遍 (FFI 5)	14 T Now let us read it one more <i>mw</i> time (FFI 5)

Note: An example of coded and translated FFI intervention conducted by the teacher during a mathematics lesson.

T = teacher;

S = student;

FFI 1 = intonational stress;

FFI 2 = visual enhancement;

FFI 3 = high frequency appearance of the focused form in the communicative context;

FFI 4 = corrective feedback;

FFI 4a = repetition of the correct form;

FFI 4b = recast;

FFI 4c = prompt;

FFI 4d = correcting student's error and explaining it explicitly;

FFI 5 = production practice/controlled-practice in a communicative context.

This example of FFI-related dialogue, integrated with a mathematics problem-solving question, was coded according to the FFI implementation chart (in this chapter, Table 5.2). As indicated, the interactions include a range of FFI methods integrated into mathematics instruction. Prompt, recast and intonational stress are common methods employed in this conversation. The teacher and students worked together through a range of mathematics questions like this, with the procedure repeated over nine consecutive weeks of immersion mathematics lessons, and where each student was provided with opportunities to present, in Chinese, their working procedure either to the whole class, to their working group or to the teacher. In this way, FFIs were solidly integrated into the mathematics learning process.

The data analysis demonstrated that in practice, the teacher employed frequent repetition of a combination of FFIs during her mathematics teaching process. Common approaches regularly used included changing the tone of voice to draw students' attention to the measure word; stressing the measure word in the teacher's speech; recasting immediately upon a student's error; providing prompts via using a metaphor to indicate the need for the measure word; and stimulating student's self-correction to reconstruct the sentence and offering linguistic cues. Examples are provided in Tables 5.5 to 5.8 below (Excerpts 2 to 5).

Table 5.5 Excerpt 2 – Classroom Interactions between Student Emily and the Teacher Using Intonational Stress (FFI 1), Visual Enhancement (FFI 2) and Prompts (FFI 4c)

		Chinese Characters			English Translation
1	Emily	每班有二十七 (missing <i>mw</i>) 学生。	1	Emily	Each class has 27 (missing <i>mw</i>) students.
2	Teacher	二十七 ... 学生?	2	Teacher	27 ... students?
	Teacher	Raising her voice [FFI 1] and using her hand to indicate the gap between number 27 and noun [FFI 2] and [FFI 4c] – students.			
3	Teacher	哦! 二十七 <u>个</u> 学生。	3	Teacher	Oh, 27 <u>个</u> (<i>mw</i>) students。

Note: Examples of prompting through change of voice and visual enhancement.

Table 5.6 Excerpt 3 – Classroom Interaction Using Intonational Stress (FFI 1)

		Chinese Characters			English Translation
1		三百六十五 <u>本</u> 法语书。	1		365 (<i>mw</i>) French books.

Note: The teacher prompts by loudly emphasises the measure word ‘本’.

By loudly emphasising the measure word ‘本’ [FFI 1] the teacher draws the student’s attention to the error of omission.

Table 5.7 Excerpt 4 – Classroom Interaction between Student Rose and the Teacher Using Recast (FFI 4b)

		Chinese Characters			English Translation
1	Rose	八班。(missing 个)	1	Rose	8 classrooms. (missing <i>mw</i>)
2	Teacher	哦, 八 <u>个</u> 班。 [FFI 4b] with <i>mw</i> added in and stressed in her voice.	2	Teacher	Oh, 8 <i>mw</i> classrooms. [FFI 4b] with <i>mw</i> added in and stressed in her voice.
3	Rose	哦, 八 <u>个</u> 班。 Kate repeated the sentence with <i>mw</i> correctly applied.	3	Rose	Oh, 8 <i>mw</i> classrooms. Kate repeated the sentence with <i>mw</i> correctly applied.

Note: Through recast the teacher provided immediate feedback highlighting Rose’s error by stressing the correct measure word.

Table 5.8 Excerpt 5 – Classroom Interaction between Student John and the Teacher Using Prompt (FFI 4c – Prompt: i.e., Metaphor)

		Chinese Characters	English Translation	
1	John	篮球队有二十四学生。 Missing <i>mw</i> in the sentence.	1	John 24 people in the basketball team. Missing <i>mw</i> in the sentence.
2	Teacher	二十四什么? [FFI 4c]	2	Teacher 24 what? [FFI 4c]
3	Teacher	胶在哪里? [FFI 4c]	3	Teacher Where is the glue? [FFI 4c]
4	Teacher	二十四 ... 什么? [FFI 4c]	4	Teacher 24 ... what? [FFI 4c]
5	Teacher	篮球队有...? [FFI 4c]	5	Teacher Basketball team has ...? [FFI 4c]
6	John	二十四个人, 每队。	6	John 24 <i>mw</i> people, in each team.
7	Teacher	对了! 太好了!	7	Teacher Correct! Great!

Note: Prompt—‘glue’ used as a metaphor for the requisite measure word in order to encourage the student to draw on his grammatical knowledge and correct his mistake.

After the initial stage of the FFI intervention in mathematics and on completing a number of teacher-controlled noticing and attention-raising sessions, the performance of student participants had improved considerably in the measure word exclusive grammar assessment. It is nevertheless important to mention that difficulties in use of the measure word-form continued to be observed. For example, students displayed uncertainty or pauses when applying measure words in unstructured productions, demonstrating that student knowledge of the measure-word concept had not yet transformed into a communicative skill; in other words, while the concept was likely to be stored in students’ long-term memory, at this point they were only able to retrieve it in a slow and partial manner.

These results indicated that noticing and awareness-raising methods alone, entailing primarily teacher-controlled classroom FFI, was insufficient to transfer students’ conceptual knowledge to skills. This supports Lyster’s (2006) claim that practice and feedback are indispensable in the transition “from controlled to more automatic processing” (2006, p. 42). At this point in the research, students had been receiving noticing and awareness-raising treatments through instructions, but had

been provided with only limited opportunity for controlled production practice (as explained at Chapter Four, section 4.3.3). This is consistent with Paradis' finding that while paying attention to language input can enable language learners to appreciate the difference between their own skills and those of native speakers, by itself this awareness is not sufficient to bridge the gap in skill (Paradis, 2009).

Consequently, a shift was instigated by the researcher from teacher-centred teaching to a student centred learning approach. This shift reflected the researcher's realisation that, as was evident from classroom observation, it was time to switch to a different approach to the teacher-controlled setting where the teacher initiates conversation and students respond. The decision was taken to modify the intervention by designing student-centred learning tasks to encourage students to learn both the mathematics content and measure-word form independently and collaboratively with other students, as well as create more opportunities for language production.

The final stage of FFI intervention

During this final FFI stage, the FFI emphasis was placed on production practice, as it stimulated the internalisation process on the target form through repetition in target language (TL) production. Consistent with Cognitive Load theory, production practice serves to automate schemas and make them easier for working memory to process, transferring knowledge into long-term memory for retrieval and use later on. Such practice reinforces and consolidates internalisation of the target form and represents an important step towards acquisition of the concept. The exercises and activities used as controlled-production practice were basic measure-word usage exercises. Examples of this approach included asking students to practise the answers in Chinese after the teacher (sometimes the teacher would re-state answers using the correct measure word form, and ask students to repeat their verbal

answers accordingly); students writing their answers down in complete sentences (noting that the measure word is a crucial part of the correct sentence) and then reading them out loud; and providing a set of numbers and nouns for students to connect in a sentence, knowing that a measure word is an essential part of each phrase.

In addition, singing in Chinese and language games where applying a measure word is a crucial part of the expression (e.g., number game ‘11’ and playing ‘My Aunt’s Suitcase’, adapted from Harley, 1998), were used as valuable ways for students to practise their use of the form, providing students with opportunities to practise Chinese productions, thereby giving students more opportunities to retrieve and use their stored knowledge, in ways that bring students’ attention simultaneously to comprehending both language (including the measure word) and content. Language games, Chinese songs and the drama performance were also shown to have lifted students’ interest levels significantly while producing language through this process, thereby helping to focus students’ attention on the Chinese language learnt in classroom, on conveying meaning to others and on demonstrating their language abilities to the school and community. Throughout, controlled-practice activities that entailed both auditory and visual processes were conducted. Research findings on FFI activity types (as discussed in Chapter Two section 2.7.2), assisted in the design of production practice tasks employed in this research; activities such as the Garden Path technique (Tomasello & Herron, 1988 & 1989); Task Essentialness (Loschky & Bley-Vroman, 1993); and Dictogloss (Swain, 1998).

Table 5.9 below lists the production practice activities employed in this research.

Table 5.9 Summary of FFI 5 – Production Practice (PP) Activities Performed by Student Participants (Main Table Features Adapted from Efron & Ravid, 2013)

Activity type	Participant organisation	Modality practice	Content of activities	Description of FFI	Language targeted
Translation from English to Chinese – phrases with <i>mw</i> specific: e.g., 我有三只狗 (I have 3 dogs)	Student-centred	Writing	Focus on form	Controlled practice; The garden path technique	Grammar
Phrase making: connect numbers, <i>mws</i> and noun word cards: e.g., 100 个朋友 (100 friends)	Student-centred	Comprehension and phrases making	Focus on content and form	Production practice; The garden path technique	Grammar & vocabulary
Translating from Chinese to English: e.g., They take 8 apples.	Student-centred	Comprehension and production	Focus on form	Controlled practice; The garden path technique	Grammar
Singing in Chinese: 1001个愿望 (1001 wishes)	Student-centred	Comprehension and singing	Focus on both content and form	Production practice; Task essentialness	Vocabulary, pronunciation & grammar
Recite times-table in Chinese: 三七, 二十一 (3x7 equals 21)	Student-centred	Speaking	Focus on content and form	Controlled practice	Discourse & grammar
Numbers game ‘11’: counting in Chinese numbers + <i>mw</i> , the 11th student has to sit down: e.g., 一个, 两个, 三个, 四个...	Student-centred	Speaking	Focus on form	Controlled practice	Grammar & discourse
My Aunt’s Suitcase (adopted from Harley (1998): describe objects from aunt’s suitcase: e.g., 阿姨的箱子里有六本书. (There are 6 books in my aunt’s suitcase)	Student-centred	Speaking, comprehension and responding	Focus on content and form	Production practice induce spontaneous response; Dictogloss	Vocabulary, grammar, discourse
Record sports competition scores in Chinese: 16 分. (16 marks)	Student-centred	Speaking and writing	Focus on content and form	Production practice; Task essentialness	Grammar
Shopping game in Chinese: buy and sell items in Chinese: 这个玩具多少钱? (How much is this toy? 23 元. (¥23 Yuan)	Student-centred	Speaking, comprehension and responding	Focus on content, form and culture	Production practice induce spontaneous response; Task essentialness	Vocabulary, grammar, discourse

Note: Examples of activities targeting correct measure-word production.

Moreover, during production practice exercises, feedback that assists students in correct use of the form is crucial in order to signal a mistake, to remind a student of the difference (the ‘gap’) between the correct form and their expression, to help them to complete the sentence correctly, and to provide linguistic clues. The corrective feedback was applied only in relation to the targeted form, with other grammatical mistakes ignored by and large.

5.3.4 The Use of Metaphor as a Prompting Method

In large part, the research intervention entailed the use of established FFI methods in noticing, awareness-raising and production practice used extensively elsewhere. It entailed changes to classroom instructions and the addition of new pedagogical approaches to merge FFI with mathematics teaching through a balanced three-set activities approach:

Noticing activities aim to effect change towards more target like declarative representations of the L2, while awareness activities generally serve to consolidate the restructuring of rule-based declarative representations.

Production practice then provides learners with important opportunities to proceduralise their declarative knowledge of emerging target-like forms.

(Lyster, 2006, p. 43)

However the use of metaphors as a prompting method to induce students’ internalisation of the grammatical knowledge stood out as particularly effective. For example, the comparison of measure words with ‘glue’ or ‘cement’ (i.e. which sticks two things together) created useful imagery which helped students to remember the position (between a number and a noun) and the grammatical function of measure words in a sentence.

At the conclusion of the FFI intervention, a group interview took place on the last day of the term, where students were asked to reflect on their experiences in studying measure words, and to offer their opinions on the methods that they thought worked best for them during mathematics lessons. One of the questions in the interview was as follows: what FFI method(s) worked best in helping you to learn measure words?

Table 5.10 Numbers of Students Identifying Specific FFI Methods as Being Most Effective

FFI Methods	Metaphor	Communicative context	Visual enhancement	Intonational Stress	Working with a group (collaborative learning)	Explicit teaching	Focused exercises	Small chunks
Number of students	8	4	3	1	1	1	1	1

Note: This table demonstrates the numbers of students that found the FFI methods that worked effectively for them, (noting that some identified more than one method).

The results of this question, where eight out of 20 answers identified metaphor as the most effective method (noting that some students identified two or more FFI methods as most helpful), are not in themselves significant in terms of the effectiveness, or relative effectiveness, of a selection of different FFI methods. Rather, the results of this question suggest that the metaphor prompting tool is worth considering for use as part of a broader FFI toolkit.

5.4 Chapter Summary

This chapter focuses on the examination of the second research question about how FFI was operationalised in the Chinese mathematics immersion lessons to support improvement in grammar accuracy. For the most part, the FFIs used in this study can be categorised into three progressive levels of emphasis consistent with Lyster’s summary of FFI methods (2006, 2007) and FFI principles, ranging from enhanced visual and aural treatments to more explicit grammar teaching. Most of these methods, which include input enhancement, input flood and corrective feedback (as a means of awareness raising) have been studied extensively in previous second language research and subsequently adopted. One further FFI method—a form of prompting in which a metaphor is used to remind students of the need for a measure word—was also employed as part of the research intervention with some success.

Table 5.11, below, summarises the FFI methods employed at each stage of the FFI intervention.

Table 5.11 Summary of FFI Methods Employed at Each Stage of the Intervention

Stage of FFI intervention	FFI Methods employed	Specific FFI methods (by code & sub-code)
Stage one Weeks 1 – 2	Noticing activities	FF1, FF2 and FF3
Stage two Weeks 3 – 4	Balanced noticing and awareness-raising activities	FF4 (a, b, c & d), supported by a mix of FF1, FF2 and FF3
Stage three Weeks 5 – 8	Focused production-practice activities	Primarily FF5 interspersed with FF1, FF2, FF3 and FF4

CHAPTER SIX – DATA ANALYSIS

RESEARCH QUESTION THREE

6.1 Introduction

In Chapter Five, the research question two, covering the operationalisation of FFI, was discussed. Chapter Six examines the impact of an FFI intervention on students' grammatical accuracy and the ways in which the intervention extends and develops their proficiency in the target measure-word form. While a qualitative approach plays a major role in the data analysis, quantitative data on student participants' assessment results are also examined to assist in drawing conclusions about changes over time in students' grammatical accuracy.

6.2 Examining Students' Acquisition of the Measure-Word Form — the Third Question: What effect does the integration of FFI into Chinese mathematics primary immersion pedagogy have on students' grammatical accuracy?

This part reviews both qualitative and quantitative data that relate to student progress in their accuracy of the target form in Chinese production prior to, during the course of, and after the FFI intervention. The third research question investigates the impact of the FFI in assisting immersion students' grammar acquisition. Essentially, assessing whether the grammar focus has improved student accuracy requires measuring their grammatical choices, understanding and production (Ellis, 2001). In this research, the accurate application of the measure-word form in a communicative context in both oral and written productions were the primary means of assessing students' grammatical acquisition. In adopting the principles of cognitive theory, the

assessment of the transformation from declarative knowledge to procedural knowledge entailed the compilation of qualitative data gathered via classroom observation and quantitative data collected from student participants' assessment results. Specifically, acquisition was measured progressively, drawing on Lyster's (2006), Ellis' (2006) and Ortega's (2009) summary of cognitive theory as it relates to the interlanguage developmental processes that apply in progressing from conceptual knowledge to procedural knowledge. The "four phases of interlanguage processes" (Ortega, 2009, pp. 116–118) align with the evaluation approach established by Ellis (2006, p. 37) which discusses gradual acquisition through the phases of attaining conceptual knowledge; gaining skill in target form application; and reaching a competent level of applying the target form frequently and extensively in different situations. A more detailed discussion is included in the Literature Review chapter section 2.7 and Table 2.1.

In considering the needs of this research, analysis of qualitative classroom observation data combined with quantitative school assessment data, was considered to be a more comprehensive means of investigation than the use of qualitative or quantitative data alone. The use of different sources of data ensures (or increases) the credibility and trustworthiness of the research outcome (discussed in Chapter Three). Particular attention was paid to development in attaining measure words through the conceptual (declarative) knowledge phase to gaining better control over the grammar feature and, finally, to develop competence in applying the knowledge into communicative interaction automatically.

6.3 Analysis of Classroom Observation Data

This section discusses development by students in grammatical accuracy through the analysis of four phases of progression (Ortega, 2009) and connects these to the relevant noticing, awareness-raising and production practice elements of the FFI framework. Furthermore, the ways in which these noticing, awareness-raising and production practice interventions impacted on students' acquisition of the target measure-word form are also discussed.

Cognitive theory measures linguistic acquisition through the internalisation process of transformation from language concept to the ability of application in the communicative process, also known as the development from declarative knowledge to procedural knowledge. According to the 'four phases of interlanguage processes' as described by Ortega (2009), learners' internal development follows four stages in grammar learning (Ortega, p. 116–118): simplification, overgeneralisation, restructuring and U-shaped behaviour to reach language transformation. These four phases were evident in the classroom observation data.

Table 6.1, below, summarises the progress observed in students' skill levels in use of the measure-word form through the course of the FFI intervention. The information in Table 6.1 was drawn from documented classroom observation of each student's Chinese production during mathematics lessons, particularly their application of the measure-word form. These observations were further confirmed in the analysis of assessment results in the following section.

Table 6.1 Classroom Observation of Student Participants' Measure Word (*mw*) Application in Chinese Production

17 students	Column 1 Weeks 1–2 Pre-assessment and the start of FFI <i>mw</i> focus	Column 2 Weeks 3–4 Balanced FFI	Column 3 Weeks 5–6 Production practice	Column 4 Weeks 7–8 Apply <i>mw</i> in communication context	Column 5 Weeks 9–10 Apply <i>mw</i> in communication context
Year 5					
Clair	Missed many; not competent	Improved accuracy	A few mistakes; proficient	Minor mistakes; fluent	Very good
Susan	Many mistakes; not competent	Improved accuracy but <i>mw</i> and noun did not match	Only some mistakes; competent	No mistakes; fluent	Excellent
John	Only used some <i>mw</i> ; unsure	Improved accuracy but <i>mw</i> and noun did not match	A few mistakes; competent	No mistakes; fluent	Excellent
George	Used a few; unsure	Improved accuracy	Some mistakes; competent	A few mistakes; proficient	Very good
William	Missed many; not competent	Improved accuracy but <i>mw</i> and noun did not match	A few mistakes; competent	A few mistakes; fluent	Very good
Peter	Missed many; not competent	Improved accuracy but <i>mw</i> and noun did not match	Some mistakes; hesitant	Improved so much; competent	Very good
Emily	Missed most of <i>mw</i> ; unsure	Improved accuracy but <i>mw</i> and noun did not match	Missed a couple; competent	Some mistakes; fluent	Very good
Rebecca	Missed most of <i>mw</i> ; unsure	Missed many; unsure	Hesitant; needs assistance	Still missing some; improved	Very good
Louise	Many mistakes; not competent	missed many; unsure	Hesitant; needs assistance	A few mistakes; competent	Very good
Fiona	Missed many; improving	Missed many; unsure	Many mistakes; unsure	Improvement in accuracy; competent	Very good
Kate	Missed many; unsure	Missed many; unsure	Many mistakes; unsure	Many mistakes; improved a bit	Satisfactory

James	Missed many; unsure	Missed many; unsure	Many mistakes; unsure	Competent with errors	Very good
Year 6					
Paul	Missed some; not competent	Missed many; unsure	More mistakes in writing	Competent; mainly accurate	Excellent
Tim	Missed many; not competent	Missed many; unsure	More mistakes in speaking	Some mistakes in speaking and writing	Unsatisfactory
Robert	Missed some; not competent	Improved accuracy but <i>mw</i> and noun did not match	Missed a couple; competent	Some mistakes both oral and written	Satisfactory
Amanda	Missed some; improving	Mainly accurate	A few mistakes; competent	Proficient	Excellent
Rose	Missed some; improving	Improved accuracy	Missed a couple; competent	Proficient	Excellent

<i>Inter- language developmental phases</i>	Phase 1: simplification Understanding the need for <i>mw</i> and beginning to understand the concept of <i>mw</i>	Moving from phases 1 to 2 for most students: simplification to over- generalisation	Phase 3 and phase 4: restructuring phases and U- shaped production	Moving toward procedural knowledge with some students in phase 4)	Majority of students have gained procedural knowledge of the <i>mw</i> . Some students are still at phase 3 and 4
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Note: The data from this table were drawn from classroom observation and associated field-notes through out the FFI intervention period. Students' abilities in terms of their control, choice and application of measure words were noted and assessed against the following four criteria (adapted from the Mawson Primary School MIP assessment criteria for language development 2013).

Excellent: highly consistent and thorough understanding of target measure-words, and the ability to apply them almost faultlessly in a wide variety of situations is exhibited.

Very good: a consistent and thorough understanding of measure-word knowledge and skills, and the ability to apply them in a wide range of situations is demonstrated.

Satisfactory: a sound understanding of the grammatical concept and generally accurate use of most measure words in tasks; demonstrates little or no hesitation in using measure words in Chinese productions, yet with some errors.

Unsatisfactory: limited capacity and inconsistency (e.g., repetitive errors; frequent hesitation) in the correct use of measure words; frequent errors in measure-word application in both speaking and written forms.

Simplification phase

“Simplification reflects a process that is called upon when messages must be conveyed with little language. It is particularly pervasive at very early phase of L2 development and among naturalistic learners” (Ortega, 2009, p. 116). In the ‘simplification’ phase, students possess limited grammatical knowledge. During the first week of this research, observation of students’ speech showed that the measure word was missing in most cases (See Table 6.1, column 1). The initial period of the FFI intervention allowed students to gain a basic understanding of grammatical structure and the concept of the need for a measure word. However the ability to use this knowledge for communicative purposes was minimal at this phase.

As a means of enabling students to progress from the simplification phase, noticing activities were used to bring learners’ attention to the target grammatical form. As observed by Ellie, it can be inferred that students came to realise that a measure word was an essential element when quantifying a noun in Chinese during this first phase of the FFI intervention. As observed on many occasions during this phase, students conveyed their meaning by placing a number and noun together without the requisite measure word in between. It was clear that most students at this phase (weeks 1 and part of week 2) omitted most measure words in both their writing and speaking activities, with many producing sentences typified in the following example:

我的班有十三 (missing measure word: 个) 学生。

[My class has 13 students.]

The sentence missed a measure word between the number 13 and the noun.

Overgeneralisation phase

The ‘overgeneralisation phase’ describes the point in the learning process when a grammatical rule is applied irrespective of its associated context or condition.

(e.g., an English learner adding ‘ed’ to all verbs when using past-tense without knowing that there are numerous exceptions to such verbs).

After application of the FFI noticing method, the conceptual knowledge then extended to producing the Chinese measure word in mathematics class, leading students into the second phase of ‘overgeneralisation’. As was observed, this transformation happened gradually for most of the students during weeks 3 to 4. Awareness-raising activities can instigate the internalisation process by encouraging learners to restructure their sentences upon assistance from the teacher or interlocutor (e.g., through feedback). However, as the grammatical concept is still forming in the working memory at this point, learners typically overgeneralise the measure word concept (Skehan, 1998). In this way, FFI awareness-raising approaches enabled students to progress from the ‘simplification’ phase to the ‘overgeneralisation’ phase (Ortega, p. 116–118).

This was indicated where students displayed a growing confidence in using appropriate measure words, as observed in their Chinese speaking and writing productions during classroom interactions with their teacher and among each other, as well as in their completed tasks (Table 6.1, column 2 refers). However, most speakers invariably used the same measure word (个) all the time, sometimes locating it in the wrong point within their sentences (detailed analysis is provided at section 6.4 of this chapter). 我有四个个 (wrong measure word) 马, 五个 (wrong measure word) 鱼. ‘I have four horses and five fish’ is typical of mistakes made by the majority of students (12 out of 17 students in one task) during this overgeneralisation phase. The measure word 匹 should be used when counting horses and 条 for fish. In these instances, a measure word was used in the right position (between a number and a noun), but the measure word itself was not the appropriate one. Nevertheless, the fact that the

students showed awareness that a measure word was essential indicated that students had acquired a limited knowledge of the measure-word form.

More noticing and awareness-raising activities specifically targeting the association between the types of measure words with their appropriate noun were conducted. According to cognitive theory, noticing and awareness-raising activities impact on transfer of knowledge from students' working memory to their long-term memory. At this point in the FFI intervention, the majority of students (11 out of 17) appeared apprehensive about using the measure-word form, as was demonstrated in the week 4 classroom assessment. Sometimes students would stop at the measure word and hesitate, unsure of themselves and looking for the teacher's help to find the right measure word to use. Despite the repetition, noticing and awareness-raising activities that the teacher conducted throughout the FFI sessions, this problem persisted for three to four sessions during this phase which, at the time, raised some doubts as to whether the FFI interventions were making much difference.

In investigating the causes of this language stabilisation, cognitive theory on input and intake provides us with some explanation. According to Ellis (2001), enhanced input is the first phase of FFI, where enriched input or input flood is used to elicit incidental acquisition of L2, with learning taking place incidentally to the process of focusing on meaning. Consciousness of both the implicitness and explicitness of the input is central in cognitive linguistics. Methods that increase the chance for noticing can provide many L2 exemplars for learners to pay attention to. However, as Paradis noted, "rules are not the target of noticing" (2009, p. 55). Hence input does not equate to intake. In this research, although manipulated input and awareness-raising methods initiated the cognitive process, by themselves these approaches were insufficient to complete the acquisition process. Hence, before

students were provided with opportunities to practice the measure-word form, the majority of students' progress appeared to stop at the second phase of the internalisation process. Thus, the provision of opportunities for practice was crucial for students to move on from the generalisation phase. As controlled practice is aimed at encouraging use of the target grammar feature in L2 productions during a communicative process, it serves to assist the gradual transformation from input to intake. Skehan (1998) explained that enhanced input through noticing activities in the form of instructions (increased frequency, salience), and focused tasks (tasks that place demands on students' knowledge-processing capabilities), should effectively assist learners in grammar acquisition.

Restructuring phase

It was at this point of the intervention that controlled practice, combined with opportunities for language production, became important while at the same time feedback continued to be provided to raise students' awareness of the need for measure words during student-teacher interactions. Drawing from the observational and assessment data, in this research form practice was found to be effective in building students' skills in target form application. This process entailed many activities and exercises designed specifically for students to practise the use of measure words in a communicative context (Chapter Five refers). Exercises included phrase making, reading and writing in mathematics, singing and language games with measure words as a core component, all of which combined to build students' procedural knowledge in the third phase—'restructuring' the grammatical concept. Ortega explains this phase of learning as 'restructuring' where learners self-correct by organising their grammatical knowledge themselves (Chapter Two refers). During this phase, most students reached a point where they were able to regulate themselves in

their expression, making corrections and adjustments to their Chinese production by applying their learnt knowledge in practice (Table 6.1, column 3 refers). By the end of this phase, the majority of students were generally able to apply different measure words to suit the noun in question, rather than using just one measure word in all circumstances.

The U-shaped phase

While most of the student participants in the study progressed beyond the third phase, many only did so after going through the ‘U-shaped’ process (Ortega, 2009). For these students this ‘U-shaped’ phase is part of the restructuring process where their learning progress seems to encounter some resistance; something that typically happens during the late stage of acquisition. Following this, it is also usually observed that the acquisition process reaches its final phase of error-free accuracy.

In the process of knowledge restructuring, learners may experience an apparent decline in their L2 proficiency. For example during the early stage of learning a new grammatical component, students would be exposed to simplified grammatical concepts. At this point learners’ accuracy may be relatively good (Ke, et al., 2012). However, as the developmental stage moved forward, the cognitive load is increased by they need to compare this knowledge of simplified concepts with new and more complex information on the target form. In forcing learners to restructure their knowledge and make more complex choices in their language productions, learners are likely to experience a set-back in their accuracy. However with continued teaching input and opportunities to practise the target form, the temporary destabilisation invariably subsides as learners become much more accurate in their use of the target form.

During weeks 8 and 9 of the classroom observation, some students seemed to regress in their Chinese measure word production skills, as evidenced by pausing between words and hesitation in completing sentences and, less frequently, by using the wrong measure word or omitting the measure word altogether. Nevertheless, analysis of the data, subsequently backed-up by teacher Ellie's reflections, these patterns of behaviour are indicative of students taking positive and significant steps towards internalisation of the measure-word form and demonstrating that their application skills are progressing towards the automatic phase. The pauses, mistakes and frustrations are indicative of students who are aware of the measure-word form but are struggling to find the correct form to use in their L2 production; an essential step for many students before they reach the final phase of language transformation, where they successfully transfer their knowledge from short-term memory to long-term memory (Shiffrin & Schneider, 1977). This conclusion was able to be drawn on analysis of classroom observation data and assessment results. The levels of accuracy (and inaccuracy) exhibited by students in their measure-word production during this phase is qualitatively different from that which was exhibited during the first phase, whereas students were sometimes able to produce correct forms in the early phase of interlanguage development, a strong element of chance and guesswork was involved. In contrast, the errors apparent during this phase will have largely disappeared by the end of the 'U-shaped' phase, because at this point students have achieved competence and skill in the use of the target form (Refer to Table 6.1, columns 4 and 5).

The four phases of the language internalisation process evident from the observation data served to reinforce Lyster's (2004) finding that, firstly FFI provides noticing and awareness of the target form sufficient to conceptualise and understand how it differs from their first language, and secondly it provides written and verbal

production opportunities where students are progressively able to proceduralise their knowledge with improved accuracy over time.

Improvement in students' internalisation of the measure-word form was evident in their production and comprehension capacity over weeks 5 to 6 of the FFI implementation period, which included designed activities in the language sessions and controlled practice during mathematics lessons as discussed in detail in the data collection section. In part, this was also evident in the results of post-assessments/term assessment tasks and delayed post-assessment (for assessment results refer to Tables 6.1 & 6.2), both of which combined mathematics problem solving tasks with a focus on the target grammar form. Improved comprehension and grammatical judgment in both controlled and spontaneous productions were observed and confirmed by significant gains. The immersion mathematics teacher Ellie also indicated in her interview responses that she observed increased control over time in student usage of the measure words: "I could really see the improvement [in the students' performance]. In the beginning they don't know how to use it [measure words]. Gradually they can use them [measure words], although sometimes [they] may not use the correct one [for use with an associated noun]. But the important thing is they know that between a number and a noun you need to put a measure word in" (Ellie, 2013).

Drawing all this together, Paradis in his statement concluded "that if a cue in L2 is not noticed, it will not be tallied by implicit acquisition through use thereafter. To be tallied, something must be used. The underlying structure of what is used is what is internalised" (Paradis, 2009, p. 53). Skehan (1998) also affirmed the roles of "input, central processing and output process" (p. 61) in L2 learning. The current research realised that noticing the input is a crucial step as it elicits the next step in

central processing (rule-based and exemplars). In teaching the measure-word form, a set of pedagogical choices was made upon the FFI framework in attaining the following three goals: introducing the rules; practising the rules to generate understanding; and developing learnt knowledge to the point where it becomes a practical skill. Each goal may serve different learning objectives and may be applied in different phases of language development. Classroom exercises, focused tasks and feedback are all useful in assisting a student to access their memory of L2 items (DeKeyser, 1998, 2001). FFI contributes to transferring knowledge of correct grammar into students' long-term memory and to supporting automatic use of the target feature. Paradis (2001) describes this process as follows:

Proceduralisation could not refer to the transformation of particular explicitly known rules into implicit computational procedures, but only to the gradual replacement of the use of explicit knowledge in constructing sentences by the use of the implicit competence newly (and independently) acquired through repeated use, allowing the speaker to automatically generate sentences. (p. 16)

Hence, the fact that students performed significantly better in their measure-word usage in post-assessments than they did at the commencement of this research (according to observation data and demonstrated in pre-assessment and classroom exercise results) confirms that the improvements occurred during the period of the research intervention.

6.4 Analysis of Students' Pre, During and Post-Assessments Results in Chinese Measure-Word Production

This section begins with a short discussion of the importance of using assessment results, a description of the assessment/test data collected for this research and how those data were assessed and interpreted. This is followed by analysis and discussion of the assessment data.

In measuring the efficacy of FFI in assisting students to improve their accuracy in the target grammatical form, acquisition was assessed by measuring students' levels of control over the target form, and changes in their performance over time. Thus the efficacy of FFI can be judged by comparing pre and post-assessment results, as affirmed by Ellis (2006). It is necessary to emphasise the importance more generally of using assessment results in applied research, as assessment/test data are crucial to investigating FFI teaching practice and evaluating its impact on student learning outcomes. Researchers and teachers routinely take note of data from student assessment results as this can then inform further improvements in their teaching practice. Assessments, both formative and summative, were an important part of the research and the FFI teaching process by monitoring students' development over time and making adaptive changes as appropriate, while at the same time providing a measure of the value (or efficacy) of the teaching process. As this FFI research took place during mathematics lessons, augmented by only a limited amount of teaching the measure word form during language classes, it is relatively safe to assume that any improvement in students' measure-word assessment results are attributable to the FFI intervention.

In terms of the intention to measure the efficacy of FFI intervention comprehensively, multiple testing methods were used to reflect students' content and

language acquisition. Formative assessments used in evaluating students' progress under the FFI pedagogy included focused observation of classroom interactions and both written and oral classroom exercises. Assessment data were collected via grammar-isolated tasks; classroom teacher and student interactions while working through mathematics questions; and writing tasks entailing expression of 'number + measure word + noun' phrases and solving mathematics questions in writing. Classroom assessment results were analysed to verify improvements in students' levels of accuracy in use of the measure-word form, and their levels of control and skill in applying the target form.

The assessment result data were first analysed by calculating the average class score in each assessment which provided a generalised picture of the accuracy of students' performance overall. Means were also used to compare relative changes in the performance of individual student participants between assessments; these data show a general trend in accuracy development over the research period. While means can be a useful measure, their use can sometimes be deceptive, especially when extreme scores distort the results. For example, one or more extremely high or low scores can skew the mean up or down, and in these cases the mean may not be the best way to accurately represent overall class performance or changes in class performance over time. Therefore, standard deviations are presented as part of the descriptive statistics, as the use of means fails provide a sufficiently robust representation of assessment results. Assessment data are presented in the Table 6.2.

Individual and collective pre and post-assessments results were used to quantify changes in students' proficiency levels in the target measure-word feature over time, and the differences in these changed accuracy levels between individual students. Table 6.2, below, details the progressive assessment results for each student

over time, and mean scores across the student group. As such the table tracks the individual and collective progress of the student participant group in acquiring the measure-word form, as measured over time through both summative assessments.

It is important to note that the degree of difficulty (in terms of competency in the measure-word form) of each assessment over the pre-assessment to post-assessment period also increased gradually over time. In other words, as the assessments were designed primarily to assess student progress over time, the questions employed in each assessment became progressively more difficult. So, rather than assessing students at each point of the intervention against a single performance benchmark, the bar was raised a little at each assessment point. Thus the improvement shown in students' assessment results over time is likely to serve as an under-representation of the actual improvement in student measure word acquisition.

Table 6.2 Quantitative Record of Students’ Measure Word (*mw*) Usage Assessment Results

	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
17students	Week 1 Pre-assessment (observation) 8 points in total	Week 4 classroom exercise (English to Chinese) 15 points in total	Week 8 Post-assessment/ EoT* assessment mathematics oral presentation	Week 9 classroom exercise (Chinese to English) 15 points in total	Week 10 Post-test/EoT* assessment 14 points in total	Week 10 EoT* immersion mathematics assessment 16 points in total	Term 4 Delayed post-assessment (6 months after the FFI intervention) 6 points in total
Name	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
	Speaking	Writing	Speaking	Reading Comprehension and Writing	Writing	Reading Comprehension and Writing	Writing
Clair	3/8, 38%	11/15, 73%	B	14/15, 93%	10/14, 71%	15/16, 93%	5/6, 83%
Susan	4/8, 50%	14/15, 93%	A	15/15, 100%	13/14, 92%	16/16, 100%	5/6, 83%
John	3/8, 38%	14/15, 93%	B	14/15, 93%	14/14, 100%	16/16, 100%	5/6, 83%
George	3/8, 38%	13/15, 86%	C	14/15, 93%	13/14, 92%	13/16, 81%	4/6, 66%
William	3/8, 38%	14/15, 93%	A	14/15, 93%	13/14, 92%	13/16, 81%	6/6, 100%
Peter	3/8, 38%	13/15, 86%	B	13/15, 86%	8/14, 57%	15/16, 93%	5/6, 83%
Emily	2/8, 25%	14/15, 93%	B	15/15, 100%	14/14, 100%	12/16, 75%	5/6, 83%
Rebecca	2/8, 25%	0/15, 0%	C	12/15, 80%	7 /14, 50%	11/16, 68%	4/6, 66%
Louise	3/8, 38%	3/15, 20%	C	14/15, 93%	11/14, 78%	15/16, 93%	5/6, 88%

Fiona	2/8, 25%	4/15, 26%	C	Absent*	8/14, 57%	14/16, 87%	3/6, 50%
Kate	0/8, 0%	2 /15, 13%	D	9/15, 60%	7/14, 50%	11/16, 68%	4/6, 66%
James	1/8, 13%	0/15, 0%	C	9/15, 60%	13/14, 92%	14/16, 87%	4/6, 66%
Paul	4/8, 50%	2/15, 13%	A	Absent*	12/14, 85%	16/16, 100%	6/6, 100%
Tim	3/8, 38%	1/15, 6%	C	12/15, 80%	9/14, 62%	8/16, 50%	5/6, 83%
Robert	4/8, 50%	13/15, 86%	B	13/15, 86%	9/14, 62%	12/16, 75%	5/6, 83%
Amanda	5/8, 62%	14/15, 93%	A	Absent*	11 /14, 78%	16/16, 100%	6/6, 100%
Rose	4/8, 50%	6 /15, 40%	A,	15/15, 100%	14/14, 100 %	16/16, 100%	5/6, 83%
Mean	36%	54%	65%	87%	78%	85%	80%
S.D	0.14	0.38		0.13	0.18	0.14	0.13

Note: *EoT: end of term. *Absent: Some students participated in a school athletic competition and missed the assessment on the day. This table summarises students' performance in phased measure word assessments, as sourced from recorded assessment data.

At the start of the research process, students demonstrated only limited knowledge of the target form and in some cases, no knowledge whatsoever. Classroom observations and pre-assessment answers in response to eight basic measure-word application questions, undertaken before the commencement of the research, provided verification of this fact, with the mean pre-assessment performance in the application of measure words in results measured at 36 percent (Refers to Table 6.2, column 1).

After four sessions of teaching measure words through mathematics, an exercise sheet was subsequently given to students to complete during their Chinese language lessons in week 4. The task duration was 30 minutes. The exercise was a paragraph of 15 short sentences, listing a number of siblings, animals and books that a person possesses. The purpose of this exercise was to check for progress in measure-word acquisition, noting that the complexity of the sentences and vocabulary was relatively simple. The paragraph was formatted as a list, thereby making it easier for the researcher to observe the pattern of students' measure-word acquisition in marking their work (Appendix J refers).

An example of a section of this exercise follows.

Assessment instructions: please write these sentences in Chinese (It is preferable to complete the writing in Chinese characters as much as you can, however Pinyin is acceptable)

I have seven people in my family.

I have my Mum and Dad,

two elder sisters and

one younger brother.

I also have two dogs,

three cats,
eight gold fish,
sixty-nine sheep and
seven dragons.

I eat an apple every day...

This exercise provided some interesting and unexpected results, refer to Table 6.2, column 2, week 4 results.

The mean of 54 percent was achieved by the class. Out of 17 worksheets, five students made only one error, and four students made between two and four errors out of 15 measure words required across the worksheet. The remaining eight students missed between nine and 15 measure words. More specifically, John, William, Susan, Emily and Amanda got 14 measure words out of 15 correct. George, Peter, and Robert got 13 out of 15 correct. Clair missed four measure words; Rose missed nine; Fiona missed 11; Louise missed 12; Kate and Paul missed 13; Tim missed 14; and James and Rebecca did not get any measure words correct.

The result of the exercise showed that nine out of 17 students performed better than they did in their pre-assessment, having acquired the knowledge of measure words as well as the ability to apply them in Chinese production tasks correctly and competently. However, the other half of the class did not do so well in their measure word exercise.

Subsequently, in the 30-minute phrase-making competition in week 5, as discussed in Chapter Five, the group with William, Susan, George and Emily received the top score with 21 points out of 25. The group comprising Amanda, Louise, Fiona and Kate group were next with 20 points. Clair, Peter and Rose scored 19, Paul, Rebecca and Robert's group got 18 and the group with John, Tim, and James got 16

points. An example of a completed sheet is included in the Appendix section, (Appendix Q).

In week 9, a grammatical exercise sheet of 15 questions in Chinese was given to students to translate into English during a Chinese language lesson, where students were asked to highlight/underline the measure word in each phrase. Fifteen marks in total with one mark each for correctly highlighting the measure word and for correct translation. Questions were designed mainly using vocabulary familiar to students, yet covering many common measure words that were the main focus of the exercise. A section of this exercise is described below as follows (further detail can be found in Appendix M):

Questions:	Answers:
1. 二十五个学 生	25 students
2. 八间教室	8 classrooms
3. 十九个班	19 classes
4. 四百个学校	400 schools
5. 六个朋友	6 friends
6. 九节课	9 lessons
7. 十个老师	10 teachers
8. 八个学科	8 subjects

All students in this exercise performed significantly higher than their past measure word tasks in accuracy. Three students were unable to undertake the exercise (as they were competing in a district athletics competition). Four out 14 students got all (15/15) questions correct; five students made one mistake; and one student made two mistakes. Subsequently, two students made three errors and two student made

four errors. Rebecca and Kate highlighted most of the measure words correctly; however, Rebecca made four mistakes in her translation and had two marks taken off. Kate did not complete the comprehension part, so she lost six marks. Despite the mistakes that some students made, students achieved a mean of 87 percent accuracy in this task (Table 6.2, column 4, refers), an improvement of 33 percent compared with the week 4 assessment, and a 51 percent improvement on the pre-FFI assessment. Furthermore, the majority of students completed the highlighting/underlining measure word section of the task without any mistakes, demonstrating that they all attained the knowledge of positioning the measure word correctly. By comparison, more mistakes were made in the translation part of the task than in the measure word part.

In the last weeks of Term 2 (weeks 8, 9 and 10) MIP days were used to complete the assessment tasks (as discussed previously). Oral presentations in mathematics were completed in week 8, which left written assessments to be completed by students in week 9. Relevant sections of the end-of-term assessment tasks are provided below, followed by a detailed analysis of the assessment outcomes.

In Part A of their end-of-term (EoT) MIP Assessments (refer to Appendix I), students were required to demonstrate their understanding and acquisition in mathematics in an oral presentation. Each student worked by her/himself to create a mathematics question and was then required to present the question orally, explaining both the procedure and the answer to the question in Chinese to the class. Such mathematics questions had been taught repetitively by the teacher during the term, with work examples and task requirements previously shown to students on the whiteboard. While most students were confident in completing the task, they tended to be more nervous when presenting their work in front of the class. The achievement criteria were focused on their level of understanding of the fundamental concept and

their application of division in practice. In addition, Chinese speaking proficiency and competency, especially the use of Chinese grammar (measure words) were also emphasised in this assessment.

William's speech was transcribed as follows:

学校图书馆买了两千三百一十二 本 中文书，分给 8 个 班，每个班有几 本 书？

(School library bought 2312 Chinese books, giving them equally to 8 classes, how many books each class will get?)

2312 除以 8 等于多少？ (What is the result of 2312 divided by 8?)

$$8 \overline{)2312}$$

每个班有 289 本 书。 (Each class gets 289 books.)

Part B: In the Chinese language writing assessment, an essay of “我-Myself” is translated from English to Chinese by the students (Appendix G).

中文考试 (Chinese Exam)

Assessment instructions: Please write the following paragraphs in Chinese. (It is preferable to complete the writing in Chinese characters as much as you can, however pinyin is acceptable)

Today is Thursday the 27th of June 2013.

My name is _____; I am ___ years old. I am in ___th grade. I live in Canberra and I go to Canberra Primary School. I have seven people in my family: two sisters, one older brother and one younger brother, me and my Mum and Dad. I also have three sheep and one dog. I have 200 friends.

In my school we have one library, two school halls, six teachers' offices, three thousands five hundred and sixty two books, twenty classrooms and twelve classes. Each class has twenty-four students in average.

This year I am learning eight subjects: Mathematics, Science, Chinese, English, Sport, History, Geography and Chemistry. Every Friday we have our School Assembly. My favourite subject is Science. Because (of) I learn Chinese, so that I can learn mathematics in Chinese. I can do addition, subtraction, multiplication and division in Chinese. I also can sing "1001 wishes" and "Mouse Loves Rice" in Chinese.

I love sport. I go swimming every Tuesdays and play basketball every Friday afternoon.

I can speak English, French, Spanish and Chinese. I like to learn Chinese and I like my teachers and students. I love my school.

– End of the Assessment –

(Chinese vocabulary required to complete this writing task was all sourced from within their MIP learning experience, with a particular focus on words learnt through the term. Grammatical elements of measure words were essential to expressing the text correctly.)

Part C: This third part comprised a sheet of division questions designed to assess students' understanding of division, their problem solving skills in division, and their Chinese comprehension skills (detail can be found in Appendix H). A sample of the questions from each section of the assessment are included below:

Section 1:

三十除以五 等于多少? Translation: what is the result of 30 divided by 5?

2322 除以 9 等于多少? Translation: what is the result of 2322 divided by 9?

Section 2:

$$8 \overline{)72}$$

$$8 \overline{)392} \text{ (only for Year 6 students, extension question for Year 5s)}$$

Section 3:

sì běn kē xué shū jiǔ shí èr kuài qián yī běn duō shǎo kuàiqián
四 本 科 学 书 九 十 二 块 钱 ， 一 本 多 少 块 钱 ？

Translation: 4 science books cost 92 Yuan, how much is for each book?

fǎ yǔ shū yī běn xiǎo hóng yǒu 85 kuài qián tā néng mǎi jǐ běn fǎ yǔ shū
法 语 书 19 一 本 ， 小 红 有 85 块 钱 ， 她 能 买 几 本 法 语 书 ？

Translation: French books are 19 Yuan each, Xiao Hong has 85 Yuan, and how many books can she buy?

Section 4: Year 6 students only, extension questions for year 5 students

26) $\overline{2028}$

xiǎo míng jīn nián kǎo shì kǎo dé hěn hǎo tā shù xué dé le bā shí jiǔ fēn yīng yǔ dé
小明今年考试考得很好，他数学得了八十九分，英语得

le jiǔ shí fēn wù lǐ qī shí liù fēn huà xué qī shí èr fēn zhōng wén bā shí sān fēn ,
了九十分，物理七十六分，化学七十二分，中文八十三分，

tǐ yù jiǔ shí wǔ fēn dì lǐ bā shí sì fēn xiǎo míng de píng jūn fēn shì duō shǎo tā
体育九十五分，地理八十四分，小明的平均分是多少？他

nǎ mén kè kǎo dé zuì hǎo nǎ mén kè kǎo dé zuì chà
哪门课考得最好？哪门课考得最差？

[Translation: Xiao Ming has done well in his exams this year, he got 89 (marks) for mathematics, 90 for English, 76 for Physics, 72 for Chemistry, Chinese is 83, PE is 95 and he got 84 for Geography. What is Xiao Ming's average mark? And which subject is his best and which one he got the lowest mark?]

– End of the assessment –

As discussed previously, post assessments (including end of research/end of Term 2 assessments) comprised three components as follows: (1) mathematics operational skills and comprehension, plus mathematics problem solving; (2) a Chinese language component; and (3) a mathematics presentation. All questions were in Chinese, with PinYin provided for some words to decrease cognitive load and make them easier for students to comprehend. Production of the measure-word form was a required element of production in all three components (further detail is provided in Chapter Five). In relation to mathematics content, the assessments covered strategies for division and problem solving. Across all post-assessments, students recorded strong results in terms of measure-word acquisition when compared

against the pre-assessment outcomes. Students' positive results are assumed to be an indication of FFI's impact on proficiency in their Chinese language production skills.

For Year 6 students, as noted in the assessment results, all students gained accuracy scores above 50 percent, with Amanda, Paul and Rose scoring the highest. The mean score for Year 6 students was 85 percent. Among Year 5 students, the mean score was 86 percent, noting that two students (John and Susan) scored 100 percent, three students (William, Louise and Clair) scored 93 percent and, at the other extreme, one student (Tim) scoring 50 percent. Overall the combined mean accuracy score for Year 5 and 6 students was 85 percent (refers to Table 6.3, column 6 for further detail).

In the end-of-term Chinese language assessment component (Table 6.3, column 5), students were required to complete a Chinese writing task that entailed correct use of the target measure word 14 times over the course of a 50-minute assessment. Significantly, eight students achieved above 80 percent accuracy in their measure words usage. At the other extreme, two students (Kate and Rebecca) failed to include seven measure words (out of 14) in their written production, and also experienced similar difficulties in their verbal expression. Overall, the results of this assessment demonstrated a 42 percent increase over the pre-intervention assessment.

All students found the mathematics presentation component (Table 6.2, column 3 and Table 6.3) of the post-test to be challenging, as they indicated in the interview (as discussed in Chapter Five, section 5.3.4). It combined both mathematical and Chinese comprehension and, most importantly, Chinese oral production. Overall, those students who are more confident in public speaking produced better outcomes than those students who typically feel anxious when making oral presentations to the class. William and Susan indicated "it was easy for us, because we are good at Chinese and mathematics" (post-intervention interview

data). However, Kate found the hardest part of the assessments was the mathematics presentation component: “It was very hard, because it makes my brain hurt.” Susan, William, Paul, Amanda and Rose scored highest overall, reflecting their high L2 competency and proficiency (and specific skills in measure word application), their mathematics problem-solving skills and their confidence in oral presentation.

Analysis of this observed oral presentation data is important in demonstrating student participants’ progress in applying measure word to communicative language tasks.

For the purpose of this research, scores for the correct application of measure words in student oral presentations were rated with an A to E grade proficiency system.

Table 6.3 Student Participants’ Measure Word Accuracy Demonstrated in Mathematics Oral Assessment Scores as Tested at Week 8

	A	B	C	D
Percentage of accuracy	90% –100%	75% – 89%	55% – 74%	Below 55%
Numbers of students	5	5	6	1

Note: Distribution of students FFI accuracy achievements in their mathematics oral presentation.

Finally, a delayed post-assessment as part of the end-of-year assessment (refer to Table 6.2, column 7). The assessment (assessment/test paper provided at Appendix N) was also conducted during Term 4, six months after completion of the FFI intervention. In the end-of-year assessment, a writing component required students to produce a piece of writing. In detail, the writing asked students to write a recount on their trip to Shang Hai University, in which they needed to express the number of libraries, classrooms, swimming pools and basketball courts and football courts. Hence, six correctly applied measure words were required to complete the piece correctly. In contrast with the pre-intervention assessment, the delayed post-assessment/ end-of-year writing test results showed that the majority of the students had a high level of retained awareness of, and proficiency in, the measure-word form. Here, a mean score of 80 percent represented a 39 percent increase on the mean pre-intervention assessment score.

Further, speaking and writing data from the ‘delayed post-assessment’ were also compared. In speaking, the 36 percent (column 1) accuracy result in the pre-assessment improved to above 65 percent (column 3) on average in week 8. In the writing production in week 4, students scored 54 percent (column 2) accuracy which improved to 78 percent (column 5) in week 10 and 80 percent (column 7) in the post-assessment accuracy.

Overall, the validated trend indicated from the individual and mean scores of all assessment tasks show that to varying extents, all 17 students made strong and relatively consistent progress over time in understanding the measure-word form, and in correctly applying their knowledge to production in at least two consecutive post and delayed post-assessments (as recommended by Ellis, 2006. Table 2.1, refers).

A frequency distribution (Stringer, 2008, p. 107) analysis of students' assessment results was also undertaken to further measure improvements made by students in correctly applying measure words to their productions. Table 6.4, below, compares the distribution of students' measure word assessment scores between the first (pre-intervention) and last (delayed post-intervention) assessments.

Table 6.4 Frequency of Student Participants' Achievements Pre and Post FFI Intervention

Pre-research assessment results		Delayed post-assessment results	
Score	No. of students	Score	No. of students
0% - 9%	1	0% - 19%	0
10% - 19%	1	10% - 19%	0
20% - 29%	3	20% - 29%	0
30% - 39%	7	30% - 39%	0
40% - 49%	0	40% - 49%	0
50% - 59%	4	50% - 59%	1
60% - 69%	1	60% - 69%	4
70% - 79%	0	70% - 79%	0
80% - 89%	0	80% - 89%	9
90% - 99%	0	90% - 99%	3
Mean pre-assessment score	36%	Mean delayed post-assessment score	80%

Note: Comparison of student participants' measure word assessment scores over time.

As evidenced above, students' improvement in their Chinese measure word productions pre, during and post the FFI intervention was shown by an overall improvement in mean assessment scores from 36 percent (pre-intervention) to 80 percent (delayed post-intervention), representing a convincing outcome indeed. Improvements in both confidence and accuracy were observed in students' measure-word tasks. Moreover, data on students' production were examined for their skills in applying the target form competently, simultaneously and in a range of different situations. Learning mathematics through immersion Chinese (complemented with three, 40-minutes language arts lessons) ensured that the majority of linguistic acquisition activities were of a communicative nature, as the target language is the primary medium for instruction. In this context, the FFI intervention provided ample opportunities for contextualised learning and application of the target form. Thus FFI as a pedagogical intervention brings students' focus on form naturally, "rather than artificially" (Skehan, 1998, p. 40).

Moreover, the language exercises conducted in language arts lessons enabled students to produce the target form repetitively. This way the measure words were acquired in chunks of sentences. Such chunks of language stored in students' long-term memory and is ready for accessing easily. It frees up the time and memory load for knowledge processing (Skehan, 1998; Sweller, 1988). Students' post-assessment results are strongly indicative of sustained and satisfactory improvements in both oral and written production of the target measure-word form, and in a range of different contexts.

The question of whether the FFI framework has facilitated students' measure word acquisition with increased accuracy is examined. Both the post-assessment (end-of-term assessments) and the delayed post-assessment results demonstrate that

very strong and enduring gains in Chinese grammar acquisition were achieved by the student participants in the target measure-word form. At the same time the learning outcomes in mathematics division (short and long) were realised as expected across the group of student participants.

Therefore the study results appear to confirm that the FFI intervention was successful in supporting acquisition of the target measure-word form by the student participant group. The process of transformation from declarative knowledge to procedural knowledge was completed for the clear majority of students, with approximately 71 percent of students scoring over 80 percent accuracy in the delayed post-assessment.

6.5 Assessment of Potential Detrimental Effects on Mathematics Learning

The possibility that the FFI intervention may have had a negative impact on students' mathematics learning (by distracting students from the mathematics content of the lessons, for example) could not be discounted. While the initial design of the FFI intervention was based on the principle of maintaining the content focus of the mathematics classroom, it is nonetheless crucial to ensure that mathematics teaching and learning was not compromised as a result. In evaluation of students' performance, the overall mathematics assessments results did not serve to provide any evidence that the FFI intervention and its grammatical focus had any negative consequences for mathematics learning. On the contrary, the objectives set for mathematics learning were effectively attained. Table 6.5, below, sets out the mathematics results before and after the FFI intervention. As shown in Table 6.5, no detrimental effect on students' mathematics learning outcomes that might be attributable to the FFI intervention was able to be discerned.

Table 6.5 Research Student Participants' Pre- and Post-FFI Mathematics Grades

Students (17 students in Year 5/6 MIP class)	Age	Mathematics results prior to the research (end of year 2012)	Mathematics results post-research (end of Semester 1, 2013)
Year 5			
Claire	10	C	C
Susan	11	A	A
John	10	A	A
George	10	B	B
William	10	B	A
Peter	10	C	C
Emily	10	C	C
Rebecca	10	D	C
Louise	10	B	B
Fiona	10	C	C
Kate	10	C	C
James	10	C	C
Year 6			
Paul	11	A	A
Tim	11	B	B
Robert	11	D	C
Amanda	11	A	A
Rose	10	B	B

Note: This table illustrates students' performances in their mathematics assessment results pre- and post-intervention. While results indicate that all students improved or maintained their mathematics grade levels through the FFI intervention period, it is acknowledged that assessment scores are not in themselves sufficient to provide a comprehensive representation of mathematics learning outcomes. It is also noted that analysis of student participants' mathematics assessment results was not the aim of this study.

6.6 Chapter Summary

This chapter investigates the impact of FFI on students' measure-word acquisition through the analysis of classroom observational data and assessment results over time. These data were scrutinised and analysed in order to answer the second research question. In addition, students' mathematics assessment results before and after the FFI intervention were compared to examine whether the grammar focus had any negative impact on students' content learning.

Analysis of qualitative and quantitative data strongly supports the research hypothesis that the application of FFI to a Chinese immersion context will have a demonstrably positive impact on acquisition of the target measure-word form.

CHAPTER SEVEN – RESEARCH FINDINGS DISCUSSION, RECOMMENDATIONS AND CONCLUSIONS

7.1 Introduction

Following-on from the data analysis chapters (Chapters 4, 5 and 6), this chapter further discusses the insights and experiences derived from this project and its focus on Chinese grammar teaching and acquisition. It also discusses the connection between the contextual variables (refer to discussion of question one in Chapter Four) and the outcomes of this research (refer to discussion of research questions two and three in Chapters Five and Six). Furthermore, this chapter affirms the potential role of FFI in an Australian Chinese immersion teaching and learning context, and proposes practical techniques and pedagogical methods in this regard. It makes recommendations for improving the design and practice of Chinese grammar teaching in content-based programs. Also discussed is whether the grammatical focus of the intervention had a negative impact on mathematics content learning.

7.2 Discussion of Research Findings

This section discusses the positive contribution of the FFI intervention to measure-word acquisition by participating students, the key findings related to the operationalisation of FFI, and the challenges faced in seeking to integrate and operationalise FFI in Chinese immersion education. The effect of the intervention on students' mathematics learning outcomes is also briefly discussed.

In his summary of FFI experimental studies, Ellis (2001) concluded that despite some mixed results (e.g., some unclear and unsustainable gains were found for certain linguistic features), generally “these experimental studies did show that

grammatical form was amenable to instruction, especially if the learners were developmentally ready to acquire the targeted structure, and also that these effects were often durable” (p. 6). The key finding from this research is consistent with Ellis’ affirmations.

In analysing the data from this research, (and noting the specific challenges associated with learning Chinese as a second language as discussed in section 2.6 of the Literature Review chapter), the results support the conclusion that noticing, raising-awareness and production practice can help learners process their knowledge from declarative to procedural, consistent with both cognitive theory and the central research hypothesis: in a Chinese immersion context, the FFI intervention was effective in assisting L2 Chinese learners to attain the target measure-word form, thereby improving their grammatical accuracy and proficiency. All student participants gained at least some degree of improvement in their understanding and practical application of the measure-word form as a direct result of the FFI research process, with many students showing significant improvements. In this regard it is important to note that the measure-word form is generally regarded as difficult to learn, as there is so little similarity with forms in European languages and the concept of measure words is difficult for English-speaking students to grasp. Furthermore some measure words do not add meaning to sentences—a characteristic shared by, for example, the concept of words having gender in Spanish and French. This further adds to the difficulties faced by learners, especially novice learners of Chinese. These considerations may serve to reinforce the significance of the research findings.

The abovementioned finding—that the FFI intervention proved effective in improving students’ accuracy and proficiency in the measure-word form—was supported both by observational data and by comparing initial assessment results of

students' measure-word proficiency with the post-assessment and delayed post-assessment results, which revealed significant and sustained progress attained by the student participant group. By the end of Term 2, the majority of students demonstrated that they had attained proficiency in relation to both the structure of 'number + measure word + noun' and the application of measure words in communication. Repeated measurement of student performance, including analysis of student class work, assessment results and student and teacher reflections, confirmed conclusively that the students' measure-word acquisition did benefit from FFI, with observed learning outcomes evident in an assessment that took place six months after the intervention.

The FFI intervention successfully addressed some persistent grammatical deficiencies previously evident in the Chinese immersion class. Furthermore, as evidenced by the delayed post-assessment six months after the FFI intervention, proficiency in the target form improved consistently and over a relatively sustained period (six months), with the majority of students showing steady improvement. While it was not possible within the confines of this study to undertake a longitudinal analysis of these learning outcomes over a longer time span, students' capability in the measure-word form, as evidenced particularly through production of the form in interactive speech and in writing by the majority of students, suggests that the learning outcomes were of a reasonably enduring nature.

Moreover, background and contextual factors relevant to this research site had significant impact on the FFI intervention design and learning outcomes, as discussed in relation research question one in Chapter Four. Some of these factors were conducive to the positive outcomes of the research. For example, the fact that families and the school value the importance of second language learning ensured

encouragement and support in their children's academic progress. Students who enrol in the immersion classes are typically quite motivated and focused, and this contributes to their positive learning outcomes.

In discussing the research outcomes, another important consideration is whether the integration of FFI has impacted on the effectiveness of mathematics teaching during the intervention period. As discussed in Chapter Six, available data on the overall mathematics learning objectives of the student participant group did not seem to be adversely affected by the FFI intervention, with no evidence that any individual differences in students' pre- and post-intervention mathematics assessment scores could be attributed to the intervention. The researcher's classroom observations confirm that the time spent on FFI interventions and exchanges with students was non-intrusive and kept to a minimum, and that the primary focus of classroom interactions remained on mathematics content. This observation was backed-up by Ellie, the immersion mathematics teacher, whose personal reflection of the exercise was recorded in the researcher's notes as, 'the FFI intervention was not intrusive and did not disrupt my [Ellie] efforts at teaching mathematics content' (Ellie, 2013). From this it can be concluded that the use of implicit and explicit FFI interventions does not compromise the flow and effectiveness of communication on core mathematics content.

Thus the conclusion can be drawn from all assessments that the majority of students achieved the objectives set at the start of the research in both mathematics and Chinese, and that the FFI intervention during immersion mathematics lessons did not compromise mathematics learning outcomes. Hence, by making substantial progress in all measures (Chinese language— new vocabulary, sentences; linguistic competency—measure-word usage; and mathematics—division techniques and

application), most students were able to demonstrate excellent levels of development in the target measure-word form, and most students were able to demonstrate that they had attained the target level of performance. Indeed, the majority students had acquired the measure-word form to the point of competency, confidence and accuracy in their procedural skills. Only three of 17 students continued to require some reminders in production at times after the intervention period. Ultimately, it was notable that evidence of this gain was replicated in the delayed (6-month) post-assessment; an outcome that tends to further confirm the research hypothesis.

A further set of issues concern the operationalisation of FFI in the primary-level Chinese immersion classroom: its implementation, feasibility and practicability. Consistent with cognitive theory, this research found that a balanced set of FFIs comprising noticing, awareness-raising and controlled practice, integrated into the content-teaching process, was practicable (Chapter Five refers). One way of considering this matter is to ask: how do the immersion teacher feel about the integration of an L2 grammatical focus when teaching non-language content? During one of the after-lesson discussions, teacher Ellie (2013) said, “I feel there is not too much of extra effort required once it’s been planned properly”. During the intervention, both the teacher and students readily adapted to the habit of combining a focus on the target measure-word form with their content learning. It also seemed that, throughout the study period, the integration of FFI was not forced, with implicit and explicit interventions taking place quite naturally whenever a student required correction or assistance. Furthermore, once a set of FFIs applicable to a certain form and skills developmental level had been put together and tested, this body of work would be able to be maintained and shared with other teachers in the form of a resource kit for use when designing their programs based on the relevant curriculum.

It is nevertheless important to note that in choosing the most appropriate FFI method, the teacher must make decisions that depend upon the learning situation, such as content, student age group, students' individual and collective learning needs, and classroom time constraints.

Essentially, the research revealed the challenges faced by immersion teachers seeking to add an FFI component to the work load and responsibilities associated with teaching subject content in a second language.

For immersion teachers, the challenges and pressures associated with teaching subject content in a second language are arguably greater than those faced by teachers who teach subject content in more typical (first language) school environments. In this context it should not be assumed that the addition of a grammatical element through FFI to immersion teachers' responsibilities can be undertaken without sufficient training and support for the teacher(s) involved. If this training and support is not provided, the demands and pressures placed on individual staff may increase to the point where staff turnover may increase, which may then adversely affect the continuity of the immersion program and erode its academic results. Thus where an immersion school is looking to introduce a grammatical focus via FFI, adequate planning, preparation and staff training will be important to its success.

In terms of the teacher's responsibilities to provide feedback (e.g., highlighting, prompting and correcting students' grammatical errors), the FFI methodology provides the teacher with a clear focus and a more systematically defined and structured guide to effective intervention. Once FFI planning has been completed for any such intervention, it can be expected that classroom implementation is not at all demanding for teachers. However, the targeted nature of FFI interventions does reinforce the importance of having a considered and

comprehensive lesson plan in place that effectively combines the grammar form and associated FFI strategies with the subject content before teaching commences.

Furthermore, teachers would have expected to make adaptive refinements to their planned approach in the course of implementing it, in order to improve its effectiveness with the student group in question. While in many ways FFI simply reflects what teachers do naturally in their classroom teaching processes to correct errors, the informative and systematic teaching framework that FFI provides to teachers nevertheless demands a methodical approach to its implementation.

Having discussed the key FFI intervention outcomes and the issues and challenges associated with its operationalisation, the following section provides an analysis of those aspects that contributed to the success of this FFI intervention.

7.3 Research Success Factors and Recommendations for FFI Integration in Chinese Immersion Classrooms

The following discussion represents an analysis of elements that contributed the success of the FFI intervention, and makes recommendations for the effective implementation of FFI in similar learning contexts.

The outcomes of the follow-up assessment for long-term (six month) effects of the intervention, where students' productive control over the form were assessed, were positive: the majority students made substantial and lasting gains across all oral and written measures. The results confirm the cognitive hypothesis that FFI could assist declarative knowledge transition process to reach for procedural knowledge. It is clearly evident that, by and large (i.e., for the clear majority of students, in most Chinese production situations), students achieved the transformation from their understanding of measure-word usage to their practical application in both planned

and spontaneous production. Most students demonstrated that they had generalised their understanding of measure words and could subsequently apply this knowledge in other contexts later on. From this research, the researcher was able to conclude that FFI is effective in improving students' measure-word knowledge and application, is feasible, and delivers long-term (at least six months after the classroom FFI implementation) proficiency outcomes for L2 Chinese students.

Elements that contributed to the success of this FFI implementation are summarised in the following sub-sections.

7.3.1 The Importance of Complementing the Theoretical Foundation for the FFI Intervention with Contextual Specifics

This project had a strong theoretical foundation from the start. Cognitive process and Cognitive Load theories informed the research design and intervention at every stage of its development. This fundamental theoretical framework helps to ensure that teaching practice aligns as closely as possible with learners' memory functions and capacity for information processing. Where any problems arise in implementing an intervention of this nature, the theoretical foundation and associated research literature provide explanations for, and solutions to, the problem. For example, when students were overloaded with new vocabulary and grammar concepts while studying mathematics, Cognitive Load theory articulates the problem in terms of the load limitations on student's cognitive functions, suggesting ways to lighten the load through 'chunking'. Learning a second language in chunks avoids this 'overload' problem and helps the brain to retrieve information quickly and easily in communication, as discussed in Chapter Two.

As discussed in Chapter Six, the application of the FFI framework was found to have contributed in a great deal to facilitating measure-word acquisition, especially in the process of transferring knowledge from declarative to procedural.

It is also important to note that the research process considered the contextual and background factors in ways that informed the practical application of FFI to best meet the specific circumstances and needs of the L2 student participants of the Mawson Primary School Chinese immersion program. As language learning is itself a social activity, the social and cultural context in which learning takes place, such as the learners' social identity, social interactions and a range of motivational factors, can all affect language learning (as is given particular emphasis by sociocultural theorists such as Vygotsky, 1978, 1987; & Lantolf, 2000). In addressing research question one, Chapter Four discussed the Mawson Chinese immersion program context in some detail, ranging from student participants' backgrounds to the structure and operation of the program. It demonstrated that the FFI framework and teaching methods were tailored to suit the age of student participants; their predominantly English-speaking backgrounds; and their L2 developmental stage and capacity. For example, the selection and use of written signs and prompts, and of language games, would have differed under different contextual circumstances. Similarly, the fact that the Mawson student participants spend just 2 days per week learning in the target language, with little or no opportunities for speaking Chinese in their remaining 3 days per week at school, required a greater emphasis on production practice than might otherwise have been the case. This additional emphasis on production exercises that made use of the measure-word form was essential for students to familiarise and automatize measure words in production and acquire a degree of proficiency in the target form.

Many other FFI methods employed in this research, including the type of scaffolded inductive feedback used (e.g., models, cues, prompts and hints) and group work activities for collaborative learning were similarly influenced by the L2 acquisition and teaching theories and characteristics of the student participant group. Thus the FFI theoretical framework was adapted to the specifics (linguistic, interactional and cultural) of the Mawson learning environment.

7.3.2 The Importance of Incorporating FFI at the Curriculum Planning Stage

In this research, FFI was incorporated as an integral part of the MIP mathematics learning process from the curriculum planning stage, congruent with the topic and theme of students' learning objectives, and was formally included in the curriculum objectives for the School immersion program. It combined language through learning, language of learning and language for learning (refer to curriculum documents included in Chapter Four, figures 4.1, 4.2 and 4.3). The development of an integrated MIP and mainstream syllabus with explicit outcomes is essential to provide clear objects and reporting criteria, as originally suggested by Scott (2002). As the FFI was planned with the mathematics and language curriculums prior to the implementation period (with adjustments made during implementation), this planning established a clear direction in how the FFI was to operate, the choice of grammatical element and the methods with which FFI was to be applied.

Noting particularly that the grammatical form selected for FFI intervention ought to be tailored within the Zone of Proximal Development (Vygotsky, 1978, 1987) of the student group in question and be presented in ways that minimise cognitive load for students. In L2 acquisition, Zone of Proximal Development (ZPD) relates to the appropriate levels of learners' language capability and proficiency, plus the learnability of the grammar item. Task difficulty and intensity should cater for the

majority group, as well as challenge students in the advanced group and assist struggling group learners (Vygotsky, 1978, 1987).

It seems important to plan FFI interventions with the subject teacher prior to the commencement of each term in order to analyse grammar learning needs and settle on the best pedagogical choices for delivery. It is at this point that the teaching and learning goals and objectives, as well as the assessment criteria for measuring learning outcomes, can be set and confirmed for each term or semester. Also, curriculum documents should preferably be written in a clear and concise format that are easy for teachers to follow. Pedagogical choices and tasks are designed during this stage, where teachers identify the methods used to deliver learning objectives (for example, the classroom teaching approach, activity design).

Thorough consideration of these matters at the planning stage is therefore critical to its success. The inference is made that this research found the more a teacher plans for this dual focus on content and language, the easier it gets in practice.

7.3.3 The Importance of Containing FFI Interventions to One or Two Forms that Closely Relate to Subject Content

This research intervention concentrated on one grammatical element—measure words—which was age and level appropriate to match Year 5 and 6 age primary school students' learning capacities, consistent with advice by Lyster (2006) and Doughty and Williams (1998), that FFI should target one or two grammatical elements at a time, depending on learners' age and capacity and the difficulty of the grammatical form. Clearly, an intervention that targets too many grammatical forms, or employs too many FFI methods at the same time, can overwhelm students' focus (at 10 and 11 years old, as the case in this research) and disrupt the process of teaching core content. Consistent with the objective of ensuring that the measure-

word focus was compatible with the mathematics content and curriculum, observations confirmed that the teacher only corrected measure word mistakes during planned and spontaneous production, and generally ignored other grammatical errors unless crucial to the mathematics task in question, (e.g., the teacher had to explain the word ‘平均’, meaning ‘average or evenly’ in English, otherwise students would not understand the mathematics question). Successful FFI demands that a clear focus be established that can be addressed within the unit of learning and that it is planned from the curriculum planning stage through to its pedagogical application. The choice of linguistic form—the grammar feature—should be based on students’ ability, in line with their age, L2 level and comprehension capacity. FFI becomes part of the classroom interaction so that it flows naturally.

In undertaking this research, I infer that the answers to questions of when, how much and which FFI to use are largely dependent on the specification and situation of each lesson, student needs and teacher’s judgement. It is part of being a teacher to make pedagogical choices and to judge how best to approach each student in their ZPD to maximise scope for positive language learning experiences and learning outcomes. Individual students differ in their cognitive and learning needs: for example, as Susan is a shy student, she was encouraged to stand up and practise her speaking skills, with the teacher prompting her where necessary to maintain the flow of her speech, rather than inserting too many corrections (which tend to disrupt the flow of speech, cause anxiety and lead to more errors). So the teacher may prefer more subtle FFI approaches because a less confident student may not benefit from too many corrections within a short space of time or tackle too many grammar elements. For students where the learning priority is to get the content right, FFI interventions may best be left for later.

Overall, the choice of grammar element to be focused on, and subject content taught in students' L2, should align with students' capabilities in both L2 and the content subject matter, yet still be sufficiently challenging for the students in terms of both language and content.

7.3.4 Effective FFI Methods to this Research

This research found that, under the 'Counterbalanced' (Lyster, 2007) FFI approach, it is desirable that a balanced combination of noticing, awareness-raising and controlled practice are used to complete the language acquisition process from conceptual to procedural knowledge, and from controlled practice to automatic production. Not one method can work exclusively to deliver these outcomes. Planned FFI is an explicit approach where the target grammatical form (or forms) is systematically incorporated, from the curriculum planning stage to classroom FFI delivery process. Some methods are less intrusive to content teaching flow than others. These less intrusive FFI methods include: input flood, recasting students' errors or changing tone of voice (to indicate an error in order to draw a student's attention to it and to correct it), a hand gesture or raised eyebrows, intonational stress by stressing or changing the tone of voice on measure words in the teacher's speech and visual enhancement (where bold, highlight or changed colour are used in written text to emphasise the measure word). On the other hand, those more intrusive or explicit FFI methods (visual signs of the measure word, using a metaphor, explicit teaching of measure words during mathematics lessons, prompting through corrective feedback) all require changing the flow of content teaching to incorporate specific elements of focus on form. Typically, the success of the FFI intervention demonstrated in this research is mainly attributable to oral and visual enhancement,

input flood, corrective feedback (including prompt through metaphor for self-repair, and recast combined with grammar targeted activities) and production practice.

It is also evident from this research that some explicit FFI approaches appeared to suit students at the age of 10 or 11 well, as was the case for this research group. Analysis of student interview transcript data demonstrates that of all the FFI methods employed in this research, a majority of students found that the metaphor worked best in helping them to memorise both the function of measure words and the positions of measure words appropriate to the circumstances.

The data analysis indicated that among the three categories of methods (refers to Table 5.2 in Chapter Five) employed throughout the research intervention period, the metaphor method which describes a measure word as ‘glue’ (i.e., a word that sticks two things together) or ‘cement’ (as in building a house) was the one that was rated as most memorable and was mentioned by most students in their group interview. The concept of ‘glue’, or ‘cement in building a house’ clearly created an image in students’ minds, and evidently helped them to realise that when counting nouns in Chinese, “you can’t put bricks together without putting cement in between, otherwise the house will collapse” as Tim explained in recalling the need to use a measure word. Tim’s recollection of this metaphor is notable for the fact that Tim usually found Chinese grammar more challenging than most students, and did not usually remember his classroom experiences in such detail. It is therefore possible to conclude that this new metaphor FFI has proven to be effective in raising students’ awareness of the target grammar feature, as well as its function (glue the number and the noun) and position (between the number and the noun) when applied in a communicative context. Given the apparent success of this ‘metaphor FFI’, a specific recommendation around adding ‘metaphor’ to the FFI toolkit is highly recommended.

The strength of the ‘cement’ metaphor used in this research as a prompt is that it assists students to conceptualise a grammatical element which does not exist in their first language. The metaphor works as a reminder in their memory. Once noticing activities have brought learners’ focus to the form, the metaphor technique elicits students to think about the grammar, recall their knowledge and trigger access to the rule-based system, noting that recast by itself may not be sufficient to trigger the thought process through simple repetition of the sound (detailed discussion on metaphor refers to the interview data in Chapter Five).

Moreover, as it is insufficient to use input manipulation exclusively, more explicit teaching and FFI methods were also essential in conjunction with controlled production practice. White (1998) in her classroom focus on form research found that “although drawing the learners’ attention to a linguistic feature may be sufficient to speed up acquisition of that feature, implicit focus on form instruction may not be adequate in cases involving significant contrasts between L1 and L2. Furthermore, there may be a ceiling on this development basis of positive evidence available in the input. In such cases, learners may need somewhat more explicit information about the L1 – L2 contrasts in order to progress to more advanced developmental stages” (p. 106). Therefore the recommendations that can be drawn from this discussion are: firstly, where the L2 grammatical element contrasts with the students’ first language, additional explicit language instruction is likely to be required to augment FFI; and secondly, a balanced mixture of implicit and explicit FFIs covering noticing, awareness-raising and production practice is vital to the success of FFI.

7.3.5 The Importance of Language Production Practice in Enhancing Grammar Learning

A further point to emphasise here is the importance of providing opportunities for both oral and written production practice in a language environment that is as natural and meaningful as possible, noting that such opportunities best enable acquisition through internalisation of implicit linguistic competence (Paradis, 2009). In a similar vein, Swain (1985) affirmed that production forces a redirection of learners' attention from meaning to grammar. Therefore, in relation to controlled production practice, it is desirable that communicative tasks are designed in ways that assist students to apply the target form usefully and appropriately (Ellis, 2001). In real classroom settings, however, these designed communicative tasks can often be difficult to realise consistently as actual production practice. Therefore, there are advantages to ensuring that some language production exercises are grammar focused, noting that knowledge and skill is reinforced through repetition in practice. This fact further highlights the importance of taking an adaptive and iterative approach to the application of FFI. As discussed previously in chapters 4 and 5, the research FFI intervention was augmented by three, forty minute language lessons targeted specifically to help students to build their knowledge and skills in the measure-word form. As discussed in Chapter Five, these language arts lessons provided students with important opportunities to familiarise themselves with the measure word concept, and to practise the use of measure words in ways that helped them to progress towards automatic production. The benefits observed from these language arts lessons strongly suggest that the inclusion of grammar-focused language lessons to accompany content-focused FFI is very useful in helping students to become proficient in the target form.

7.3.6 Reducing Cognitive Load through Familiar Teaching Tools

Following the above discussion regarding the importance of language-production exercises to augment FFI, a further aspect that emerged from this research concerns the significance of students' familiarity with the types and procedures of specific classroom tasks and language games that were used during the research intervention, (i.e., the student group had played games '11' and 'My Aunt's Suitcase' previously, and were therefore familiar with the procedure of them). In part, the Chinese language lessons referred to at 7.3.5 above included playing games such as these. The student group was able to direct their primary focus on the accuracy of the measure-word form. Hence, the students did not need to worry about the format or the procedure of the game (how to play), and recognised them as interesting games that they enjoyed. This in itself added some degree of success to this research intervention. Thus by adapting language games and activities already known by the students and stored in their long-term memory as schemas, the cognitive load associated with the learning activity is reduced and learners' focus can be isolated onto the target form. This approach, which aligns with Cognitive Load theory, was an important factor in the effectiveness of language arts lessons in support of this FFI intervention. For detailed discussion, refer to Chapter Five.

7.3.7 The Compatibility of FFI with Content-Focused Models of Second Language Chinese Education

It is important to recognise there are considerable benefits that immersion approaches can bring to L2 teaching in terms of the benefits of extensive language exposure, of a communicative approach to teacher-student interactions and much more besides, all of which are important to successful L2 acquisition (Lyster, 2006; Ortega, 2009). The success of this FFI intervention in Chinese for L2 learners was

largely attributable to the communicative nature of the immersion model. The content-focused and communicative nature of the Mawson MIP program provided this FFI intervention with ample opportunities for Chinese language production, and hence FFI fitted well with the program in supporting students' acquisition of the measure-word form. Hence the outcome is consistent with cognitive theory, as the degree of success is dependent on the extent to which the task is communicative in nature. In other words, such FFI methods "may have been effective precisely because they are complemented in the immersion context by its communicatively rich backdrop of subject matter instruction" (Lyster, 2006, p. 52). The potential for FFI to add value depends on its deployment where tasks are communicative in nature, and hence FFI works well within an immersion context.

7.3.8 The Importance of Teaching Skills to the Effective Application of FFI

Finally, this research confirms that the important role played by immersion teachers (and, in the case of this research, the MIP mathematics teacher) in delivering a successful FFI program cannot be under-stated. In this regard, the lack of qualified bilingual teachers to meet demand from primary and secondary schools is one of the most significant challenges facing immersion/CLIL programs, particularly in Chinese. Immersion teachers not only require native-like competence in the target language and competency in language teaching but also require the ability and willingness to teach subject areas such as mathematics, science and art in the target language. As Scott observed, "the staff are under intense pressure in an innovative program like MIP and burn-out is a constant danger" (Scott, 2002a, p. 11). Clyne et al., (1995) assertion that

the teacher is the one variable that dominates all others in mediating the success of a program, [and it] is also the teacher who often carries the burden

of sole input, cultural model, innovation, persuasion, public relations, and materials development. (p. 178)

Hence the skills and efficacy of the teacher are of some importance in determining the success (or otherwise) of an immersion program. This leads to the next point: the provision of adequate training and support for immersion teachers is crucial to the ongoing success of immersion programs. At Mawson Primary School, MIP teachers have remarked on a persistent shortage of measures to provide them with program-specific knowledge and training; a fact that compounds the problems described in the above paragraph. Furthermore, as MIP teachers lack any curriculum guidelines applicable to primary-level immersion Chinese programs, they are forced to adapt as best they can. In the researcher's experience, all Chinese teachers employed in the Mawson MIP program had no previous immersion/CLIL teaching experience. Indeed, as the majority were trained as specialised language teachers, they had never worked as a classroom teacher, let alone shouldering such broad curriculum teaching responsibilities prior to working at Mawson. As proved to be the case for all teachers who had worked as a MIP immersion teachers, it can be challenging for an overseas born, native Mandarin-speaking and Australian trained Chinese L2 specialist (such as myself) to take-on a classroom teacher role where content is taught in the students' L2.

Ideally, immersion teachers should possess an understanding of both western classroom teaching fundamentals and the cultural and social expectations prevalent in Australian schools, together with an ability to develop positive rapport with students and the wider school community. There are advantages for immersion teachers to possess sufficient English skills to promote the immersion program, write reports, communicate with parents, apply for funding, and more. Risks faced by teachers

include classroom discipline issues, lack of knowledge and experience in subject teaching and teaching students from a variety of backgrounds, lack of the skills and confidence required to organise class events, provide pastoral care for students. These are just some examples from a broader list of concerns that may be addressed to ensure the continuing success of the MIP program and, no doubt, similar Chinese immersion programs.

In order to address these problems, it is recommended that release-time be provided: (i) to MIP teachers for in-service training; and (ii) to both MIP and subject teachers to ensure co-ordinated curriculum development and sufficient time to undertake other tasks required for a successful immersion program. In addition, in relation to teacher education, it seems clear from the findings of this research that education for Chinese language teachers would benefit from including an FFI component. This is already the case in some universities in languages method teacher education, including Monash University in Australia. Given both the importance of grammar to the achievement of Chinese language proficiency, and the utility of FFI approaches in targeting form, it is apparent that FFI should be an essential part of the Chinese language teacher's pedagogical toolkit. This is especially crucial for language teachers of Chinese heritage who teach Chinese in Australia. These teachers, many of whom have undertaken most of their schooling and teacher training in China, often find it challenging to adapt to the more communicative ways in which Chinese is taught in Australia (Moloney & Xu, 2012; Orton, 2011).

7.4 Research Limitations

It must be acknowledged here that the findings of this research have some limitations.

Firstly, as a number of factors have contributed to the success of the measure-word acquisition process, it is impossible to isolate a specific classroom context and attribute its specific contribution to the learning outcomes. As Batstone (2012) explained, it is possible that “it was not the task alone which was responsible for these changes, but the task as it was shaped through various aspects of the social context” (p. 461). This is why the social context is selected as research question one and emphasised in discussing the findings. As Batstone (2012) observed, every learner is predisposed to approaching learning tasks in particular ways, and sometimes learners collectively decide to approach a task in a certain way. In the case of this Mawson intervention, both the effort behind the intervention and the positive relationship between the researcher and participants helped to create a nurturing, conducive learning environment for student participants. However, while these factors may have played a small role in the research outcomes, care was taken to focus, as far as was practicable, on FFI as the key variable in designing the study in order to minimise the risk that other factors (i.e., effort in curriculum planning; the positive rapport between teachers and students), might influence the research outcomes. This was achieved by ensuring that the FFI intervention (with the exception of limited augmentation during language arts lessons), was the only change made to standard classroom practice by this research project, with all other factors remaining unchanged throughout the extended pre to post assessment period. This approach helped to ensure the credibility of the research findings.

Secondly, the conclusion that the FFI implementation had no negative impact on MIP students' mathematics (division) learning outcomes may in itself mask a further set of variables. In any mathematics class there is a range of extraneous variables that influence mathematics learning outcomes, such as differences in (i) student effort, motivation levels and learning habits; (ii) the nature and extent of parental assistance and supervision; and (iii) student aptitude for the content. Student participants in this research, as discussed in Chapter Four, generally benefit from strong family support for their participation in MIP and are quite motivated to do well. Thus the conclusion that the FFI intervention had no adverse effect on mathematics division learning outcomes (noting however that this matter was not the focus of this research), while evident through the research intervention and in the absence of any evidence to the contrary, is nonetheless difficult to prove conclusively.

Thirdly, as the FFI treatment for this project was only carried out in a term period, with one teacher and with a relatively small number of student participants in a single Chinese immersion class, this research was not intended to prove that the results are consistently transferable to other Chinese L2 education contexts. Moreover, the grammatical focus is limited to one element—the measure-word form—which is high in frequency in mathematics teaching process. It may not be so effective for lower frequency words or for other grammatical forms in particular content areas. Ideally, much more research in a wider range of Chinese L2 contexts and grammatical forms over a longer time frame is needed to fill the many knowledge gaps that remain in the application of FFI to Chinese L2 education.

Despite these limitations, the research has been able to demonstrate that a balanced application of noticing, awareness-raising and production of FFI methods, particularly the more explicit FFI approaches (i.e., those that promote learners'

attention to, raise learners' consciousness in perceiving, and provide opportunities for using, the target form in communicative context), should support significant learning gains for L2 Chinese immersion students in the Year 5 to 6 age group. Provided it is well planned and integrated into L2 curriculum, the use of FFI promises positive outcomes in building grammatical proficiency within a content-focused classroom learning context. While a more comprehensive evaluation of both the efficacy and further potential of FFI are beyond the scope of this project, it is hoped that practitioners can draw some insights about the practical aspects of integrating and applying FFI.

7.5 Areas for Further Improvement in FFI Intervention

Some areas have been identified for further improvement to the approaches used in this research to integrate FFI into the classroom.

The effectiveness of the intervention could have been further enhanced by lightening the cognitive load by narrowing the range or amount of new Chinese vocabulary at the start of the research intervention. As discussed in the FFI intervention and the data analysis chapters, at the time when the FFI intervention began, students were exposed to some new classroom instructions, new Chinese vocabulary taught during language sessions (vocabulary that was also used in mathematics questions) and new measure words all at the same time. Early in the intervention it became apparent that the combination of all this new material was quite challenging for students. At one point in the FFI intervention, it was evident that the cognitive load was too heavy for students to process. I dealt with this problem at the time by producing written signs for use by the teacher which helped her provide explicit instruction on this new vocabulary during the intervention period. However, as discussed in Chapter Five, and despite the success of this FFI intervention, for

future reference the number of (simultaneous) learning challenges faced by students would be reduced if, for example, the students were familiarised with non-measure-word vocabulary before the FFI intervention. An additional conclusion from this adaptation is that where the range of new content-related vocabulary is broadened by an FFI intervention, it is prudent to prepare written signs to assist in classroom instructions, thereby reducing the cognitive load and ensuring that the target grammatical form is isolated to the extent possible from other new L2 vocabulary.

A further enhancement concerns the times-table exercises delivered in Chinese where the addition of a measure word at the end of each number in the questions (rather than using numbers exclusively) could have further assisted students in learning the target form. For example: 八个乘以十二个等于多少? (What does 8 measure-word times 12 measure-word equal?) Such an adaptation was useful in providing a further opportunity for measure-word practice.

It was noted in hindsight that the L2 mathematics questions used in the research were all formatted in a similar way. This fact may have served to prompt students to use a common solution to solving these mathematics questions, which in turn might possibly have diverted their attention away from language comprehension. From this it can be concluded that a greater variety in the question format would be helpful in challenging students further in both their language comprehension and mathematical skills. Future FFI design could benefit by incorporating these improvements (as discussed above) in order to further enhance learning outcomes. Building further on this point, it is also recognised that there was scope for more spontaneous language production opportunities to be provided in the design of controlled-practice activities (e.g., group discussion while applying measure words).

Overall, however, noting in particular the scale of this intervention, the opportunity to expand on the variety of activities was limited in any event.

7.6 Conclusions and Recommendations for Further FFI Research

This case study project was conceived to investigate the efficacy, feasibility and methodology of applying FFI in a Chinese immersion program. Based on cognitive theory, prior FFI research findings, and consistent with Lyster's recommended approach (2004, 2006), this research employed a balanced mix of implicit and explicit FFIs, grouped into categories of noticing, awareness-raising and production practice, and applied this approach to Chinese immersion mathematics teaching lessons. The research intervention took approximately 60 minutes (across two sessions) per week of FFI treatment over a 10-week period in Term 2, 2013, to a group of 17 Year 5 and 6 (10 to 11 years old) primary school Chinese immersion students. The impetus for this research arose from the pressing need to address deficiencies in the grammatical proficiency of primary-level Chinese immersion students, specifically in this instance student deficiencies in understanding and applying the Chinese measure-word form. FFI was integrated with the aim of assisting the transformation from language concept to language skills in measure-word usage. From this research, a range of recommendations can be drawn that relate to pedagogy, curriculum planning and other elements essential to successful integration of FFI into Chinese immersion programs and, more generally, into L2 Chinese language education.

It is important to realise firstly that even though the task of measuring and comparing student learning outcomes over a short time frame is quite complex, the positive nature of the research findings was validated through post-intervention interviews, a post-assessment/test and a delayed post-assessment/test, conducted to

monitor and/or measure acquisition of the targeted grammar form. Secondly, while the researcher took on an observer role in the researcher's own class (as both immersion teacher and researcher), by ensuring the classroom FFI intervention was undertaken by a colleague, the researcher was able to observe, record and take field notes in a manner that was as objective as possible. Finally, reflection and adaptation of the approach as appropriate was a standard procedure after each FFI session and, in a more thorough way, at each stage of the research. Thus, the credibility and validity of the research findings are high.

From this project a list of factors that contributed to the success of FFI outcomes are identified, as discussed earlier in this chapter. Adequate planning is important in the success of any FFI intervention. It is crucial to incorporate FFI from the curriculum planning stage, with a dual focus on both subject content and language objectives, and to align them with the scope and sequence of the National Curriculum (in Australia, or any other required curriculum document elsewhere).

Also, in relation to the application of FFI, for the most part the range and sequencing of FFIs used in this study are consistent with Lyster's summary of FFI methods (2006, 2007) and FFI principles, most of which have been studied extensively in previous L2 research. However, the use of a metaphor to assist students in making connections between the grammatical form and their real-life experience, a technique utilised by the researcher, was itself found to be an effective method during the course of this research intervention.

In terms of the need for future FFI research in L2 Chinese, further classroom case-study research is encouraged as a means of both building the knowledge base on the application of FFI to L2 Chinese, and building the knowledge and expertise of language teachers with a passion to improve their teaching and to study further the

potential for FFI in this field. Noting that L2 Chinese teaching is less-well established in English-speaking countries than L2 teaching in other languages and has to date been neglected in the research literature relative to other languages, the discipline of Chinese language education would benefit from further research. Valuable options for further research include: exploration of the range of Chinese grammar features and how they can best be taught through FFI treatments in various content contexts; further detailed investigation on explicit and implicit instruction and how it affects L2 grammar acquisition; in-depth and comparative study of the relative efficacy of key FFI methods (e.g., prompting, recasting); and further research into the cognitive linguistic theoretical underpinnings of how each method can best stimulate L2 Chinese acquisition. Furthermore, research into the development of a systematic assessment system with scope and sequence specifically targeting the immersion model is essential. Such research would, over time, be extremely valuable to informing both L2 Chinese curriculum design and the compilation of production practice task design for classroom language teachers to adopt in their day-to-day teaching practice.

Significantly, this research could also help to elicit a wider range of Chinese grammar features that could be targeted through FFI intervention. For example, conjunctive pairs, adverbs and adjectives, particles, and passive structures fit the FFI criteria as the Chinese forms not only differ from equivalent or similar grammar features in English, but are also aspects of Chinese grammar where errors commonly occur in production and are thus amendable to enhanced instruction through FFI.

It should also be noted that additional research along the lines described above would deliver significant benefits to the profession of Chinese language teaching itself, helping to develop a more advanced and interactive community of practice

amongst practitioners, and providing expanded opportunities for undergraduate, post-graduate and in-service education and development.

Overall, with its foundations in cognitive theory, the FFI framework assisted students in transferring their knowledge from declarative to procedural, thereby attaining improved accuracy and competence in the application of measure words. In addition, Cognitive Load theory helped with pedagogical design in the classroom teaching. Through the integration and application of FFI methods, using implicit and explicit approaches (mostly briefly) during classroom interactions, plus limited augmentation through measure-word-specific instruction during Chinese language lessons, learners' production accuracy was demonstrably and significantly improved (as evidenced by a consistent growth rate in average assessed scores of 44 percent in the accuracy of measure-word usage across the student group between pre and post assessment results). The FFI intervention studied in this research proved effective in improving L2 Chinese students' measure word acquisition, progressing from a basic understanding of the grammar concept to the development of the necessary skill required for accurate and repeated productions in both controlled exercises and communicative contexts.

Furthermore, the balanced combination of noticing, awareness raising and practice approaches, employed in non-intrusive ways, did not detract from students' progress in learning mathematics content. In the process of FFI integration, scaffolding approaches within students' ZPD proved to be one of the key elements that contributed to the success of the FFI intervention. Overall, this demonstrates that language tasks and exercises tailored to target improvement of specific language forms in a communicative environment, combined with noticing and awareness-raising activities with feedback, are highly effective in language proficiency

development. Despite the challenges of measuring improvements in language proficiency and in attributing these to specific pedagogical changes, it is hoped that the positive findings of this research can make a contribution to both the theoretical discussion of the importance of FFI in the grammar teaching and acquisition process, and its practice within the classroom.

In preparing this report, the significance of this research project revealed itself in a range of different ways. Firstly, the outcomes of this study have already had some impact on language teachers and students in the Mawson Primary School MIP by providing pragmatic pedagogical methods, communicative language task designs and classroom instructions in grammar teaching. The MIP curriculum, adapted to combine the scope, sequence, language and grammar components of the Australian curriculum with MIP subject content, has been adapted to incorporate FFI into immersion teaching and has been used continuously since then to become an essential part of the MIP classroom teaching procedure.

Importantly it has also contributed to my own professional practice of Chinese language teaching since moving on from Mawson Primary School. My current secondary-level (Years 7 to 12) students are benefitting from the integration and implementation of a grammar focus informed by the research experience, which in my view is noticeably assisting them to build their grammatical production proficiency. I was invited to present my experiences in immersion language teaching to the Asia Education Foundation National Conference in August 2013, and my speech attracted some considerable interest within immersion and language education areas. I look forward to further opportunities to share my FFI knowledge and experiences with other language professionals in the future.

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APPENDIXES

Appendix A

Explanatory Statements

Dear Parents/Carers of Grade 5 and 6 Chinese Immersion Program Students:

Title: Focus on form – Developing Chinese Speaking Skills in an Immersion context

This information sheet is for you to keep.

My name is Jia Zhu and I am conducting a research project with Dr. Miriam Faine a lecturer in the Faculty of Education towards a PhD study at Monash University. This means that I will be writing an 80,000 word thesis.

I have chosen the grade 5 and 6 class students because I am currently studying the “Focus on Form” (grammar focused) approach to the immersion program in a primary school context. The school principal and the classroom teachers have expressed a strong interest in how this approach influences the development of students’ grammatical proficiency and accuracy in speaking Chinese. I would like to investigate how this approach can work with a grade 5/6 class.

The aim/purpose of the research

My study will find out the best ways to integrate grammar teaching in our content-based immersion programs to improve students’ Chinese language speaking skills.

Possible benefits

This study attempts to answer several important questions regarding the nature and theory of immersion education. It is designed to provide enhanced, extended understanding of Second Language teaching and learning in its social and educational context. It aims to benefit other language immersion programs. Hopefully this will contribute to current second language teaching and learning methodology more generally in relation to the acquisition of skills in spoken Chinese grammar.

This research will provide a good experience for students as participants of a research project, in the knowledge that their participation may hopefully inform improvements in Chinese language teaching methodology to benefit future students.

What does the research involve?

The study involves classroom observations and audio-taping, answering one questionnaire and one audio-taped group interview, plus a pre and post assessments that comprise an essential analytical step in assessing students’ learning outcomes.

How much time will the research take?

Participants will be observed in their normal classroom learning time twice per week of 20 minutes each session for 7 weeks. The pre- and post- assessment will be integrated with their existing coursework (not extra tasks); these will take 40 minutes in total of class time. One semi guided group interview conducted by the researcher with students at the end of the term will take 15 minutes, plus 15 minutes to answer a simple questionnaire about their Chinese grammar learning. Overall the study will require a total of 5 hour and 50 minutes of school term time for student participants.

Inconvenience/discomfort

No inconvenience or discomfort will be experienced by the participants, as the activities form a standard component of normal Chinese immersion lessons.

It is important to note that for the most part the research project will proceed during teachers' and students' normal school hours. It will not place any additional burden on teachers and students on top of normal class curriculum.

Payment

There will be no payment for the participation.

Can I withdraw from the research?

Participation in this study is voluntary and students are under no obligation to participate. Furthermore students may choose to withdraw from that study at any time. However, some data is collected anonymously and it will not be possible to exclude such contributions after collection. Therefore it will not be possible to withdraw non-identifiable responses and the data will remain part of the study.

Confidentiality

No students' or teachers' names will be used. Pseudonyms will be used instead. The school will also be given a pseudonym.

Storage of data

Storage of the data collected will adhere to the University regulations and kept on University premises in a locked cupboard/filing cabinet for 5 years. A report of the study may be submitted for publication, but individual participants will not be identifiable in such a report.

The data collected may also be used for future research and/or for publication of journal articles.

Results:

If you would like to be informed of the aggregate research finding, please contact Jia Zhu on 0400 043 882 or email jzhu45@student.monash.edu The findings are accessible for 2 years after its completion.

If you would like to contact the researchers about any aspect of this study, please contact the Chief Investigator: Ms. Miriam Faine	If you have a complaint concerning the manner in which this research <insert your project number here> is being conducted, please contact:
Dr. Miriam Faine Monash University Department of Education Clayton Campus, building 6 Victoria 3800 Tel: 03 9905 2781 Email: Miriam.faine@manash.edu	Executive Officer, Human Research Ethics Monash University Human Research Ethics Committee (MUHREC) Building 3e Room 111 Research Office Monash University VIC 3800 Tel: +61 3 9905 2052 Fax: +61 3 9905 3831 Email: muhrec@monash.edu

Thank you.



Jia Zhu

Dear teacher and the language assistant of the grade 5 and 6 Chinese Immersion Program:

Title: Focus on form – Developing Chinese Speaking Skills in an Immersion context

This information sheet is for you to keep.

My name is Jia Zhu and I am conducting a research project with Dr. Miriam Faine a lecturer in the Faculty of Education towards a PhD study at Monash University. This means that I will be writing an 80,000 word thesis.

I have chosen this particular group of participants because I am currently learning about “Focus on Form” (grammar focused) approach in the immersion program context in primary school levels. My school principal and the classroom teachers are very interested in how this approach influences the students’ development of grammatical accuracy in their speaking work. I would like to investigate how this approach works with a grade 3/4 class.

The aim/purpose of the research

This study will find out how Chinese grammar teaching can be integrated in our immersion programs to improve students’ Chinese language speaking skills.

- To examine how grammar focus works in the Chinese immersion setting. I will study the techniques of the grammar focus implementation and the task design. Overall, this study will examine how (teachers’ grammar teaching methods) and when (the teachers’ approach to correcting mistakes) the grammar teaching takes place in the immersion classroom context.
- Moreover, the study will explore the pedagogical and methodological aspects of classroom practice. It is intended to find out the best ways to integrate Chinese grammar teaching in the curriculum and deliver it through classroom practices such as classroom discourse and interactions, communicative tasks, natural language learning activities, etc.

Possible benefits

- This study attempts to answer several important questions regarding the nature and theory of immersion education by placing its main emphasis on both language and content acquisition. It is designed to provide enhanced, extended understanding of SL teaching and learning in its social and educational context. It hopes to draw out pragmatic experiences from a case-study approach to benefit other immersion programs and therefore to contribute to the pedagogical development of SL acquisition.
- Hopefully this work will contribute to current second language teaching and learning methodology in relation to the acquisition of skills in Chinese grammar. It is intended to strengthen the immersion approach to building learners’ language accuracy.
- This research will provide a good experience for students as participants of a research project, in the knowledge that their participation may hopefully inform improvements in Chinese language teaching methodology to benefit future students.

What does the research involve?

The study involves classroom observations and audio-taping, semi-structured interviews, discussion with the researcher about the grammar teaching and learning implementation, plus some reflection and discussions after each lesson about the FonF process.

How much time will the research take?

- Interview and discuss FonF implementation, choice of grammar features, techniques, etc., with teacher (1 hours)
- Audio-taped classroom observations for 7 weeks, twice per week (4 hours and 40 minutes)
- Audio-taped discussions and reflections after each classroom observation with the teacher and the assistant regarding the lesson process (around 2 hours and 20 minutes)
- Semi-guided group interview and a in classroom questionnaire (30 minutes in total)
- Pre and post assessments (40 minutes)

9 hours and 10 minutes in total of teachers' time within a term.
Inconvenience/discomfort

It is important to note that for the most part the research project will proceed during teachers' and students' normal school hours. It will not place any additional burden on teachers and students on top of normal class curriculum.

Payment

There will be no payment for the participation.

Can I withdraw from the research?

Participation in this study is voluntary and you are under no obligation to participate. Furthermore you may choose to withdraw from this study at any time. However, some data is collected anonymously and it will not be possible to exclude such contributions after collection. Therefore it will not be possible to withdraw non-identifiable responses and the data will remain part of the study.

Confidentiality

No students' or teachers and language assistant' names will be used. Pseudonyms will be used instead. The school will also be given a pseudonym.

Storage of data

Storage of the data collected will adhere to the University regulations and kept on University premises in a locked cupboard/filing cabinet for 5 years. A report of the study may be submitted for publication, but individual participants will not be identifiable in such a report.

The data collected may also be used for future research and/or for publication of journal articles.

Results see my comment above

If you would like to be informed of the aggregate research finding, please contact Jia Zhu on 0400 043 882 or email jzhu45@student.monash.edu

The findings are accessible for 2 years after its completion.

If you would like to contact the researchers about any aspect of this study, please contact the Chief Investigator: Dr. Miriam Faine	If you have a complaint concerning the manner in which this research <insert your project number here> is being conducted, please contact:
Dr. Miriam Faine Monash University Department of Education Clayton Campus, building 6 Victoria 3800 Tel: 03 9905 2781 Email: Miriam.faine@manash.edu	Executive Officer, Human Research Ethics Monash University Human Research Ethics Committee (MUHREC) Building 3e Room 111 Research Office Monash University VIC 3800 Tel: +61 3 9905 2052 Fax: +61 3 9905 3831 Email: muhrec@monash.edu

Thank you.



Jia Zhu

Appendix B

Consent Forms

Consent Form - Year 5/6 Chinese Immersion Program Staff:

Title: Focus on form – Developing Chinese speaking skills in an immersion context

NOTE: This consent form will remain with the Monash University researcher for their records

I agree to take part in the Monash University research project specified above. I have had the project explained to me, and I have read the Explanatory Statement, which I may keep for my records. I understand that agreeing to take part means that:

I agree to be interviewed by the researcher Yes No

I agree to allow the interview to be audio-recorded Yes No

I agree to take part in the classroom observation by the researcher Yes No

I agree to allow the classroom observation to be audio-recorded Yes No

I agree to take part in discussion and reflection regarding this Chinese grammar research project Yes No

I agree to allow the discussion and reflection to be audio-recorded Yes No

I agree to administer the 'Questionnaire Form' to the participating students. Yes No

I will provide explanations to and assist students as appropriate. Yes No

I agree to attend the semi-guided interview conducted by the researcher with my students at the end of the data collection period. Yes No

I agree to allow the interview to be audio-recorded Yes No

I understand that my participation is voluntary, and that I can choose not to participate in part or all of the project. I also note that I can withdraw at any stage of the project without being penalised or disadvantaged in any way, however, any non-identifiable data will remain part of the study as it is not possible to identify an individual's contribution to exclude it.

I understand that any data that the researcher extracts from the interview, questionnaire for use in reports or published findings will not, under any circumstances, contain names or identifying characteristics of students or staff.

I understand that I will be given a transcript of data concerning me for my approval before it is included in the write up of the research.

I understand that any information I provide is confidential, and that no information that could lead to the identification of any individual will be disclosed in any reports on the project, or to any other party.

I understand that data from the observation, interview, questionnaire and my tests will be kept in a secure storage and accessible to the research team. I also understand that the data will be destroyed after a 5 year period unless I consent to it being used in future research.

Name: _____

Signature: _____

Date: _____

NOTE: This consent form will remain with the Monash University researcher for their records

I agree to allow my child to take part in the Monash University research project specified above. I have read the Explanatory Statement, which I may keep for my records. I understand that agreeing to take part means that:

- I consent to my child participating in the semi-guided group interview and to being interviewed by the researcher Yes No
- I agree to allow the interview to be audio-recorded Yes No
- I permit my child to take part in classroom observation by the researcher Yes No
- I agree to allow the classroom observation to be audio-recorded Yes No
- I give my consent to my child to complete the questionnaire form relating to this project Yes No
- I agree to my child taking part in pre and post assessment about this Chinese grammar research project Yes No

I understand that my child's participation is voluntary, and that my child can choose not to participate in part or all of the project. I also note that I can withdraw my consent at any stage of the project without being penalised or disadvantaged in any way, however, any non-identifiable data will remain part of the study as it is not possible to identify an individual's contribution to exclude it.

I understand that any data that the researcher extracts from the interview, questionnaire for use in reports or published findings will not, under any circumstances, contain names or identifying characteristics of students or teaching staff.

I understand that I will be given a transcript of data concerning my child for my approval before it is included in the write up of the research.

I understand that any information that my child contributes is confidential, and that no information that could lead to the identification of any individual will be disclosed in any reports on the project, or to any other party.

I understand that data from the observation, interview, questionnaire and my child's tests will be kept in a secure storage and accessible to the research team. I also understand that the data will be destroyed after a 5 year period unless I consent to it being used in future research.

Student's name: _____

Signature of Parent/Guardian: _____ **Date:** _____

Name of Parent/Guardian: _____

Appendix C

Data Collection – Classroom Observation Sheet (Field Note)

Date and time School term 2	Content focus	Form of activity	Situation prompting FFI intervention	Grammar focus	Method	Purpose	Process of the FFI Intervention	Outcome
17/05/2013 10:00 to 10:30 am (30 minutes) School week 3	Mathematics classroom teaching and learning	Teacher controlled classroom teaching approach	Missing the “MW” in students’ sentences (speaking)	Measure words (MW) 个, 本	4,5, 1,2,3, 1,4,4, 4,6.	Indication there is a mistake been made.	Teacher	Reproduction of the sentence correctly
23/05/2013 10:00 to 10:30 am (30 minutes) School week 4	Mathematics classroom teaching and learning	Group work	Missed mw in production	Mw: 辆, 只	5,6,7,1,3,5,2, 4,4,6.	Encourage students to correct their own mistakes	Classroom instruction; T and S Interaction	Correct mw production

FFI Method

1. Visual stress: sign the mw.
2. Changing of tone (intonational stress) to indicate there is an error made, to signal students to pay attention and correct it.
3. Stress the MW in teacher’s speech.
4. High light the MW in teacher’s writing (on board).
5. Bold or changing the colour of the print the MW in reading materials.
6. Students’ self-corrections on MW.
7. Teacher prompted student’s self-correction in reproduction of the MW.
8. Provide time and linguistic clues to prompt students’ self-correction.
9. Corrective feedback.

Appendix D

Immersion Curriculum 2010 (prior to this research)

Subject: Chinese MIP

Grade: 5/ 6

Term: 1, Year: 2010

Organizational focus:

Chinese Culture and more of Character Writing

Main Topics:

Subjects, Time Reading, Calendar, Weather, Food, Drink and Diary writing

Curriculum (Language) Focus	Suggested Activities	Learning Outcomes	Assessment	Resources
Listening: Demonstrate comprehension of approximately six to eight items of factual information (e.g., in descriptions, reports, accounts), a sequences of events and a set of instructions	<ul style="list-style-type: none"> • Listening to a story and answering questions • True or false questions • Bingo words game • Memory game 	<ul style="list-style-type: none"> • Select key items of information • Identify a sequence of events in a simple narrative or an itinerary of a journey • Respond correctly to instructions for completing an action • Identify connections between ideas • Distinguish the tone of homophones 	Continuous assessment of individual and whole class tasks in writing, reading, listening and speaking skills	<ul style="list-style-type: none"> • Language Other Than English curriculum and standards framework 2 • Book ‘ Ni Hao’ students book and practice book • Chinese Made Easy • Activity book
Speaking: Ask for and provide information about self and others (e.g., attributes, preferences and plans), express feelings and preferences, and exchange factual information (e.g.,	<ul style="list-style-type: none"> • Summarise • Describe • Introduce • Making posters and try to say them in Chinese 	<ul style="list-style-type: none"> • Complete an information exchange in a role play with one item of information • Express preferences in response to questions • Formulate questions to obtain key information 	Pupils ability to ask for and provide information about self and others and to request and give information	<ul style="list-style-type: none"> • Chinese readers • Story books

time, date, and place. Price, colour)		<ul style="list-style-type: none"> • Provide a single sentence explanation for a choice, preference, future plan and in response to questions 		
<p>Reading:</p> <p>Identify key items of information (e.g., about a person, place, sport, animal) in a text of approximately 12 sentences and use the information in different forms (e.g., to create a poster, carton, or group items for a labelled chart)</p>	<ul style="list-style-type: none"> • Read and retell • Simple story reading • Character reading 	<ul style="list-style-type: none"> • Select and use key items of information to complete a poster, chart or respond to questions • Locate key information to complete a table or chart • Identify words and phrases linking ideas in a text • Read aloud texts containing familiar characters, with correct pronunciation, intonation and phrasing 	<p>Classroom observation pupils' capacity to read correctly</p> <p>Teacher notes pupils' ability to identify words and phrases as meaningful units</p>	<ul style="list-style-type: none"> • Chinese readers • Story books
<p>Writing:</p> <p>Write a factual or imaginative text of approximately six to ten linked sentences (e.g., narrative, weather report) and complete tables and grids, with information obtained from spoken and written texts</p>	<ul style="list-style-type: none"> • Write a Diary • Write a story • Make words search • Character writing tasks • Book making on a set topic • Project: My Day 	<ul style="list-style-type: none"> • Use correct word order • Use Chinese letter writing conventions correctly 	<p>Pupils' ability to use a class word bank and dictionaries to check, correct and enhance writing</p> <p>Use appropriate punctuation to link ideas when writing more than two sentences</p>	

Appendix E

Lesson Plan 1 (Data collection weeks 1 and 2): Language and Mathematics

Content:

- Revise the concept of ‘splitting a number equally’ using diagrams and blocks.
- Develop students’ breaking-up strategies to divide two-and three-digit numbers.
- Describing place value in Chinese
- Revise times tables and two-digit division in Chinese.
- Extension work: mental computation of multiplication and division in Chinese.
- Using school related vocabulary in solving mathematical questions.

Cognition:

- Develop students’ understanding in basic division concept.
- Provide the opportunities for students to notice the MWs when describing in the context of numbers and nouns.
- Using connective phrases to state reasons and results.

Culture:

- Introducing Chinese currency system in the context of ‘remainders’: explain ‘块 kuai or 元 yuan (dollar), 角 jiao (ten cent), 分 fen (cent)’.

Communication:

Language of learning: see attachment

Key vocabulary in Chinese under the topic of school and learning: see attachment

Common Chinese vocabulary used in the context of division: see attachment

Language for learning:

Connective phrases to explain reasons and connections: see attachment

Describe mathematical terms in Chinese: see attachment

Language through learning:

MW words usage: see attachment

Language used in division context: see attachment

Revise language in school and learning context in content learning: see attachment

Lesson plan 2 (Data collection weeks 3 and 4): Language and Mathematics

Content:

- Revise times tables and two-digit division in Chinese.
- Reinforce students' understanding in division by relates to their real-life experience.
- Making up division questions in Chinese to revise division concept.
- Practice solving division questions.
- Extension work: mental computation of multiplication and division in Chinese.
- Using school related vocabulary in solving mathematical questions.

Cognition:

- Develop students' understanding in breaking-up strategy and preparation for written methods.
- Raise learners' awareness of the basic Measure Words usage.
- Revise the use of connective phrases in mathematical problem solving questions.

Culture:

- Mental computation in division in the context of Chinese currency.

Communication:

Language of learning:

Key vocabulary in Chinese under the topic of school and learning:

Common Chinese vocabulary used in the context of division:

Language for learning:

Questions forms in Chinese in the schooling context:

Connective phrases to explain reasons and connections:

Describe mathematical terms in Chinese:

Language through learning:

Measure Words usage:

Language used in division context:

Revise language in school and learning context in content learning

Lesson plan 3 (Data collection weeks 5 and 6): Language and Mathematics

Content:

- Discuss about interrelations between multiplication and division: show two price tags to students:
商店 A (shop A): 五本书 ¥45 块 (5 books for \$45), 商店 B (shop B) 三本书 ¥36 块 (3 books for \$36 dollars), state that the price tags are for the same book, but different shops selling them in different price, ask them which book shop is cheaper?
- Identify solutions for ‘amount left over’.
- Explore different strategies to solve division questions.
- Split the dividend to divide 块 kuai (dollars) and 分 fen (cents).
- Revise times tables and two-digit division in Chinese.
- Extension work: mental computation of multiplication and division in Chinese.
- Using school related vocabulary in solving mathematical questions.

Cognition:

- Develop students’ understanding in basic division concept.
- Provide the opportunities for students to practice and reinforce the use of MWs when describing in the context of numbers and nouns.
- Using connective phrases to state reasons and results.

Culture:

- Buy and sell in Chinese.

Communication:

Language of learning:

Key vocabulary in Chinese under the topic of school and learning:

Common Chinese vocabulary used in the context of division:

Language for learning:

Connective phrases to explain reasons and connections:

Describe mathematical terms in Chinese:

Language through learning:

MW words usage:

Language used in division context:

Revise language in school and learning context in content learning

Lesson plan 4 (Data collection weeks 7 and 8): Language and Mathematics

Teaching Objectives specifically for the 2 sessions of the unit:

Content:

- Develop students' understanding in dividing and multiplying by 10.
- Explore different strategies to solve division questions.
- Split the dividend to divide 块 kuai (dollars) and 分 fen (cents).
- Large number divisions in Chinese.
- Extension work: dividing two-digit numbers, mental computation of multiplication and division in Chinese.
- Using school related vocabulary in solving mathematical questions.

Cognition:

- Develop students' understanding in basic division concept.
- Provide the opportunities for students to practice MW usage when describing in the context of numbers and nouns.
- Build students' MW knowledge linguistically without the learning context to strengthen the grammar knowledge.
- Using connective phrases to state reasons and results.

Culture:

- Buy and sell in Chinese.

Communication:

Language of learning:

Key vocabulary in Chinese under the topic of school and learning:

Common Chinese vocabulary used in the context of division:

Language for learning:

Connective phrases to explain reasons and connections.

Describe mathematical terms in Chinese.

Language through learning:

MW words usage:

Language used in division context:

Revise language in school and learning context in content learning

Appendix F

5/6 MIP Thursdays, Fridays Working Schedule

	Thursdays	Fridays
9:00 – 9:30 am	Attendance (marking roll) Circle time: School Values and any issues need to be discussed or revision of learning	Attendance (marking roll) Circle time: Chinese revision, Mathematics mental computation, language games
9:30 – 10:00 am	Chinese language teaching and learning Vocabulary, sentences, comprehension, listening, speaking, reading and writing	Environmental study
10:00 – 10:15am	Fruit time	Fruit time
10:15 – 10:30am	Chinese literacy	Mathematics in Chinese teaching and learning
10:30 – 11:00 am	PE in Chinese	
11:00 – 11:30 am	Recess	Recess
11:30 – 1:00 pm	<ul style="list-style-type: none"> • Mathematics in Chinese • Science in Chinese • History and cultural study • Chinese language exercise, group activities • Arts and cultural study • Research project • P.E (above activities will rotate from week to week according to the curriculum content)	11:30 – 12:00 am PE in Chinese
		12:10 – 1:00 pm School assembling
1:00 – 2:00 pm	Lunch	Lunch
2:00 – 3:00 pm	<ul style="list-style-type: none"> • Language games • Art and craft • Revisions • Completing work tasks • Explain home works • Watch or listen to Chinese stories 	<ul style="list-style-type: none"> • Class meeting • Waste wise • SRC meeting • Gardening group • The rest of class may complete work and cleaning up...
	Staff meeting	

Appendix H

End of Semester Test (Immersion Mathematics Component)

shù xué kǎo shì
数学考试 End of Semester Mathematics Test 2013

míngzì
名字: _____

rìqī
日期: _____

Section 1:

a) 三十除以五等于多少?

b) 2322除以9等于多少?

Section 2:

a) $8 \overline{)72}$

b) $7 \overline{)392}$

c) $4 \overline{)36}$

Section 3:

a) 四本科学书¥九十二块钱，一本多少块钱?

b) 我的学校有二百〇七个学生，九个班，每个班平均有多少个学生?

c) 法语书¥19一本，小红有¥85块钱，她能买几本法语书?

Section 4: Extension questions:

a) $26 \overline{)2028}$

b) xiǎo míng jīn nián kǎo shì kǎo dé hěn hǎo tā shù xué dé le bā shí jiǔ fēn yīng yǔ dé le jiǔ shí fēn
小明今年考试考得很好，他数学得了八十九分，英语得了九十分，

wù lǐ qī shí liù fēn huà xué qī shí èr fēn zhōng wén bā shí sān fēn tǐ yù jiǔ shí wǔ fēn dì lǐ
物理七十六分，化学七十二分，中文八十三分，体育九十五分，地理

bā shí sì fēn xiǎo míng de píng jūn fēn shì duō shǎo tā nǎ mén kè kǎo dé zuì hǎo nǎ mén kè kǎo
八十四分，小明的平均分是多少？他哪门课考得最好？哪门课考

de zuì chà
得最差？

End of the test

Appendix I

End of Semester Test (Mathematics Presentation Component)

shù xué jiǎng yǎn

数学讲演 Mathematics Presentation

míng zì

名字: _____

wèn tí

问题 your question:

jiě tí

解题 working out the answer:

dá àn

yīn wéi

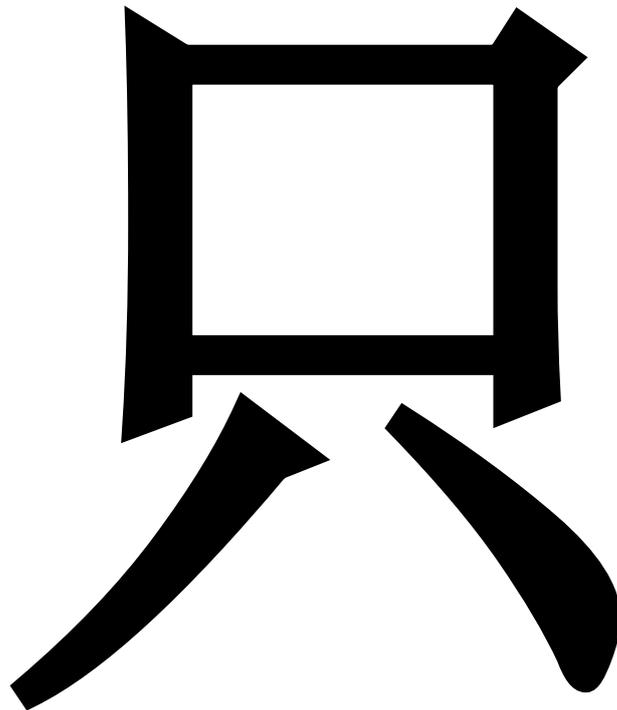
suǒ yǐ

答案 answer: (因为 ... 所以 ...)

Appendix K

Example of a Measure Word Flashcard (with Common Measure Words)

z h ī



g è kǒu mén bēi

个 口 门 杯

zhāng jié tiáo cì

张 节 条 次

běn jiān kuài kè

本 间 块 课

Appendix L
Immersion Mathematics Exercise Sheets

shù xué liàn xí
数 学 练 习 (Mathematics Exercises)

rì qī
日期:

míng zì
名 字:

莫森小学有 207 个学生，9 个班，每个班平均有多少个学生？

图书馆买了 150 本书，分给 10 个班，每个班有多少本书？

shù xué wèn tí
数 学 问 题 Mathematics work sheet

xué shēng xìng míng
学 生 姓 名 _____

- tú shū guǎn jīn nián yòng jiǔ shí liù kuài qián mǎi zhōng wén shū měi běn shū shí èr kuài zhè gè
1. 图 书 馆 今 年 用 ¥ 九 十 六 块 钱 买 中 文 书 ， 每 本 书 ¥ 十 二 块 ， 这 个
tú shū guǎn mǎi le jǐ běn zhōng wén shū
图 书 馆 买 了 几 本 中 文 书 ？

- zhōng guó de xué xiào měi tiān shàng bā jié kè sì shí wǔ fēn zhōng yī jié kè xué shēng men yī
2. 中 国 的 学 校 ， 每 天 上 八 节 课 ， 四 十 五 分 钟 一 节 课 ， 学 生 们 一
tiān shàng jǐ gè xiǎo shí de kè
天 上 几 个 小 时 的 课 ？

- xiǎo míng jīn nián kǎo shì kǎo dé hěn hǎo tā shù xué dé le bā shí jiǔ fēn yīng yǔ dé le jiǔ shí
3. 小 明 今 年 考 试 考 得 很 好 ， 他 数 学 得 了 八 十 九 分 ， 英 语 得 了 九 十
fēn wù lǐ qī shí liù fēn huà xué qī shí èr fēn zhōng wén bā shí sān fēn tǐ yù jiǔ shí wǔ fēn
分 ， 物 理 七 十 六 分 ， 化 学 七 十 二 分 ， 中 文 八 十 三 分 ， 体 育 九 十 五 分 ，
dì lǐ bā shí sì fēn xiǎo míng de píng jūn fēn shì duō shǎo tā nǎ mén kè kǎo dé zuì hǎo nǎ
地 理 八 十 四 分 ， 小 明 的 平 均 分 是 多 少 ？ 他 哪 门 课 考 得 最 好 ？ 哪
mén kè kǎo dé zuì chà
门 课 考 得 最 差 ？

- xiǎo hóng de wài yǔ kǎo shì yī gòng yǒu dào tí tīng dú shuō xiě píng jūn měi xiàng yǒu duō
4. 小 红 的 外 语 考 试 一 共 有 36 道 题 ， 听 ， 读 ， 说 ， 写 平 均 每 项 有 多
shǎo dào tí
少 道 题 ？

- yīn wéi xué xiào de tǐ yù guǎn yī gòng kě yǐ yǒu gè rén zhè gè xué xiào yī gòng yǒu gè
5. 因 为 学 校 的 体 育 馆 一 共 可 以 有 120 个 人 ， 这 个 学 校 一 共 有 12 个
bān měi bān píng jūn gè rén suǒ yǐ yī cì néng yǒu jǐ gè bān qù zhè gè tǐ yù guǎn
班 ， 每 班 平 均 24 个 人 ， 所 以 ， 一 次 能 有 几 个 班 去 这 个 体 育 馆 ？

sì běn kē xué shū jiǔ shí èr kuài qián yī běn duō shǎo kuài qián
6. 四本科学书¥九十二块钱，一本多少块钱？

liù běn měi shù shū qī shí èr kuài qián yī běn duō shǎo kuài qián
7. 六本美术书¥七十二块钱，一本多少块钱？

fǎ yǔ shū yī běn xiǎo hóng yǒu kuài qián tā néng mǎi jǐ běn fǎ yǔ shū
8. 法语书¥19一本，小红有¥85块钱，她能买几本法语书？

xué xiào tú shū guǎn yī gòng yǒu běn shū rú guǒ wǒ men bān yǒu gè tóng xué jiè shū měi
9. 学校图书馆一共有326本书，如果我们班有9个同学借书，每
gè rén jiè jǐ běn shū
个人借几本书？

gè xué shēng gè bān měi gè bān duō shǎo gè xué shēng
10. 312个学生，12个班，每个班多少个学生？

gè zú qiú fēngěi gè bān měi gè bān duō shǎo gè zú qiú
11. 128个足球，分给16个班，每个班多少个足球？

shù xué liàn xí tí
数学练习题

rì qī
日期: _____

xué shēng míng zì
学生名字: _____

zài xué xiào měi tiān yī gòng yǒu liù gè xiǎo shí de xué xí shí jiān rú guǒ měi jié kè shì sì shí wǔ fēn
1. 在学校, 每天一共有六个小时的学习时间, 如果每节课是四十五分

zhōng zǎo fàn shì sān shí fēn zhōng wǔ fàn shí jiān shì liù shí fēn zhōng yī tiān néng yǒu duō shǎo jié kè
钟, 早饭是三十分, 午饭时间是六十分, 一天能有多少节课?

wǒ mèi mèi xǐ huān yīn lè kè hé měi shù kè tā měi gè xīng qī yǒu liǎng jié yīn lè kè sān jié měi shù kè
2. 我妹妹喜欢音乐课和美术课, 她每个星期有两节音乐课, 三节美术课

tā yī gè xīng qī yī gòng yǒu jǐ gè xiǎo shí xué yīn lè jǐ gè xiǎo shí xué měi shù
, 她一个星期一共有几个小时学音乐, 几个小时学美术?

wǒ de xué xiào yǒu èr bǎi líng qī gè xué shēng jiǔ gè bān měi bān píng jūn yǒu duō shǎo gè xué shēng
3. 我的学校有二百〇七个学生, 九个班, 每班平均有多少个学生?

rú guǒ zhè gè xué xiào yǒu 16 jiān jiào shì 416 gè xué shēng měi jiān jiào shì píng jūn yǒu duō shǎo gè xué shēng
4. 如果这个学校有16间教室, 416个学生, 每间教室平均有多少个学生?

tú shū guǎn jīn nián yòng yuán jiù shí liù kuài qián mǎi zhōng wén shū měi běn shū shì èr kuài zhè gè tú shū
5. 图书馆今年用¥九十六块钱买中文书, 每本书¥十二块, 这个图书

guǎn mǎi le jǐ běn zhōng wén shū
馆买了几本中文书?

zhōng guó de xué xiào měi tiān shàng bā jié kè sì shí wǔ fēn zhōng yī jié kè xué shēng men yī tiān shàng

6. 中国的学校，每天上八节课，四十五分钟一节课，学生们一天上

jǐ gè xiǎo shí de kè

几个小时的课？

xiǎo míng jīn nián kǎo shì kǎo dé hěn hǎo tā shù xué dé le bā shí jiǔ fēn yīng yǔ dé le jiǔ shí fēn wù

7. 小明今年考试考得很好，他数学得了八十九分，英语得了九十分，物

lǐ qī shí liù fēn huà xué qī shí èr fēn zhōng wén bā shí sān fēn tǐ yù jiǔ shí wǔ fēn dì lǐ bā shí

理七十六分，化学七十二分，中文八十三分，体育九十五分，地理八十

sì fēn xiǎo míng de píng jūn fēn shì duō shǎo tā nǎ mén kè kǎo dé zuì hǎo nǎ mén kè kǎo dé zuì chà

四分，小明的平均分是多少？他哪门课考得最好？哪门课考得最差？

xiǎo hóng de wài yǔ kǎo shì yī gòng yǒu dào tí tīng dú shuō xiě píng jūn měi xiàng yǒu duō shǎo dào tí

8. 小红的外语考试一共有36道题，听，读，说，写平均每项有多少道题？

yīn wéi xué xiào de tǐ yù guǎn yī gòng kě yǐ yǒu gè rén zhè gè xué xiào yī gòng yǒu gè bān měi bān

9. 因为学校的体育馆一共可以有120个人，这个学校一共有7个班，每班

píng jūn gè rén suǒ yǐ yī cì néng yǒu jǐ gè bān qù zhè gè tǐ yù guǎn

平均24个人，所以，一次能有几个班去这个体育馆？

Appendix M
Measure Word Application Assessment

日期_____，

名字:_____

Please high-light the measure words and write the English meaning for each phrase:

1. sān zhī yáng 三只羊 _____
2. liǎng zhī gǒu 两只狗 _____
3. liù jiān bàn gōng shì 六间办公室 _____
4. yī gè lǐ táng 一个礼堂 _____
5. yī gè tú shū guǎn 一个图书馆 _____
6. sān qiān wǔ bǎi liù shí èr běn shū 三千五百六十二本书 _____
7. qī kǒu rén 七口人 _____
8. èr shí wǔ gè xué shēng 二十五个学生 _____
9. bā jiān jiào shì 八间教室 _____
10. shí jiǔ gè bān 十九个班 _____
11. sì bǎi gè xué xiào 四百所学校 _____
12. liù gè péng yǒu 六个朋友 _____
13. jiǔ mén kè 九门课 _____
14. shí gè lǎo shī 十个老师 _____
15. bā gè xué kē 八个学科 _____

Appendix N
End of Year Test – Year 5/6 MIP

kǎoshì
考试

xìngmíng
姓名：

一. 请写中文: (Please write the Chinese for these words and sentences):

go:

how:

what:

museum:

Beijing university:

hospital:

music lesson:

geography:

history:

why:

where:

I am sick:

cold:

sore throat:

cough:

headache:

diarrhoea:

fever:

What has happened (in what way that you are not feeling well)?

You need to drink lots of water, eat an apple:

I have sports and Chinese lessons today:

I learn eight subjects this year:

How do I get to the Summer Palace?

My brother study Mathematics, History, Science, English and Art, he has five subjects:

shùxué
二. 数学 Mathematics:

1. 学校图书馆要买890本中文书, 每本书二十六块钱, 图书馆一共要用多少钱买这些书?
tú shū guǎn
2. 我的班有25个同学, 我们学校一共有八个班, 学校有多少个学生?
3. 爸爸买了九本中文书, 每本32¥, 他一共用了多少钱?
4. 三十六乘以九等于多少?
5. 658除以2等于多少?
6. 三十二乘以八等于多少?
7. 三七九九加五六九〇等于多少?
8. 9413减543等于多少?

三. Please read the scenarios carefully and write a paragraph for each question in Chinese:

1. You just arrived in Bei Jing from Australia, you meet a student in Bei Jing University, her name is Ming Ming. Can you introduce yourself and tell her about your name, family, where you live, subjects you learnt this year and your favourite subject, plus, activities you do after school, e.g., sports, etc.
2. In Bei Jing, you want to go the museum, how would you ask for directions?
3. You got sick in Bei Jing, you need to tell the doctor about your symptoms, can you write about what will you tell the doctor?
4. **Write about your visit to Shanghai University: you went to Shanghai University for a visit; there are 5 libraries, 459 classes and 2 swimming pools, 4 basketball courts, 3 soccer courts in the university. You bought 24 books in the university shop.**

Appendix O

A Brief Introduction of Student Participants

There are five students in grade 6:

Paul's father is from an English speaking Angelo background; his mother is from a Chinese ethnic background and speaks conversational Chinese, as she migrated to Australia when she was very young. English is the language spoken at home. Paul is eleven years old and has learnt Chinese LOTE for three years from Kindergarten to Grade 2. He is in his fourth year in MIP, having attended from grade three to grade six. Paul is a happy, easy-going, focused MIP student who is doing very well in all areas of his learning. Paul likes sports and sometimes he likes to chat with his friends during class times. Paul's Chinese language skills have developed to a competent level, as assessed against the MIP curriculum, and he received an A in speaking, reading, listening and writing Chinese.

Amanda is eleven this year. Her mother is a native Chinese speaker from China and her father is an Anglo-Australian. Both parents work full-time. English is the language she speaks at home and school, as Amanda describes in her Questionnaire Sheet: "I am a half Chinese on my mother's side. We speak English at home, though". She occasionally hears her mother speaks Chinese on the phone, plus a couple of visits to China are all the exposure she got to the language. Amanda has learnt LOTE Chinese for 3 years and is in her fourth year of MIP. The main motivation for Amanda to attend Waratah P.S. is the school MIP program. Clearly her family sees it as a priority for Amanda to learn Chinese and she is encouraged by her parents to do well. Amanda has reached A grade in all aspects of Chinese.

Born in America, Rose is from an Anglo-European background; English is the native tongue for her family. However she spent three years in Beijing when her parents worked there, where she attended the international school in Beijing. While English is the medium of instruction at this international school, she has nevertheless had more exposure to Chinese language than any other MIP class members. She works hard in her character writing. With one and half years of LOTE Chinese learning and almost two years in MIP, Rose is very confident and fluent Chinese speaker in learnt topics. Rose is competent in four key language skills, and participated at B grade level in the class.

Tim can't sit still for more than 5 minutes, but nevertheless works hard. He can lose his focus easily during class and he plays Rugby and basketball, as well as attending Taekwondo training and swimming lessons in after school hours. He is a very honest boy with a warm heart. His Chinese written skills are good, and he believes the reason for his good Chinese writing skills is that, as he used to get in trouble in his previous MIP class, he was made to produce many extra pages of Chinese writing during his lunch times. Despite Tim's very good skills in written Chinese, his speaking, reading and listening skills are just average for the class. Both Tim's parents are from UK, so English is the native tongue for Tim and his family. Tim started learning Chinese in LOTE from Kindergarten year to Grade 2 for three years and has participated in MIP for over three years to date.

Robert is eleven years old. As the school singing star, he plays guitar and sings English and Chinese songs beautifully. With a broad range of knowledge and interests, Robert likes science and sports and is very talented in spoken Chinese. As such he is confident and competent in all his verbal presentations. However, he can be easily distracted during lessons. Robert's written work is very messy, and his Chinese reading skills are average. His verbal and listening skills are confident but his

Chinese writing is below the class average. Robert is from an Anglo-European background and he has spent 3 years learning LOTE Chinese and is in his fourth year of MIP.

In Grade 5:

William is an exceptional learner, with a strong aptitude for languages. His ability in comprehension and in memorising new words, phrases and songs is extraordinary and he has attained an outstanding rank in all areas of learning. William is ten years old, but he is being extended to learn at the same standard as the year 6's in the MIP class. William speaks Chinese quite fluently, and has reached an advanced standard in Mathematics. William strives to be perfect, and expresses frustration if he makes a mistake. William comes from an Anglo-European background family, with English as his first language, and he was born in Canberra. He has learnt Chinese for three years in LOTE from Kindergarten to Grade 2 and is in his third year of MIP.

Susan is the other fantastic Chinese learner and her capacity to learn is outstanding. Susan is eleven years old and is an introverted and quiet student. She has achieved a top level in her Chinese speaking, listening, reading and writing: meeting the learning objectives of Grade 5 and works with Grade 6 students. Susan is from English and Spanish backgrounds, yet English is the first language for Susan. Apart from English, She is learning Spanish and Chinese. Three years in LOTE and two years in MIP, Susan has attained an A grade in learning Mathematics through Chinese.

Rebecca is ten years old and she is an enthusiastic learner in MIP: a loving, compassionate person who always helps others when they are in need. Rebecca is from English speaking background. She is dyslexic, finding it difficult to process instructions and having problems in her writing as well. Rebecca's Chinese level is below class average in reading, writing and she finds Mathematics a bit hard as well. Nevertheless, she tries her best in participating in learning tasks. Rebecca has been learning Chinese from Kindergarten year for two years in LOTE and three years in MIP.

George is a friendly class member and he is doing a good job in MIP. George's Mum left China when she was 9 years old; she speaks Cantonese and a limited Chinese Mandarin. George enjoys computer games and Art. Dyslexia has affected George in his academic learning. George is good at Mathematics operational skills, but low on computation and problem solving tasks. In MIP, George generally follows the class progress with an average level of achievements in speaking, listening and below average in his reading and writing. George is eleven and has been learning Chinese for six years with three years in LOTE and three in MIP to date.

Emily is ten years old and she has been learning Chinese from she was five with two years in LOTE and three years in MIP at Waratah P.S. Emily enjoys MIP learning, she is a confident speaker in both English and Chinese. Emily is a very considerate and helpful member of the class. Emily has dyslexia; in Chinese study she needs extra time and support to process teacher's instructions. However, she is confident in speaking and listening Chinese, Emily enjoys performing art and she has achieved B grade in her speaking, listening skills and C for reading and writing.

Clair's Mum is from Philippines and her father is Dutch, the home language is English, only occasionally she speaks a little bit of Tagalog at her Grandma's house. She is ten years old and like her classmates, she has been in LOTE for three years and continued to MIP for three year. Clair works very hard to get outstanding results in her MIP study. She gets self-conscious when answering questions in front of students, however she enthusiastically participates in class tasks and puts her hand up for performance in the school assembly. Overall, Clair has achieved a B grade in Chinese and Mathematics acquisition.

John (Michael) was born in Syria and he came to Australia when he was 3 years' old. He speaks Arabic and English at home. He is a bright, positive student who shows talents in Art. John started LOTE Chinese in Grade 2 for one year and moved to MIP in Grade 3, it has been 3 years since John started MIP. John has an aptitude for SL learning, especially in MIP Mathematics, it doesn't take long for John to solve a Mathematics question and he has gained B grade in his language and Mathematics components.

Peter is a very kind boy who works hard in his MIP time. He is from an Anglo-Saxon background. Peter has been in LOTE for two years and in MIP for three years. He is very interested in learning Chinese culture; enjoys listening to Chinese stories and singing Chinese songs. Peter scored C for his MIP subjects. Peter's family is very supportive in his Chinese learning, they hosted a language assistant from Chinese for a few month.

Louise is ten years old and she has been in LOTE for three years and MIP for three years. Louise works hard in her MIP days and she is an artistic student who writes Chinese characters beautifully. Louise achieved a B grade in her MIP grade last year. Language is Louise's strong subject, she finds learning Mathematics in Chinese is challenging at times, but she strives to overcome those difficulties at the end. Louise likes singing Chinese songs, dance and participates in class plays.

Fiona enjoys MIP learning and she speaks Chinese confidently. Sometimes she finds hard to concentrate for a sustainable length of time in class. She puts in lots of hard work in her Art work, wins Chinese Art competitions every year. Fiona got C for reaching class average learning outcomes. Fiona got strong support from her family and she is from an English speaking background. Fiona has been in LOTE for three years, MIP for three years. She is ten years old.

Kate likes Chinese music, she enjoys singing Chinese songs. Kate finds hard to complete class tasks within the time frame. Kate works hard in MIP, language is her strength, sometimes Mathematics is hard for her to comprehend, hence, learning Mathematics through Chinese is a huge challenge for her. As Kate expressed in her questionnaire "I get confused, sometimes". A bit below class average is where Kate is at in her MIP learning. She is ten years old, has been spending three years in LOTE and three years in MIP. Both Parents are from English speaking background.

James is ten years old and he has only been in MIP class for two years. James grew up with his father and English is their first language. As he had lots of trouble in his previous class and he was bullied by some students, he moved to the MIP class. Since then, James has been working well, tries hard to control his frustrations, working on his social issues. He started doing quite well in Chinese learning from start of the year. Music and computer games are his passions, so he often uses the Chinese learning games on the Ipad. With a friendly learning environment at 5/6 MIP, He has started to show really positive behaviour, therefore, his learning has also improved. Getting D for his language grade last year, he is performing at a level that is below the class average in language, Mathematics and other MIP subjects.

Appendix P

‘阿姨的箱子里有什么? (My Aunt's Suitcase)’ Phrase Sheet

一 二 三 四 五 六 七 八 九 十 十一

十二 十三 十四 十五 十六 十七 十八 十九 二十 一百二十八

七百六十二百一十六 一千九百六十八

liàng chē liàngqìchēzìxíngchē běnshū běnwùlǐshū

辆 车 辆 汽 车 自 行 车 本 书 本 物 理 书

běnyīngwénshū běnzhōngwénshū běnxībānyáyǔshū

本 英 文 书 本 中 文 书 本 西 班 牙 语 书

běndìlǐshū běnxiǎoshuō zhīgǒu zhīmāo tiáoyú

本 地 理 书 本 小 说 只 狗 只 猫 条 鱼

ménkègèxuékègègēgēmèimèigèshāngdiàngèxuéxiào

门 课 个 学 科 个 哥 哥 个 妹 妹 个 商 店 个 学 校

gèlǎoshīgèxuéshēnggèbāndiǎndiǎnkǒurénběnshūjiékè

个 老 师 个 学 生 个 班 点 点 口 人 本 书 节 课

jiéshùxuékèjiédìlǐkèkuàiqiánkuàiqiánkuàidiǎnjiékǒugèběn

节 数 学 课 节 地 理 课 块 钱 块 钱 块 点 节 口 个 本

ménzhīliàng tiáo

门 只 辆 条

Appendix Q

Phrase-Making Worksheet Examples

十二 ^{běnsū} 本书 ✓ 三 ^{gè mèimèi} 个妹妹 ✓ 二百一十六 ^{ménkè} 门课 ✓
 十五 ^{gè bān} 个班 ✓ 一千九百六十八 ^{mén kuài} 门块 ✓
 二 ^{kǒu rén} 口人 ✓ 十六 ^{gè gēgē} 个哥哥 ✓ 十四 ^{gè shāngdiàn} 个商店 ✓
 十一 ^{gè zhōngwénshū} 个中文书 ✓ 十九 ^{gè qìchē} 个汽车 ✓ 九 ^{běnyīngwénshū} 本英文书 ✓
 十八 ^{gè chē} 个车 ✓ 八 ^{gè xuékē} 个学科 ✓ 一百二十八 ^{běndìlǐshū} 本地理书 ✓
 七百六十 ^{gè lǎoshī} 个老师 ✓ 五 ^{tiáoyú} 条鱼 ✓ 十 ^{gè kè} 个课 ✓ 七 ^{běn} 本
 物理书 ^{wùlǐshū} 一 ^{kuài qiān} 块千 ✓ 十七 ^{běn jī} 本籍 ✓ 十三 ^{zhī māo} 只猫 ✓

四 ^{gè xuéxiào} 个学校 ✓ 十三 ^{běn wùlǐshū} 本物理书 ✓ 一 ^{běnsùxué} 本数学 ✓
 十七 ^{gè lǎoshī} 个老师 ✓ 七 ^{zhī gǒu} 只狗 ✓ 十八 ^{gè xuéshēng} 个学生 ✓
 十六 ^{zhī māo} 只猫 ✓ 一百二十八 ^{kǒu gēgē} 口哥哥 ✓ 五 ^{gè xuékē} 个学科 ✓
 十九 ^{běn yīngwénshū} 本英文书 ✓ 三 ^{běndìlǐshū} 本地理书 ✓ 二 ^{gè shū} 个书 ✓
 十四 ^{běn zhōngwénshū} 本中文书 ✓ 二百一十六 ^{kǒu mèimèi} 口妹妹 ✓
 二十 ^{kǒu rén kè qìchē} 口人课汽车 ✓ 一千九百六十八 ^{gè shāngdiàn} 个商店 ✓

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